

Exhibit 12

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

SECURITIES AND EXCHANGE)
COMMISSION,)
)
Plaintiff,)
) Case No.
v.) 20-Civ-10832 (AT) (SN)
)
RIPPLE LABS, INC., BRADLEY)
GARLINGHOUSE, and CHRISTIAN)
LARSEN,)
)
Defendants.)
_____)

CONFIDENTIAL - SUBJECT TO PROTECTIVE ORDER

VIDEOTAPED DEPOSITION OF

DR. PETER ADRIAENS

Tuesday, February 8, 2022

Reported by:
BRIDGET LOMBARDOZZI,
CSR, RMR, CRR, CLR
Job No. 220208BLO

1 UNITED STATES DISTRICT COURT
 2 SOUTHERN DISTRICT OF NEW YORK
 3

4 SECURITIES AND EXCHANGE)
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 LARSEN,)
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 Defendants.)
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 11
 12
 13
 14

15 Videotaped deposition of DR. PETER ADRIAENS
 16 taken on behalf of Plaintiff at the offices of Debevoise
 17 & Plimpton, 919 Third Avenue, New York, New York,
 18 commencing at 9:07 a.m. and ending at 6:21 p.m., on
 19 Tuesday, February 8, 2022, before Bridget Lombardozzi,
 20 CCR, RMR, CRR, CLR, and Notary Public of the States of
 21 New York and New Jersey, pursuant to notice.
 22
 23
 24
 25

A P P E A R A N C E S (All appearing remotely):

For the Plaintiff:

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REBECCA MATSUMARA, Ripple

STELLA UVAYDOVAS, SEC

JAMES BRADY, Videographer
Shereck Video Service

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WITNESS

EXAMINATION

DR. PETER ADRIAENS

BY MR. SYLVESTER

11

BY MR. WHITE

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EXHIBITS

SEC PA
NUMBER

DESCRIPTION

PAGE

Exhibit 1

Expert Report of Dr. Peter

13

Adriaens dated 10-4-21

NO BATES, 137 pages

Exhibit 2

Rebuttal Report of Dr. Peter

14

Adriaens dated 11-12-21

NO BATES, 34 pages

Exhibit 3

Expert Report of Dr. [REDACTED]

202

[REDACTED] dated 10-4-21

NO BATES, 46 pages

EXHIBITS

SEC PA NUMBER	DESCRIPTION	PAGE
Exhibit 22	Printout from XRPL.org	171
	Consensus Protections Against	
	Attacks and Failure Modes	
	NO BATES, 3 pages	
Exhibit 23	11-10-21 Status of Analysis	131
	of Halt on 11-3-21	
	NO BATES, 2 pages	
Exhibit 24	Printout from amazon.com	154
	"What is Decentralization in	
	Blockchain/"	
	NO BATES, 7 pages	

DEPOSITION SUPPORT INDEX

DIRECTION TO WITNESS NOT TO ANSWER

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18	25
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STIPULATIONS

Page	Line
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- none -	-
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PORTION MARKED HIGHLY CONFIDENTIAL

Page	Line
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- none -	-
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REQUEST FOR DOCUMENTS

Page	Line
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- none -	-
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1 - - -

2 9:07 a.m.

3 February 8, 2022

4 - - -

5 THE VIDEOGRAPHER: We're on
6 the record. The time is 9:07 a.m.
7 Today's date is February 8th, 2022.
8 This is Disk 1 of the video deposition
9 of Peter Adriaens in the matter of the
10 SEC versus Ripple Labs.

11 My name is Jim Brady. I'm
12 the videographer with Gradillas Court
13 Reporting. Today's court reporter is
14 Bridget Lombardozzi, also with
15 Gradillas Court Reporting. We're here
16 today at the office of Debevoise &
17 Plimpton, 919 Third Avenue, New York,
18 New York.

19 All attorney appearances will
20 appear on the transcript.

21 I ask now that the court
22 reporter please swear in the witness.

23 P E T E R A D R I A E N S,
24 having been duly sworn, was examined
25 and testified as follows:

1 THE REPORTER: Thank you.

2 You may proceed.

3 DIRECT-EXAMINATION

4 BY MR. SYLVESTER:

5 Q. Good morning, Professor.

6 Could you please state your name for the
7 record.

8 A. Peter Adriaens.

9 Q. And I'm Mark Sylvester. I'm an attorney
10 with the SEC, the plaintiff in this okay. I'm
11 here with my colleagues, Daphna Waxman and Jon
12 Daniels. There are other of my colleagues joining
13 us on Zoom today.

14 Are you represented by counsel here
15 today?

16 A. No, I'm not.

17 Q. Have you had your deposition taken
18 before, Professor?

19 A. Can you repeat the question?

20 Q. Sure.

21 Have you had your deposition taken
22 before?

23 A. My deposition or a deposition?

24 Q. Your deposition. Have you been deposed?

25 A. I have been deposed, yes.

1 Q. How many times?

2 A. Three or four times.

3 Q. Okay. Is there anything that would
4 prevent you from testifying fully and truthfully
5 here today?

6 A. No.

7 Q. Were you retained to provide expert
8 services in this case?

9 A. Yes, I was.

10 Q. Who retained you?

11 A. Debevoise & Plimpton and Kellogg Hansen.

12 Q. Were you retained on behalf of Ripple
13 Labs only or all defendants?

14 A. It was on behalf of all defendants.

15 Q. Okay. If I say "Ripple" today, I mean
16 Ripple Labs, the defendant in this case. Okay?

17 A. Okay.

18 Q. Are you familiar with the term "XRP"?

19 A. Yes, I am.

20 Q. Are you familiar with the term "digital
21 asset"?

22 A. Yes, I am.

23 Q. Are you familiar with the term "XRP
24 Ledger"?

25 A. Yes, I am.

1 Q. What is the XRP Ledger?

2 A. It is an open permissionless blockchain.

3 THE REPORTER: Permissless?

4 THE WITNESS: Permissionless
5 blockchain.

6 THE REPORTER: Thank you.

7 BY MR. SYLVESTER:

8 Q. Is there only one XRP Ledger or are
9 there multiple ledgers?

10 A. As far as I know, there's one XRP
11 Ledger.

12 Q. Professor, let me hand you what's been
13 marked Exhibit 1.

14 (Whereupon, exhibit is
15 received and marked SEC Adriaens
16 Exhibit 1 for identification.)

17 BY MR. SYLVESTER:

18 Q. I'm going to hand you a copy and ask
19 counsel to pass it down. There we go.

20 And, Professor, is Exhibit 1 your expert
21 report of October 4th, 2021?

22 A. Yes, it is.

23 Q. Okay. Turning to the page following
24 page 70, is that your signature on that page?

25 A. Yes, it is.

1 Q. Okay.

2 (Whereupon, exhibit is
3 received and marked SEC Adriaens
4 Exhibit 2 for identification.)

5 BY MR. SYLVESTER:

6 Q. Let me hand you what's been marked PA-2.

7 Is PA-2 your expert rebuttal report of
8 November 12th, 2021?

9 A. Yes, it is.

10 Q. And turning to the page following page
11 31 of Exhibit 2, is that your signature on that
12 page?

13 A. Yes, it is.

14 Q. Have you finished all of the work that
15 you were assigned to do in this case?

16 A. I did.

17 Q. Are you planning on providing any
18 supplemental reports?

19 A. No, I'm not.

20 Q. Okay. Who wrote Exhibit 1?

21 MR. WHITE: Objection.

22 I'm going to instruct you not
23 to answer --

24 THE REPORTER: I can't hear
25 you, sir.

1 MR. WHITE: Exhibit 1?

2 MR. SYLVESTER: Yeah. His
3 expert report.

4 MR. WHITE: You can answer
5 that question. We'll take this one at
6 a time.

7 A. I wrote the expert report.

8 Q. Okay. Did anyone help you draft Exhibit
9 1?

10 MR. WHITE: You can answer
11 that yes or no.

12 A. Yes.

13 Q. Okay. Who provided help in drafting
14 Exhibit 1?

15 A. I went through multiple iterations with
16 counsel.

17 Q. Which attorneys?

18 A. Are you asking for specific names?

19 Q. Yes.

20 A. It was multiple.

21 Q. Can you recall any of the names sitting
22 here today?

23 A. Collin White. Chris.

24 Q. Chris Ford?

25 A. Yes.

1 Lisa.

2 Q. Lisa Zornberg?

3 A. Lisa Zornberg. And others that were
4 on -- in various discussions.

5 Q. Apart from counsel, did anyone else help
6 you prepare your report?

7 A. I had one of my students or staff in the
8 Center for Smart Infrastructure Finance at the
9 University of Michigan help.

10 Q. Who is that?

11 A. The name of the student?

12 Q. Yes.

13 A. Kenneth Chung.

14 Q. Apart from Mr. Chung and counsel, did
15 anyone else help you prepare your report?

16 A. No.

17 Q. Okay. Other than yourself, did anyone
18 draft any part of Exhibit 1?

19 MR. WHITE: I'm going to
20 instruct not to answer. That gets
21 into attorney work product, so we're
22 not going to go into those details.

23 MS. SMITH: Okay. So your
24 position is that if counsel drafted a
25 portion of this expert report, that's

1 privileged?

2 MR. WHITE: Our position is
3 that work product protects the
4 drafting process and you're asking a
5 question that goes to that. So the
6 answer to that question is yes.

7 BY MR. SYLVESTER:

8 Q. Okay. Did anyone provide comments to
9 Exhibit 1?

10 MR. WHITE: You can answer
11 that question yes or no.

12 A. Yes.

13 Q. Was it all the same people that we've
14 already discussed: Ms. Zornberg, Mr. White,
15 Mr. Ford, and your student?

16 A. It was part of the same discussions,
17 yes.

18 Q. Okay. Did you incorporate counsel's
19 comments into the final version of Exhibit 1?

20 MR. WHITE: You can -- you
21 can answer that question yes or no.

22 A. Is your question did I incorporate or
23 did I consider them?

24 Q. Did you incorporate counsel's comments
25 into the final version of Exhibit 1?

1 A. You'll have to be more specific
2 regarding which comments. I considered all
3 comments that I received.

4 Q. I see.

5 Were there some comments that you
6 incorporated?

7 A. There may have been.

8 Q. Who wrote Exhibit 2?

9 MR. WHITE: Same instruction,
10 please. You can answer that question.

11 A. I did.

12 Q. Okay. Did anyone help you draft Exhibit
13 2?

14 A. The same people I referred to earlier.

15 Q. The same people you referred to that
16 helped you draft Exhibit 1, is that right?

17 A. Yes, sir.

18 Q. Okay.

19 A. Except for the student. He was not
20 involved in that one.

21 Q. I see. So counsel only.

22 A. Yes.

23 Q. Okay. Did any of your -- did any of
24 Ripple's counsel draft any part of Exhibit 2?

25 MR. WHITE: I'm going to

1 instruct not to answer that question,
2 again on the same basis.

3 Q. Did counsel provide comments to Exhibit
4 2?

5 MR. WHITE: You can answer
6 that question yes or no.

7 A. Yes.

8 Q. Did you incorporate counsel's comments
9 into the final version of Exhibit 2?

10 A. I considered them.

11 Q. Did you incorporate any of counsel's
12 comments into the final version of Exhibit 2?

13 A. I can't be specific unless we go to a
14 specific section.

15 Q. And sitting here today, do you recall
16 incorporating any of counsel's comments into
17 Exhibit 2?

18 MR. WHITE: You can answer
19 that yes or no.

20 A. Yes.

21 Q. Okay. Are all of the opinions that you
22 are offering in this case set forth either in
23 Exhibit 1 or Exhibit 2?

24 A. Yes.

25 Q. And sitting here today, do you have any

1 plans to offer any additional opinions that are
2 not in Exhibit 1 or 2?

3 A. I am not planning on offering any
4 additional opinions. However, I would like to
5 make a clarification to some of the language in
6 Exhibit 1.

7 Q. Okay. Is there an error in Exhibit 1?

8 A. There's unclear description -- unclear
9 language in the description of the methodology
10 that I used to arrive at Exhibit D.

11 Q. I see.

12 What paragraph is that?

13 A. That would be page -- page 64, paragraph
14 124, and page 65, paragraph 125.

15 Q. Okay. Thank you.

16 Is Appendix A to Exhibit 1 your CV,
17 Professor?

18 A. Yes, it is.

19 Q. And it's obviously quite lengthy, so I
20 won't ask you to review it right now.

21 So just sitting here today, are you
22 aware of any inaccuracies in your CV?

23 A. As far as I know, it was updated as of
24 October 4th, 2021.

25 Q. Okay. And is your -- strike that.

1 Does the education section of your CV
2 accurately list the degrees that you earned?

3 A. Apologies. What was the question?

4 Q. Does the education section --

5 A. Oh.

6 Q. -- of your CV accurately list the
7 degrees that you earned?

8 A. Yes.

9 Q. Okay. Have you had any formal education
10 after 1992?

11 A. As in degree? No additional degree.

12 Q. Okay. Have you taken any computer
13 science courses?

14 A. Yes.

15 Q. Okay. When did you take -- when did you
16 last take a computer science course?

17 A. Fifteen years -- I'm not exactly sure.
18 Maybe 15 years ago when I switched my career.

19 Q. Have you ever taken any course specific
20 to blockchain technology?

21 A. I teach a course on blockchain
22 technology.

23 Q. Prior to your teaching engagement, did
24 you ever take any course regarding blockchain
25 technology?

1 A. There were at that time no courses
2 available in blockchain technology.

3 Q. At the time of your formal education you
4 mean?

5 A. At the time of formal education. At the
6 time when I switched to the Business School at the
7 University of Michigan in 2006.

8 Q. Have you ever held any professional
9 licenses?

10 A. I have a professional engineering
11 license.

12 Q. Has that license ever been revoked or
13 suspended?

14 A. No, it has not.

15 Q. Have you ever been the subject of any
16 disciplinary action related to your professional
17 activities?

18 A. No.

19 Q. Okay. You've been a professor at the
20 University of Michigan since 1992?

21 A. Yes.

22 Q. Apart from the course that you just told
23 me about blockchain technology, have you ever
24 taught a computer science course at the University
25 of Michigan?

1 A. I have not taught a computer science
2 course.

3 Q. Okay. And when did you first teach a
4 blockchain technology course?

5 A. 2016.

6 Q. Okay.

7 A. I started teaching finance and financial
8 technology and blockchain courses in 2016.

9 Q. Have you ever taught a course
10 exclusively devoted to blockchain?

11 A. No. There's no such course available
12 currently at the University of Michigan.

13 Q. You've served as an expert witness prior
14 to this case, is that right?

15 A. I currently serve, yes.

16 Q. And prior to your engagement in the case
17 against Ripple Labs, you've served as an expert
18 witness in other cases?

19 A. I have, yes.

20 Q. Okay. Page 35 of your CV lists your
21 litigation expert witness work, is that right?

22 A. Yes.

23 Q. Are these seven engagements the totality
24 of your litigation expert witness work or were
25 there any other engagements?

1 MR. WHITE: Objection to the
2 form of that last question.

3 A. These were -- these were the
4 engagements, yes.

5 Q. These were all of your expert witness
6 engagements?

7 A. Yes.

8 Q. Okay. Taking a look at page 35, what
9 were the names of the cases that these engagements
10 involved for these seven assignments?

11 A. I do not exactly recall.

12 Q. You don't recall any of the names of any
13 of the seven cases?

14 A. Not of the cases, no.

15 Q. In each of these cases, did you provide
16 an expert report?

17 A. Yes.

18 Q. In any of these cases, did your expert
19 report involve blockchain technology?

20 A. No.

21 Q. Have you ever been qualified by a court
22 as an expert in blockchain technology?

23 A. By a court? No.

24 Q. Prior to this case, had you been
25 retained as an expert in any case involving

1 digital assets?

2 A. No.

3 Q. In any of these seven cases, were you
4 retained by the plaintiff?

5 A. I was not.

6 Q. In any of these seven cases, was any
7 governmental entity a party?

8 A. I don't believe so.

9 Q. Has your expert testimony ever been
10 excluded in whole or in part?

11 A. No.

12 Q. Has any portion of an expert report you
13 submitted ever been excluded in whole or in part?

14 A. Sorry. Can you repeat that question?

15 Q. Sure.

16 Has any expert report that you submitted
17 ever been excluded in whole or in part?

18 A. No.

19 Q. Has any expert affidavit that you
20 submitted as part of a case ever been excluded in
21 whole or in part?

22 A. Not that I recall.

23 Q. What are you an expert in, Professor?

24 A. I'm an expert in finance,
25 entrepreneurial business development, and

1 financial technology.

2 Q. What --

3 A. Particularly focused on applications in
4 various different digital industries.

5 Q. Do you consider yourself an expert in
6 blockchain technology?

7 A. Yes.

8 Q. When did you first learn of the
9 existence of blockchain technology?

10 A. I don't exactly recall, but it was at
11 least between five and ten years ago.

12 Q. Have you off -- strike that.

13 Have you authored any academic papers on
14 the topic of blockchain technology?

15 A. Yes.

16 Q. How many?

17 A. I'm going to have to look at my risumi.

18 Q. That's fine. Also feel free to
19 approximate. I don't need an exact number.

20 A. Probably a half dozen.

21 Q. When did you first publish a paper on
22 the topic of blockchain technology?

23 A. When you refer to "the topic of
24 blockchain technology," that is very broad.

25 Is there a specific aspect of that that

1 you want to refer to?

2 Q. Well, of the six that you just
3 mentioned, when was the first of those six
4 published?

5 A. I think 2018, I believe.

6 Q. Were any of the six that you just
7 mentioned peer reviewed?

8 A. Yes.

9 Q. All six of them?

10 A. I'm going to have to take a look at --

11 Q. Sure.

12 A. -- the six that I referred to.

13 Q. When you find the items that you're
14 looking for, Professor, will you just call them
15 out?

16 A. Yes, I will.

17 Q. Thanks.

18 A. On page 14, under "Journal Publications
19 (Published)," 4, 5, and 6. And on page 19, under
20 "Refereed Conference Papers," 3 and 4. And the
21 rest were book chapters or -- which are typically
22 not refereed, and nonrefereed abstracts.

23 Q. Were the five papers that you just
24 identified all peer reviewed?

25 A. Yes.

1 Q. Do any of your publications address the
2 topic of decentralization of blockchains?

3 A. What do you mean with addressing it?

4 Q. Is that the topic of the paper?

5 A. It is not the topic of the paper, but I
6 do bring up the concept of decentralization in
7 these papers.

8 Q. Are you familiar with the term
9 "consensus theory"?

10 A. I'm familiar with consensus.

11 Q. Okay. Do -- do any of your publications
12 address the topic of consensus?

13 A. Again, it's not the topic of the paper,
14 but it is part of the descriptions within the
15 paper.

16 Q. Okay. Are you familiar with the
17 Byzantine generals problem?

18 A. At the high level? Yes.

19 Q. Okay. Do any of your publications
20 address the topic of the Byzantine generals
21 problem?

22 A. They do not.

23 Q. Okay. Do any of your publications
24 compare the relative decentralization of two or
25 more blockchains?

1 A. Relative? Sorry. Can you repeat that
2 question?

3 Q. Sure.

4 Do any of your publications compare the
5 relative decentralization of two or more
6 blockchains?

7 A. I am not sure what the question means.

8 Q. Do any of your publications examine
9 whether one blockchain is more decentralized than
10 another blockchain?

11 A. No, they do not.

12 Q. Have you ever designed a blockchain
13 yourself?

14 THE REPORTER: Repeat.

15 MR. SYLVESTER: Sure.

16 Q. Have you ever designed a blockchain
17 yourself?

18 A. I have not.

19 Q. Have you ever contributed code to a
20 blockchain in development?

21 A. My students have. I have not.

22 Q. Thank you.

23 Have you contributed a proposed
24 improvement to an existing blockchain?

25 A. I have not.

1 Q. Okay. Is it fair to say that you began
2 to focus your professional efforts on blockchain
3 in 2015?

4 A. It became part of the teachings and
5 research, yes.

6 Q. You supervise a research group at the
7 University of Michigan?

8 A. Yes, I do.

9 Q. Does that group conduct any research on
10 consensus?

11 A. "Consensus" is a very broad question, so
12 if we could narrow -- narrow it down further.

13 Q. Sure.

14 Does your -- does your re -- the
15 research group that you supervise conduct any
16 research on the Byzantine generals problem?

17 A. No, they do not.

18 Q. How long has the Journal of Blockchain
19 Research been published?

20 MR. WHITE: Objection to
21 form.

22 You can answer if you
23 understand.

24 A. Do you mean when was it founded? When
25 was it started?

1 Q. Yes, I do.

2 A. I'm not exactly sure, but I believe it
3 is on the order of two to three years.

4 Q. It was founded two to three years ago?

5 A. I believe so, yes.

6 Q. Okay. Are you on the Journal of
7 Blockchain Research's advisory board or its
8 editorial board?

9 A. Advisory board.

10 Q. Okay. How long have you served in that
11 capacity?

12 A. I'm not exactly sure. I'm going to have
13 to think. COVID has sort of changed our -- warped
14 our time. Since before COVID, so it must have
15 been 2019.

16 Q. How were you selected to serve on the
17 advisory board of that journal?

18 A. I was a participant in a mathematical
19 conference on financial tech -- in a self-funded
20 mathematical conference on financial technology
21 that was held in Blockchain Triangle in University
22 of North Carolina, I believe. And so some of the
23 other members of that journal were present there
24 and they asked, based on my presentation, whether
25 I wanted to become a member of the advisory board.

1 Q. In paragraph 11 of your report, you
2 describe founding two start-up firms, is that
3 right?

4 A. Yes.

5 Q. Do either of the firms that you founded
6 employ blockchain technology?

7 A. They currently do not, but we're
8 exploring it in one of them.

9 Q. For the one that you're exploring, are
10 you exploring use of either XRP or the XRP Ledger?

11 A. No. This time not. No.

12 Q. In paragraph 8 of Exhibit 1, your
13 opening report, you write that you are on --
14 you're an advisory board member of two funds, is
15 that right?

16 A. Yes, until 2017. Yes.

17 Q. I see. You're not currently a -- a
18 member?

19 A. No longer, no.

20 Q. I see.

21 When you were on the advisory board of
22 those two funds, did you have any role in funding
23 a company that had created its own blockchain?

24 A. Apologies. Which paragraph are you
25 referring to?

1 Q. Paragraph 8.

2 A. Could you repeat the question, please?

3 Q. Sure.

4 When you were on the boards of those
5 funds in that capacity, did you have any role in
6 funding a company that had created its own
7 blockchain?

8 A. I'm on the advisory board of the funds
9 and the funds -- I'm going to have to go back over
10 which portfolio companies at that time were
11 actually financed by the fund. So I'm not exactly
12 clear on that question.

13 Q. You're not sure sitting here today?

14 A. I'm not sure sitting here today.

15 Q. Okay.

16 A. We have received many applications,
17 including from blockchain companies, of companies
18 that seek financing.

19 Q. Okay. When was bitcoin created?

20 A. Well, paper was published in 2008.

21 Q. When did you first learn of Ripple's
22 existence?

23 A. I'm not exactly sure. It was around the
24 time that I was serving -- during the period I was
25 serving on the fund and -- on the funds and we

1 received applications of blockchain companies and
2 start looking for blockchain companies that were
3 currently active in the market. I would say about
4 maybe a decade ago. Between five years and a
5 decade ago. Something like that.

6 Q. Was there any funding relationship
7 between either of the funds on which -- strike
8 that.

9 Was there any funding relationship
10 between the Wolverine Venture Fund and Lurie
11 Commercial -- Commercialization Fund and Ripple?

12 A. No.

13 Q. Okay. Do you own XRP?

14 A. I do not.

15 Q. Have you ever owned XRP?

16 A. No.

17 Q. Sitting here today, do you have any
18 plans to acquire XRP?

19 A. No.

20 Q. Prior to your retention in this case,
21 did you know anything about the SEC's case against
22 Ripple?

23 A. I was aware through media, media
24 disclosures and writeups and financial review and
25 sort of articles like that. Forbes. So I knew

1 about it, yes.

2 Q. Prior to your retention, had you ever
3 discussed this case with any Ripple employee?

4 A. Can you repeat that question?

5 Q. Sure.

6 Prior to your retention as an expert
7 witness in this case, had you ever discussed the
8 SEC's case against Ripple with any Ripple
9 employee?

10 A. No, I have not.

11 Q. Prior to your retention in this case,
12 had you ever met any of the lawyers representing
13 defendants in this case?

14 A. I have not.

15 Q. Okay. Are you charging defendants a fee
16 for your expert services in this case?

17 A. Yes.

18 Q. How much is your fee?

19 A. It's 750 an hour for preparation of
20 reports and 950 an hour for depositions.

21 Q. Is this your standard hourly fee for
22 expert services?

23 A. Yes.

24 Q. How much have you billed for your
25 services so far?

1 A. I have to check the exact numbers, but I
2 believe it's around 250,000.

3 Q. Have you received any of your
4 compensation in XRP?

5 A. I have not.

6 Q. Do you have any plans to receive XRP as
7 compensation for your expert services in this
8 case?

9 A. No.

10 Q. Turning back to Exhibit 1, is Appendix B
11 to your report a list of materials you considered
12 in preparing your report in addition to those that
13 are cited in the body of your report?

14 A. Yes, it is.

15 Q. Did you personally review each of the
16 materials listed in Appendix B?

17 A. I did over the time of preparing for the
18 case, yes.

19 Q. Did defense counsel provide you with all
20 of the documents listed in Appendix B?

21 A. Not all the documents.

22 Q. Which were the documents that were --
23 that you obtained other than from defense counsel?

24 A. I'm not exactly sure, but there were
25 some documents that I pulled myself because they

1 were publicly available after reading some of the
2 reports, such as, for example, the Wells report.
3 I looked at some of those footnotes and pulled
4 those myself, but they're listed here as well.

5 Q. When you say "the Wells report," do you
6 mean the "In Re: Ripple Labs Inc. Wells
7 Submission on behalf of Ripple Labs Inc."?

8 A. I believe so.

9 Q. Which documents did you procure after
10 reading Ripple's Wells submission?

11 A. I cannot be certain of that.

12 Q. Do you recall any sitting here today?

13 A. It was one of the litigation materials,
14 but I do not recall.

15 Q. Okay. Turning to --

16 A. All that were requested by me from
17 counsel.

18 Q. Okay. Turning to Appendix C, you
19 received Appendix C, the list of XRP use cases,
20 from defense counsel, is that right?

21 A. I requested this list from counsel after
22 having seen reference to a comprehensive list of
23 use cases in some of the filings, including the
24 Wells filing, I believe. And I was aware of a
25 number of cases myself. So then I, yes, did

1 request from counsel whether they had this list
2 available or a list available that I could take a
3 look at.

4 Q. Okay.

5 A. And that's this list, Appendix C.

6 Q. That's Appendix C. Okay.

7 Did you make any changes to the XRP use
8 cases list that you received from defense counsel
9 before appending it to your report as Appendix C?

10 A. Is the question did I make changes to
11 Appendix C before I appended it to the report?

12 Q. Close.

13 You received at your request a list of
14 use cases from defense counsel.

15 A. Yes. Yes.

16 Q. After receiving that list but before
17 appending it to your report, did you make any
18 changes to the list?

19 A. I did not make changes to the list, no.

20 Q. Okay. What, if anything, did you do to
21 confirm the accuracy of the information supplied
22 on Appendix C?

23 A. This was part of my work and methodology
24 listed in Appendix D. So I looked at the
25 websites. I looked at -- double-checked what

1 industries these companies -- what does it say? --
2 category, I guess, that these various different
3 companies were assigned to. So I just did spot
4 checks on those.

5 Q. Did you look at the websites for each of
6 the entity names listed on Appendix C?

7 A. That was the work that I delegated to
8 the student I referred to earlier.

9 Q. Okay. What work did the student that
10 you referred to earlier do with respect to each of
11 the entries on Appendix C?

12 A. Well, the student was really involved in
13 the methodology to extracting from this list a
14 subset that is my Appendix D. So as part of
15 arriving at Appendix D, we had to actually do a
16 review of appendix -- and an analysis of Appendix
17 C.

18 Q. And what did that student's review and
19 analysis entail?

20 A. So that goes to the methodology that I
21 describe on page 64. So the student looked for
22 each of these companies, first at which of these
23 companies had received venture rounds. So we
24 checked each of the companies as to the
25 availability of information on each of these

1 companies in Crunchbase. Crunchbase is a public
2 database where one can search companies for
3 financing, type of financing and who finances the
4 company. We also get information there on
5 founding date.

6 I used founding date in my methodology
7 as a proxy for when venture investment was
8 received by these companies relative to when XRP
9 and XRPL technology was available.

10 So that's the kind of work that he did.
11 Looked at the websites, looked at the founding
12 dates, looked at the amount of the -- capital was
13 received by these companies. And that's where I
14 need to offer a correction on my page 64.

15 Q. How does the description of the
16 methodology that you just explained differ, if at
17 all, from your description on page 64?

18 A. So I want it to be clear. The
19 methodology has not changed. It's the description
20 of the methodology that is unclear. So --

21 Q. Can you explain to me what's unclear?

22 A. So -- yes. So the methodology
23 essentially went through three steps. The first
24 step was to go to Crunchbase and look for all the
25 equity investment that each of the companies on

1 the list of 660 had received and we used it as a
2 proxy for high-growth companies among that list of
3 660. And it's bullet number 1.

4 So bullet number 2 then, out of that
5 full list, I looked at when these companies were
6 founded, and that's what I state here, to see
7 whether the companies were founded before or after
8 Ripple was founded. But as you will see, my
9 methodology, and the result of my methodology is
10 Appendix D, I included companies that were founded
11 before Ripple was founded but actually received
12 their equity capital after Ripple was founded, and
13 that piece of information is not included in
14 bullet number 2. So when I talk about the
15 founding, to look at the before and after, it's
16 really about the financing after the founding of
17 Ripple.

18 And the third bullet is as is. It's
19 really only bullet number 2 in Appendix 4.

20 And, just to be clear, the methodology
21 is what the methodology is. It resulted in my
22 Appendix D as a result of analysis of Appendix C.
23 It's just that the description was not very clear.

24 Q. Okay. So the -- the piece of your
25 methodology that in your view wasn't clearly

1 described in your existing report, Exhibit 1, is
2 that on some occasions you included companies
3 within Appendix D that were founded prior to
4 Ripple's founding?

5 A. Yes.

6 Q. Okay.

7 A. But received equity capital after
8 Ripple's founding. And that is part of the title
9 of Appendix D.

10 Q. Who prepared Appendix D?

11 A. I did together with my student.

12 Q. Other than your student, did anyone else
13 assist you with preparing Appendix D?

14 A. No. I -- regarding Appendix D, I'd like
15 to make a correction there as well --

16 Q. Sure. Go ahead.

17 A. -- in light of the correction on page
18 64, paragraph 124. And the -- the title is really
19 about use cases receiving venture capital after
20 Ripple founding. So this "and founded" is not
21 necessary in this title.

22 Q. And in some cases it's inaccurate?

23 MR. WHITE: Objection to
24 form.

25 You can answer.

1 A. It does not reflect the actual list of
2 companies that I extracted from the larger
3 database --

4 Q. Right.

5 A. -- which were founded before. So that's
6 why "and founded" is incorrect.

7 Q. I see.

8 How many of the companies listed on
9 Appendix D were founded before Ripple's founding?

10 A. I believe it was eight companies and
11 these are all with the founding date, which is the
12 last column in -- in this Appendix, in Appendix D.
13 Last column is the founding date of those
14 companies.

15 Q. I see.

16 A. So those that have founding dates before
17 2012. About eight companies.

18 Q. What's the meaning of the number to the
19 left of the date?

20 A. That's the aggregate equity capital that
21 these companies have received.

22 Q. In millions?

23 A. In millions. Sorry. Yes.

24 Q. What, if anything, did you do to confirm
25 the accuracy of the information in Appendix D?

1 A. Appendix D was the result of my
2 analysis. So it was all based on the information
3 that was found on Crunchbase. However, I was
4 notified later on in Mr. [REDACTED] report that one
5 of the companies in here had -- we referred to the
6 wrong website and, so, therefore there was
7 confusion on the name.

8 So the correction to the list really
9 came after taking a look at Mr. [REDACTED] report and
10 when he referred to one company, namely STYRA
11 Technologies. It's on page -- I guess these pages
12 are not numbered. It's page 3 of Appendix D, sort
13 of in the upper half. STYRA Technologies is not
14 the correct company. It is not the correct
15 website and that is not the correct equity capital
16 to be used.

17 So this is -- this was an erroneous
18 inclusion in that list.

19 Q. And prior to including STYRA in your
20 Appendix D, did you visit STYRA's website as
21 listed in Appendix D?

22 A. As I mentioned earlier, I worked with my
23 student to look at these websites, yes.

24 Q. How many of the websites listed in
25 Appendix D did you personally visit, if any?

1 A. As I said, this was a back-and-forth
2 between student and myself.

3 Q. Sitting here today, do you recall
4 visiting any of the websites that are listed on
5 Appendix D?

6 A. I did double-check after the STYRA issue
7 was pointed out. Double-checked again all the
8 websites of these companies.

9 Q. After you read Mr. [REDACTED] rebuttal
10 report?

11 A. I double-checked at that time, yes.

12 Q. Prior to submitting the -- the report in
13 the October of last year, which websites listed in
14 Appendix D did you visit personally, if any?

15 A. I did them together with my student.

16 Q. Does that mean that you -- you sat with
17 your student and looked at them together?

18 MR. WHITE: Objection; form.

19 You can answer.

20 A. We did not sit together. I asked him
21 to -- after he did all the Crunchbase analysis,
22 I -- I walked with him over the Crunchbase
23 analysis and how to do this. And then he came
24 back with a short list and then we started looking
25 at -- we con -- we double-checked the websites and

1 the information of that short list and --

2 Q. When you say "short list" -- sorry. Go
3 ahead.

4 A. The short list being the 91 companies
5 that resulted from the method -- from the
6 methodology I applied to the 660.

7 Q. So the short list is now Appendix D?

8 A. Yes. Appendix D is the list of equity
9 invested companies that have -- either founded
10 after or before Ripple, that have received equity
11 capital after the founding of Ripple.

12 Q. Okay. Setting apart anything --

13 A. Except for STYRA, of course.

14 Q. Thank you.

15 Setting apart anything that your student
16 may have done, what did you do to review any of
17 the websites that are listed on Appendix D?

18 A. I looked at the websites. Looked at
19 when -- how they used XRP and XRPL or XRPL; what
20 these companies did; what industry they were in;
21 how they were categorized. So generally what kind
22 of information was available on these companies.

23 I looked at media releases of these
24 companies. I cross-referenced all these companies
25 again with XRP and XRPL and see if there was any

1 release that would either confirm or not confirm,
2 but in this case it all confirmed the use, the use
3 of XRP and XRPL.

4 Q. And you personally did that for all 91?

5 A. I personally did that for all 91.

6 Q. How did you locate media releases with
7 respect to the XRP or the XRP Ledger for all 91?

8 A. There's sort of two parts to your
9 question. How do you check media releases? Many
10 of these companies actually have media buttons
11 that I can check.

12 And as far as the cross --
13 cross-referencing to XRP and XRPL, I did a search.

14 Q. A Google search?

15 A. A keyword search, yes.

16 Q. Okay.

17 A. And then looked at whatever business
18 websites or other credible websites came up.

19 Q. Okay. Turning to --

20 A. CoinDesk and as such.

21 Q. I'm sorry? What was that?

22 A. It's a list of -- these are references
23 such as Fortune and CoinDesk and crypto.com and,
24 you know, professional sites that would have
25 information on the use of XRP or XRPL by these

1 companies.

2 Q. Turning to Appendix E, was Appendix E
3 supplied by defense counsel?

4 A. Appendix E was requested by me. I was
5 aware, since I had been aware and was familiar
6 with Ripple or knew about Ripple, as I said, about
7 between five and ten years ago. I knew what they
8 were doing. I had seen media releases of this
9 company.

10 I was able to, as part of my report,
11 looking at equity investment in these companies
12 and I at one point requested whether my
13 knowledge -- I wanted to cross-reference whether
14 my knowledge and what was available about the
15 company was correct. So I requested this list and
16 then this list was provided by counsel.

17 Q. After you received the list that appears
18 at Appendix E to your report but before you
19 appended it to your report, did you make any
20 changes?

21 A. Can you repeat the question?

22 Q. Sure.

23 You received the materials that now
24 appear as Appendix E from --

25 A. Mm-hmm.

1 Q. -- defense counsel, correct?

2 A. Yes.

3 Q. Okay. Before you appended those
4 materials as Appendix E to your report -- your
5 report, did you make any changes?

6 MR. WHITE: Objection to
7 form.

8 You can answer.

9 A. I don't think I did, no.

10 Q. What, if anything, did you do to confirm
11 the accuracy of the information in Appendix E?

12 A. I -- so Appendix E has a lot of
13 information. The subtitle of Appendix E is "Brief
14 Timeline of Products, Fundraising Rounds, and
15 Accolades." So the three elements of that.

16 Regarding everything that related to any
17 of these three, I had other sources of information
18 available as well, but in here I looked at all the
19 websites or all these web links that were
20 provided.

21 Q. And, again, you personally visited each
22 of these websites?

23 A. I personally visited each of these
24 websites.

25 Q. Did you take any other steps other than

1 visiting these websites to confirm the accuracy of
2 the information?

3 A. Yes. For example, fundraising rounds I
4 requested from counsel that I could see the
5 consolidated financial statements to
6 cross-reference the amount of equity capital that
7 was received, et cetera. Why it was received, any
8 other information.

9 So I did a lot of cross-referencing
10 between this and other sources of information
11 available to me. I went just also to Ripple's
12 site. I went to all the other media sites that
13 are footnoted in the -- in the document to make
14 sure that the information contained in here was
15 correct.

16 And, again, the intent was not, as I
17 stated in my report, where I take someone's
18 information and put it in a few charts, Chart 6
19 and Chart 7, to be illustrative of products and
20 accolades. Not a full and complete list.

21 Q. Which years of Ripple's consolidated
22 financial statements did you review?

23 A. I think we have to go back to materials
24 provided in Appendix B. I believe the first
25 Bates-identified documents are the consolidated

1 statements, but also -- let me refer to my report,
2 the table where I aggregate this information.
3 There's a footnote in the report that I also want
4 to refer to so...

5 Yeah. Table 3 on page 50 has the
6 footnote to -- to the links in Appendix E, I
7 guess. Appendix -- yeah, in Appendix E, and the
8 data came from the consolidated statements which I
9 think are all the Bates-numbered documents.

10 Q. I see.

11 A. So I seen every year, I believe. Yep.
12 2014, '15, '16, '17, through -- through 2020.

13 Q. Did you review the entirety of the
14 financial statements for the years listed in
15 Footnote 77?

16 A. I did, yes.

17 Q. Okay. Other than the materials that
18 we've already discussed in the appendices, did
19 defense counsel supply you with any other facts or
20 data that appears in your report?

21 A. Other than the footnotes and Appendix B,
22 no.

23 Q. When you say "other than the footnotes,"
24 do you mean that defense counsel supplied you with
25 the citations that appear in the footnotes in your

1 report?

2 MR. WHITE: Objection.

3 Calls --

4 A. Can you restate that question?

5 Q. Sure.

6 Can you identify me -- for me what facts
7 or data defense counsel supplied that we haven't
8 yet discussed today?

9 A. No, these were all mine.

10 Q. So to be clear, other than the
11 appendices that we've discussed --

12 A. Mm-hmm.

13 Q. -- there's nothing else in your report
14 in terms of facts or data that was supplied by
15 defense counsel?

16 A. No.

17 Q. In your report you cite press releases
18 by Ripple on occasion, correct?

19 A. In the report?

20 Q. Yes.

21 A. Yes. Where in the report are you
22 referring?

23 Q. I don't have a citation for you at the
24 ready.

25 Do you recall sitting here today whether

1 or not you cited Ripple press releases in the
2 report?

3 A. I do, yes.

4 Q. Okay. And did you?

5 A. Yes. Yes, I did. I'm sorry. Yes.

6 Q. And on occasion you referred to Ripple's
7 website as a source for your report, is that
8 correct?

9 A. Yes, I did.

10 Q. Okay. For any of these Ripple sources,
11 what, if anything, did you do to confirm the
12 accuracy of the information supplied in those
13 sources?

14 MR. WHITE: Objection.

15 A. Is your question specific to the Ripple
16 website?

17 Q. Specific to Ripple website or Ripple
18 press releases or any other Ripple-authored
19 source.

20 MR. WHITE: Same objection.

21 A. So I've been familiar with Ripple for a
22 long time and I'm also -- through the University
23 of Michigan we're a member of UBRI, Ripple's
24 University Blockchain Research Initiative, that
25 results in meetings. There was one in-person

1 meeting in Berkeley, UC Berkeley, and there have
2 been two online meetings. And so there's a lot of
3 information that comes out there that jives with
4 the information that is released on the website.
5 So it becomes sort of a cross-referencing between
6 multiple sources.

7 Q. Okay. Other than what you just
8 mentioned, did you take any affirmative steps to
9 confirm the accuracy of information authored by
10 Ripple that's cited in your report?

11 MR. WHITE: Objection; form.

12 A. Depends on which specific information
13 and reference you're referring to.

14 Q. Sitting here today, can you recall any
15 steps you took to confirm the accuracy of any
16 particular Ripple source cited in your report?

17 MR. WHITE: Objection; form.

18 A. Any Ripple source?

19 Q. Yes.

20 A. I cannot answer that question. Some I
21 did; some I did not further verify. There's many
22 pages on the websites. There's many documents
23 related to XRP and XRPL. There's many other
24 crypto sites that refer to it. And in some cases
25 I did cross-reference. We have to go to a

1 specific citation or footnote.

2 Q. Okay. Did you talk to any Ripple
3 employees in connection with the preparation of
4 your report?

5 A. No.

6 Q. Okay. Was there ever any occasion where
7 you copied language from a Ripple source directly
8 into your expert report?

9 A. What do you mean with "a Ripple source"?

10 Q. For instance, there's a -- say there's a
11 Ripple press release.

12 Did you ever copy language directly from
13 that press release into your report?

14 A. If and when I did, it would have been in
15 quotations.

16 Q. Okay. Setting aside Ripple sources, did
17 you ever copy language from any other source
18 directly into your report without quotations?

19 MR. WHITE: Objection to
20 form.

21 A. Not that I'm aware of, no.

22 Q. Okay. In preparing your opinion that's
23 set forth in Exhibit 1, did you consider any
24 sources that aren't cited in Exhibit 1?

25 A. Could you repeat that question?

1 Q. Sure.

2 In preparing your expert opinion that's
3 set forth in Exhibit 1, did you consider any
4 sources that are not cited in Exhibit 1?

5 A. No.

6 Q. Okay.

7 A. Besides my overall knowledge in the
8 space and that helped me structure the report, but
9 I cited to any statement that was relevant in this
10 report.

11 Q. Okay. I'll just ask a narrowing
12 opinion.

13 In preparing your opinion set forth in
14 Exhibit 1, did you consider any websites where you
15 didn't cite the website in Exhibit 1?

16 A. I did not.

17 Q. Okay. Moving to Exhibit 2, your
18 rebuttal report, in preparing your opinions set
19 forth in Exhibit 2, did you consider any materials
20 that are not listed within Exhibit 2?

21 A. I only see the footnotes here. Are
22 there any other...?

23 Q. Right.

24 Were there any other sources that you
25 considered in preparing Exhibit 2 that are not

1 cited in any way in Exhibit 2?

2 A. No.

3 Q. No.

4 You cite a number of academic articles
5 in Exhibit 2?

6 MR. WHITE: Objection. Is
7 there a question?

8 A. Can you repeat the question?

9 Q. Sure.

10 You -- did you cite a number of academic
11 articles in Exhibit 2?

12 A. I do.

13 Q. Okay. Did defense counsel supply you
14 with any of the academic articles that you cite in
15 Exhibit 2?

16 MR. WHITE: You can answer
17 that yes or no.

18 A. No.

19 Q. Okay. Other than your own reports, have
20 you read any other expert reports in this case?

21 A. Yes.

22 Q. Which ones?

23 A. I have read Dr. [REDACTED] report and
24 then the rebuttal reports inasmuch as they cover
25 your question.

1 Q. Have you read all of the rebuttal
2 reports from the SEC?

3 MR. WHITE: Objection.

4 A. I have read the rebuttal report from
5 Mr. [REDACTED] that is relevant to my original report.

6 Q. Did you read Mr. [REDACTED] opening report?

7 A. I did not.

8 Q. Okay. Did you read the entirety of
9 Mr. [REDACTED] rebuttal report?

10 A. I did.

11 Q. Are there any other expert reports that
12 you read that we haven't discussed yet?

13 A. There was an updated report by
14 Dr. [REDACTED] that I also read.

15 Q. Have you also reviewed Dr. [REDACTED]
16 deposition testimony in this case?

17 A. I have not.

18 Q. Other than the deposition testimony
19 that's listed in Appendix B to your Exhibit 1,
20 have you reviewed any other deposition testimony
21 in this case?

22 A. Sorry. I have to go and refer.

23 Q. Sure.

24 A. No, just David Schwartz and Asheesh
25 Birla.

1 Q. Okay. Going back to Exhibit 2 for a
2 moment, did you read all of the academic papers
3 that you cited in Exhibit 2?

4 A. Exhibit -- what do you refer -- what is
5 Exhibit 2?

6 Q. Your rebuttal report is Exhibit 2.

7 A. Ah, yes. Okay.

8 Q. So the question is: Did you read all of
9 the academic papers that you cited in your
10 rebuttal report?

11 A. I did.

12 Q. Let's see. Let's turn back to Exhibit
13 1, paragraph 41, and Footnote 26.

14 Are you there, Professor?

15 A. Page 41?

16 Q. Paragraph 41.

17 A. Oh, paragraph 41.

18 Q. Page 19.

19 A. And you're referring to?

20 Q. Footnote 26.

21 A. Yes.

22 Q. In Footnote 26, you cite a number of
23 items on which you rely in addition to the sources
24 cited in your report, is that correct?

25 MR. WHITE: Objection.

1 A. These are cited in my report.

2 Q. Right. Let me just read it. Footnote
3 26 states "In describing the XRP Ledger, XRP, and
4 Ripple throughout this report, in addition to the
5 cited sources, I am relying on..." and then the
6 sentence continues, correct?

7 A. Oh, yes.

8 Q. Okay. What of your "personal dealings
9 with Ripple in connection with UBRI and developing
10 the gift to the University of Michigan" did you --

11 THE REPORTER: Repeat.

12 MR. SYLVESTER: Sure.

13 Q. What of your "personal dealings with
14 Ripple in connection with UBRI and developing the
15 gift to the University of Michigan" did you rely
16 on in forming the opinions set forth in your
17 report?

18 A. Specific which knowledge?

19 Q. Yeah.

20 How did it inform your report?

21 MR. WHITE: Objection.

22 A. Well, I'm broadly familiar with the
23 company. I'm familiar with its arc of products
24 over time. I'm familiar with the application use
25 cases even before we started doing this report

1 that used XRP -- some use cases that used XRP or
2 XRPL.

3 I'm familiar with Xpring and RippleX,
4 again, through my engagements on UBRI.

5 I'm familiar with, of course,
6 conversations that I had with other UBRI members
7 from the 27 global universities that come together
8 at these conferences. So that sort of generally
9 informs the broad understanding of -- of -- of
10 technology, technology limitations, uses, business
11 models.

12 And then, of course, I cite specifically
13 to a case, a business case, Ripple -- the business
14 of crypto, which is one of the business cases that
15 I use in an entrepreneurial business development
16 course that I teach at the University of Michigan
17 to engineers and MBAs.

18 Q. What use cases for XRP or the XRP Ledger
19 were you familiar with prior to your engagement
20 with this case?

21 A. Are you asking for the names of the
22 companies?

23 Q. Whatever you would consider to be a use
24 case.

25 MR. WHITE: Objection. No

1 question.

2 A. So I was familiar with Ripple Net and
3 xCurrent and the xRapid, ODL, even though it all
4 went through iterations. I was familiar with, of
5 course, the exchanges, decentralized exchanges as
6 well as other exchanges that use XRP.

7 I am --

8 Q. Can you give me an example of
9 decentralized and other exchanges that use XRP?

10 A. Both buyers and sellers of XRP on
11 exchanges. On a -- not a specific exchange, but
12 Binance and others, [REDACTED] and those.

13 Q. Okay. Turning back to Footnote 26, one
14 of the other items on which you relied in your
15 expert report is your experience as an expert in
16 blockchain technology, is that correct?

17 A. Yes.

18 Q. How did your experience as an expert in
19 blockchain technology inform your report?

20 A. Well, my expertise is mainly focused
21 around different application domains, the
22 disruptive potential of blockchain, blockchain
23 business -- the blockchain business case, business
24 cases. How different kinds of companies have
25 deployed blockchain, not just start-ups, but also

1 larger corporations such as IBM and others. How
2 they use blockchains as really more from on the
3 applied side rather than on the underlying
4 technical features side specifically.

5 So that sort of broad information is how
6 disruptive the technology is in the market. And
7 with "disruptive," I mean how disruptive the
8 future opportunities for growth are for blockchain
9 in the industry.

10 Q. Another item on which you relied
11 according to Footnote 26 is Ripple's Wells
12 submission.

13 Do you see that?

14 A. Yes.

15 Q. Do you have an understanding of what a
16 Wells submission is, what its purpose is?

17 A. I do not.

18 Q. Okay. What portion of Ripple's Wells
19 submission did you rely on in preparing your
20 report?

21 A. I read the entire submission to get a
22 sense of context, to get a sense of arguments, to
23 get a sense of kind of information that is
24 being -- that was in the early days of my
25 engagement in this case where I wanted to

1 basically look at all types of reports that were
2 out there, filings, as well as depositions, to
3 inform myself as to what the context and various
4 different arguments were related to this case.

5 Q. When you say you wanted to get a sense
6 of the arguments related to this case, arguments
7 about what?

8 A. Well, I don't mean the -- the legal
9 arguments. I just want to see what are the
10 different positions, I guess, that -- that these
11 different reports, you know, display.

12 Q. The position of Ripple?

13 MR. WHITE: Objection. No
14 question.

15 A. The position of whomever the author was
16 of -- and authors were of the report.

17 Q. Do you know who authored Ripple's Wells
18 submission?

19 A. As I sit here, I cannot be sure, but I
20 believe it was on behalf of Ripple. I just --
21 that was immaterial to my review. My review was
22 what is the information that is out there relating
23 to this SEC case? Because all I knew at that time
24 was essentially all the media disclosures. So
25 very high level. I didn't know anything else

1 related to -- of course related to the specific
2 case. I wanted to read more about it.

3 Q. Did you do anything to verify the
4 accuracy of any information you learned from
5 reviewing Ripple's Wells submission?

6 A. I did not. I read it, again, to gain
7 insights.

8 Q. You mentioned earlier -- turning again
9 to Footnote 26, you mentioned earlier the business
10 case that you teach in your class.

11 Is that Ripple, the business of crypto?

12 A. Yes, it is.

13 Q. Okay. What information did you draw
14 from Ripple, the business of crypto, in forming
15 your opinions?

16 A. Well, this is one of a few FinTech or
17 financial technology cases that is available on --
18 in the Harvard Business School site, cases that I
19 use in my classes, that really talks about and --
20 and explains to the students sort of how digital
21 companies and early technology companies develop
22 their product strategy, their market strategy,
23 their market adoption. It's really more from that
24 perspective.

25 So I wanted to understand what was the

1 value proposition that -- I wanted to understand.
2 I mean I teach what's the value proposition that
3 Ripple put out there and how -- sort of what is
4 the arc of different products that result in sort
5 of moving towards that market.

6 Q. Do you know whether anyone at Ripple
7 contributed content to that business case?

8 A. I will have to check the business case,
9 but I would not be surprised, given my knowledge
10 of how business cases are written, that there
11 would be interviews with people from Ripple.

12 Q. Do you know whether anyone at Ripple
13 approved the statements in the business case?

14 A. I do not know what -- as I'm sitting
15 here now.

16 Q. Okay. Would that sort of review and
17 approval by a company that was the subject of a
18 business case be standard operating procedure?

19 MR. WHITE: Objection; form
20 and foundation.

21 A. I'm not sure what the Harvard Business
22 School's rules are regarding the degree of
23 affirmation or confirmation or sign-off.

24 Q. Did you ever learn -- go ahead. Sorry.

25 A. So the case is exemplary of many other

1 digital finance cases that I teach in that class
2 and they all follow that same arc in business
3 development iterations and product iterations over
4 time. So as the students become more interested
5 in financial technology and blockchain, I wanted
6 to bring in financial technology cases to sort of
7 illustrate that this is generally how digital
8 industries develop.

9 Q. Did you at any point ever learn that any
10 of the information included within that case study
11 was inaccurate?

12 MR. WHITE: Objection; form.

13 A. Sorry. Could you repeat that question,
14 please?

15 Q. Sure.

16 Have you ever learned that any of the
17 information included within the case study
18 referenced in Footnote 26 was inaccurate?

19 MR. WHITE: Objection; form.

20 A. So did I verify that or did I learn
21 about it? So what was your question?

22 Q. The latter.

23 Just have you ever discovered or learned
24 at any point in time that there's any information
25 that's within that case study that turned out to

1 be inaccurate?

2 MR. WHITE: Objection; form.

3 A. The only thing I can speak to is that
4 they highlight the MoneyGram collaboration,
5 partnership in the business case --

6 Q. Mm-hmm.

7 A. -- as written up. And I learned after
8 that the MoneyGram partnership I believe was
9 either on hiatus or discontinued. I'm not sure
10 exactly what was -- what was happening there. But
11 that wouldn't make it inaccurate. It's just that
12 one partner that adopted the product may have made
13 a decision as to whether or not they liked it or
14 didn't like it.

15 This is, again, part of the overall
16 adoption process. You test out the market. So I
17 don't think the question is about accurate or
18 inaccurate necessarily. It's about does the -- do
19 the conditions change?

20 Q. Right. But just setting aside changed
21 market conditions --

22 A. Mm-hmm.

23 Q. -- is there anything else in the report
24 that sitting here today you think is inaccurate?

25 A. I would have to go back over that report

1 in the context of what I know now since being
2 engaged whether or not anything that I read in
3 that case I would deem to be inaccurate. I don't
4 know.

5 Q. Turning back to Exhibit 2, paragraph 2,
6 it says that you've been asked to evaluate the
7 methodology and conclusions set forth in that
8 report, referencing Dr. [REDACTED] report, is that
9 right?

10 A. Yes, that's what it states in this
11 paragraph.

12 Q. Okay. Are you rebutting any expert's
13 opinion in this case other than Dr. [REDACTED]
14 opinion?

15 A. My focus was on Dr. [REDACTED] report.

16 Q. Regardless of your focus, is there any
17 other expert opinion that you're rebutting in this
18 case other than Dr. [REDACTED] opinion?

19 A. No.

20 Q. Okay. Do you know Dr. [REDACTED]

21 A. Personally? No, I do not.

22 Q. Prior to this case, had you ever heard
23 of him?

24 A. I had not.

25 Q. Prior to your retention in this case,

1 did you have any familiarity with his work?

2 A. Prior to retention in this case?

3 Q. Mm-hmm.

4 A. No.

5 Q. Okay. Did you review the portions of

6 Dr. [REDACTED] report that set forth his

7 qualifications in his CV?

8 A. Yes, I did.

9 Q. Do you believe that Dr. [REDACTED] is
10 qualified to offer an expert opinion on the topic
11 of decentralization?

12 MR. WHITE: Objection; form
13 and calls for a legal conclusion.

14 A. When you refer to the "topic," what do
15 you mean specifically?

16 Q. Well, in Dr. [REDACTED] report, he sets
17 forth his opinion on the decentralization of the
18 XRP Ledger, correct?

19 A. Yes.

20 MR. WHITE: Objection; form.

21 Q. And he also in his report compares the
22 decentralization of the XRP Ledger with the
23 bitcoin and Ethereum ledgers, correct?

24 THE REPORTER: Slow down,
25 please. "He also in is report..."?

1 Q. Compares the decentralization of the XRP
2 Ledger with the bitcoin and Ethereum ledgers,
3 correct?

4 MR. WHITE: Objection; form.

5 A. That is what his opinion -- his opinion
6 is based on that compare -- his methodology is --
7 he uses a methodology to make that comparison,
8 yes.

9 Q. And in so doing, he's offering an
10 opinion broadly on the topic of decentralization,
11 correct?

12 MR. WHITE: Objection; form.

13 A. He is offering an opinion on that,
14 that's correct.

15 Q. Okay. So based on your review of
16 Dr. [REDACTED] qualifications and his CV, do you
17 believe that he's qualified to offer an opinion on
18 the topic of decentralization?

19 MR. WHITE: Objection; form,
20 calls for a legal conclusion.

21 Q. You can answer.

22 A. He is qualified. I agree he is
23 qualified to form an opinion. The question is
24 whether the approach and the methodology that he
25 uses is one that is established in the literature.

1 Q. Prior to your retention as an expert
2 witness in this case, had you ever met anyone who
3 worked at Ripple?

4 A. Prior to my retention? Yes.

5 Q. Who?

6 A. Asheesh Birla.

7 Q. Anyone else?

8 A. And then Lauren Weymouth.

9 Q. Anyone else?

10 MR. WHITE: Objection; form.

11 A. There are people that speak at these
12 UBRI conferences and I meet them from far away,
13 but I don't really have a one-on-one conversation
14 with them.

15 Q. Who falls within that category?

16 A. Example, David Schwartz and Chris
17 Larsen. He opens the conference. He opened one
18 of the conferences.

19 Q. How about Mr. Garlinghouse?

20 MR. WHITE: Objection; form.

21 A. I don't know him.

22 Q. Have you ever heard him speak?

23 A. No.

24 Q. And you've never had a one-on-one
25 conversation with either Mr. Schwartz or

1 Mr. Larsen?

2 MR. WHITE: Objection; form.

3 A. I have not.

4 Q. Okay. When did you meet Mr. Birla?

5 Approximately is fine.

6 A. I believe that must have been 2018

7 sometime.

8 Q. How did you meet him?

9 A. He was -- I was introduced to him

10 through the Business Engagement Office of the

11 University of Michigan. Companies such as Ripple

12 that have alumni of the University of Michigan

13 will reach out to the Business Engagement Office

14 to set up partnerships or gift agreements or

15 things like that.

16 And through the initial context that

17 Mr. Birla made with the Business Engagement

18 Office, I received a call to say that Ripple was

19 interested in finding out what the University of

20 Michigan was doing with respect to blockchain and

21 cryptocurrencies and that resulted in a first --

22 first a call and then a meeting at one of the --

23 during one of the football games, I believe.

24 Q. Why did the Business Engagement Office

25 of the University of Michigan reach out to you?

1 MR. WHITE: Objection;

2 foundation.

3 A. I had at that time -- so this was --
4 we're talking 2018. In 2016, '16/'17, I started
5 the Center for Infrastructure Finance at the
6 University of Michigan. And some of the people at
7 the Business Engagement Office that I know knew
8 that I was interested in decentralized
9 technologies and blockchain as part of that
10 center. So they reached out to several people
11 across the university.

12 MR. WHITE: Ms. Sylvester,
13 sorry, we've been going for about an
14 hour and twenty. Would now be a good
15 time for a break?

16 MR. SYLVESTER: Sure. Fine
17 by me.

18 MR. WHITE: Okay.

19 THE VIDEOGRAPHER: We'll go
20 off the record. The time is 10:31.

21 (Whereupon, a recess is
22 taken.)

23 THE VIDEOGRAPHER: We'll go
24 back on the record. The time is
25 10:48.

1 BY MR. SYLVESTER:

2 Q. Professor, when was the last time that
3 you spoke with Mr. Birla?

4 A. I don't recall exactly. Since
5 Ms. Weymouth took over from him in her role as
6 director of UBRI. I believe I refer to that in my
7 expert report, when she took over. She took over
8 in August 2018.

9 Q. And what is her role at UBRI?

10 A. She is the Director of University
11 Partnerships.

12 Q. And what's the nature of your
13 communications with her in that role?

14 A. She will -- she will contact all the
15 UBRI leads on occasion and then it's usually about
16 an update on their software or an invitation to
17 participate in meetings or in hackathons or things
18 like -- things of the like.

19 Q. What exactly is UBRI?

20 A. UBRI is a name, University Research
21 Partnership, that is intended to -- intended to
22 sort of expand the knowledge in blockchains and
23 financial technology and to prepare the next
24 generation of, sort of, employees in the FinTech
25 space at various different universities.

1 So it really is a gifting program to
2 stimulate innovation -- sorry, to stimulate
3 innovation at universities.

4 Q. UBRI is a gifting program, is that
5 right?

6 MR. WHITE: Objection; form.

7 A. It is a partnership program and the way
8 they work with universities is through gifts.

9 Q. UBRI gives gifts to universities.

10 MR. WHITE: Objection. No
11 question.

12 A. That I'm going to have to double-check
13 how the gift arrangement, as in the legal gift
14 arrangement, is structured, which I do not get
15 involved in. But it is a -- it is designated as
16 being a gift under a corporate gifting of the
17 university. So, therefore, it's not a contract.

18 Q. When you said "the gift" in your answer,
19 do you mean the gift given to the University of
20 Michigan?

21 A. Yes.

22 Q. Okay. And Ripple funds UBRI, is that
23 right?

24 A. Actually, I am not privy to that
25 information, on how UBRI is funded.

1 Q. Okay. Can you look --

2 A. But it being a partnership program --

3 MR. WHITE: Let the witness
4 finish his answer -- sorry, finish his
5 answer.

6 MR. SYLVESTER: Please do.

7 A. No, that's okay.

8 I don't know how it is funded.

9 Q. Okay. Can we look at paragraph 12 of
10 your report?

11 A. Yes.

12 Q. So the first sentence says "Ripple Labs
13 Inc. (Ripple) funds what is known as the
14 University Blockchain Research Initiative (UBRI)"?

15 A. Yes.

16 Q. What's the basis for that statement?

17 A. When I say it funds it, it's actually
18 operated out of Ripple. It's part of Ripple, but
19 I -- it does not refer to the actual sourcing of
20 the funding, which I do not know and I'm not
21 familiar with.

22 Q. Why did you choose the word "funds"?

23 A. I mainly did it based on assumption
24 because it's part of Ripple and, therefore, I
25 would assume it is Ripple-backed.

1 Q. Sitting here today, do you know whether
2 or not it's Ripple-backed?

3 MR. WHITE: Objection to
4 form.

5 A. As I answered earlier, I am not familiar
6 with the actual agreements between Ripple and
7 UBRI, the UBRI program.

8 Q. What was your --

9 A. The corp -- corporate agreements, that
10 is.

11 Q. Sure.

12 What was your involvement with the
13 University of Michigan's participation in UBRI, if
14 any?

15 A. I am one of the three university leads
16 to operationalize the gift.

17 Was that your question?

18 Q. Can you explain what you mean by
19 "operationalize the gift"?

20 A. Yeah. So when a -- a corporate funder
21 engages with the university, the university,
22 through its Business Engagement Office, will reach
23 out to who they think are relevant faculty
24 members/professors at the university and they
25 identified three key members. Over time. This

1 was iterative. One in engineering, that is
2 myself. Then a person in the business -- the Ross
3 School of Business and a person in the Ford School
4 for Public Policy.

5 And they then leave it up to the three
6 of us to develop a program that would meet the
7 spirit of the gift, but we do not have any
8 contractual obligations to -- Ripple cannot
9 interfere in what it is that we actually do with
10 the funding once it releases UBRI and comes to the
11 university.

12 Q. And, Professor, we've been speaking of
13 "the gift."

14 Is this the gift referenced in paragraph
15 13 of your expert report?

16 A. Yes, it is.

17 Q. Okay. You're the director of the Center
18 for Smart Infrastructure Finance?

19 A. That's correct, yes.

20 Q. And that center co-founded the
21 University of Michigan FinTech Collaboratory?

22 MR. WHITE: Objection. No --
23 no question.

24 Q. Go ahead.

25 A. Okay. Yes, the center is one of the

1 three co-founders of the FinTech Collaboratory.

2 Q. And according to paragraph 12, the
3 FinTech Collaboratory -- strike that.

4 According to paragraph 12, the FinTech
5 Collaboratory is funded in part by a gift from
6 UBRI, is that right?

7 A. Yes. Which statement are you referring
8 to?

9 Q. Paragraph 12, the third sentence.

10 A. Yes. Yes.

11 Q. Okay. What portion of the FinTech
12 Collaboratory's budget is -- constitutes that gift
13 from UBRI?

14 MR. WHITE: Objection; form.

15 A. So the FinTech Collaboratory isn't
16 really an entity. It's an integration of three
17 centers. And these -- the Ripple gift comes in to
18 these three centers, each of whom have plenty of
19 other funding from other sources.

20 Q. Okay. Does -- does the FinTech
21 Collaboratory have a budget?

22 A. That would be the Ripple gift.

23 Q. The Ripple gift is the FinTech
24 Collaboratory's budget?

25 A. That then trickles down into the three

1 partners: In engineering, in the business school,
2 and in Ford School for Public Policy. And these
3 three partners actually have to find -- or
4 actually are funded otherwise as well. So
5 basically it's part of the funding of the three
6 core members of the FinTech Collaboratory.

7 Q. And who are the three core members of
8 the FinTech Collaboratory?

9 A. So it is the Center for Infrastructure
10 Finance; it is the Ford School for Public Policy
11 Center on Finance, Law, and Policy; and it is the
12 FinTech Initiative at the Ross School of Business.

13 Q. Have you seen the original gift
14 agreement referenced in paragraph 13?

15 A. I have seen it, yes.

16 Q. Do you have it?

17 MR. WHITE: Objection to
18 form.

19 Q. Is it within your files?

20 A. It's probably somewhere on my computer.

21 Q. Did you review that in connection with
22 preparing your report?

23 A. No.

24 Q. Was there a second gift agreement for
25 the gift extended in April of 2021 as referenced

1 in paragraph 13?

2 A. Yes.

3 Q. And do you have access to that gift
4 agreement as well?

5 MR. WHITE: Objection; form.

6 A. I have access to the check.

7 Q. Are the funds from the gift extension
8 referenced in paragraph 13 allocated in the same
9 way as the initial gift?

10 MR. WHITE: Objection; form.

11 A. No. So it depends on the needs and the
12 needs of the individual partners of the center.

13 Q. How is -- sorry. Go ahead.

14 MR. WHITE: Please finish
15 your answer.

16 A. It depends on the needs, the
17 programmatic needs, I guess, of the different
18 members of the Collaboratory.

19 Q. The gift extension that started in April
20 of 2021 is ongoing for two years from April 2021?
21 Am I reading that correctly?

22 A. Yes, but I am not sure when the gift was
23 actually committed to the university. It was sort
24 of -- there was an agreement and then there was a
25 commitment of the gift as in when it's actually

1 coming to the university. So I don't know when
2 it's coming to the -- or when -- when it came to
3 the university.

4 Q. Do you know how the funds as part of the
5 gift extension have been allocated to date?

6 A. To date? I would have to take a look.

7 Q. Have part of -- strike that.

8 Has any part of the gift extension been
9 allocated to the FinTech Collaboratory?

10 A. It all went to the FinTech
11 Collaboratory, but the allocation as to the three
12 parties of the FinTech Collaboratory changes. And
13 from my recollection, the gift extension was
14 mainly allocated to the business school and the
15 School for Public Policy.

16 Q. As -- as part of your role at the
17 University of Michigan, do you conduct research?

18 A. Yes. I lead a research group, yes.

19 Q. And is any of that research group's
20 funding funded by the UBRI gifts we've been
21 discussing?

22 A. Some of it.

23 Q. What percentage?

24 A. When you refer to "percentage," do you
25 refer to the percentage of the center's budget,

1 how much of that is Ripple, how much of that is
2 UBRI funds?

3 Q. I'm focusing just on the research group
4 that you supervised.

5 A. Okay.

6 Q. How much of that research group's
7 funding comes from the UBRI gifts we've been
8 discussing?

9 A. Maybe about 10 or 15 percent.

10 Q. Has there been any change or update to
11 Ripple's gift to the University of Michigan since
12 you submitted your report in October of 2021?

13 MR. WHITE: Objection; form.

14 A. Can you restate that question?

15 Q. Sure.

16 Has there been any change or update to
17 Ripple's gift to the University of Michigan since
18 your report was submitted in October of 2021?

19 A. You're referring to Exhibit 1?

20 Q. Yes.

21 MR. WHITE: Objection.

22 Objection to form of the last
23 question.

24 THE WITNESS: Okay. Sorry.

25 MR. WHITE: You can answer.

1 A. No.

2 Q. Are you familiar with the concept of a
3 validator node that runs on the XRP Ledger?

4 A. Yes.

5 Q. Okay. Does the University of Michigan
6 run a validator node on the XRP Ledger?

7 A. It does not.

8 Q. Has it ever?

9 A. Not that I know of. It's part of the
10 restrictions of the gift agreement.

11 Q. I see.

12 Can we turn to the end of paragraph 12?
13 The last sentence of paragraph 12 says "As part of
14 UBRI, the University of Michigan maintains a
15 validator node on the XRP Ledger (which I describe
16 in greater detail below), but the University of
17 Michigan has not actively participated in voting
18 on the XRP Ledger because of university policies
19 governing services under corporate gift
20 agreements."

21 Do you see that?

22 A. Yes.

23 Q. Okay. What does "maintains a node" --
24 sorry. Strike that.

25 What does "maintains a validator node on

1 the XRP Ledger" mean?

2 A. I would say we have the nodes or we are
3 a node, but we're -- it's inactive. We don't get
4 involved in any verification of transactions or
5 anything. It's not active.

6 Q. So the -- the node maintained by the
7 University of Michigan on the XRP Ledger does not
8 validate transactions?

9 MR. WHITE: Objection. No
10 question.

11 Q. Go ahead.

12 A. It -- it does not validate transactions.

13 Q. Okay.

14 A. And the maintenance part relates to that
15 we do get the updates on the protocols and
16 whatnot, that we get things to download, but we
17 actually do not validate.

18 Q. Did anyone at Ripple ever ask anyone at
19 the University of Michigan to run a validator node
20 on the XRP Ledger?

21 MR. WHITE: Objection;
22 foundation.

23 A. As part of the negotiations around the
24 gift agreement, Ripple stated that they would like
25 the University of Michigan to become an active

1 validator node on the network. And the university
2 said that that could not be part of the agreement.
3 However -- because of policies that I cite to
4 later, standard practice policies and gift
5 acceptance; however, if researches would choose to
6 maintain it or -- out of their -- out of their
7 funds, they could, but it's -- so Ripple only
8 asked at the time that we negotiated the gift
9 agreement.

10 Q. What was the policy that prohibited the
11 University of Michigan from being able to run a
12 validator node on the XRP Ledger?

13 A. So I refer to page 7 in my report where
14 I refer to that standard practice guide and
15 policies. And this is the way I understand it,
16 but I did not get involved in the negotiations
17 between the university and UBRI. That the
18 expectation of running a validator node under a
19 gift agreement would constitute a contractual
20 expectation which cannot be done under a gift
21 agreement.

22 Q. A contractual expectation between what
23 parties?

24 A. Between -- between Ripple and -- and the
25 University of Michigan.

1 Q. Who was involved, if you know, in the
2 negotiations between Ripple and the University of
3 Michigan around the gift arrangement?

4 MR. WHITE: Objection; form.

5 A. I do not know the names, but this goes
6 to the Office of the Vice President for Research.

7 Q. Do you know who was involved on the
8 Ripple end?

9 MR. WHITE: Objection; form.

10 A. I do not know who was involved on the
11 Ripple end in the negotiations. I know who my
12 contact person is, but I don't know if that person
13 is involved in the actual negotiations of gift
14 agreements.

15 Q. That's Ms. Weymouth?

16 MR. WHITE: Objection. No
17 question.

18 Q. You can answer.

19 A. After August 2018, yes.

20 Q. And what -- you state in paragraph 15
21 that your "communications with Ms. Weymouth have
22 pertained to the use of the gift funds at the
23 University of Michigan and our participation in
24 the annual UBRI conference."

25 A. Yes.

1 Q. Why were you speaking with Ms. Weymouth
2 about the use of the gift funds at the University
3 of Michigan?

4 A. Because she is the administrator and
5 director of university relationships. And she
6 will occasionally check in with the universities
7 that have received gifts. And she said, "So how
8 are you doing? What are you doing with this?"
9 It's sort of a -- part of a regular check-in to
10 maintain the relationship.

11 Q. So as part of the check-in, you explain
12 to her how the university is using the gift funds.

13 MR. WHITE: Objection. No
14 question.

15 A. Yes.

16 Q. Have you ever spoken at any of the UBRI
17 conferences?

18 A. Yes.

19 Q. Which ones?

20 A. I spoke at the -- the 2020 conference
21 and --

22 Q. What was the top -- sorry. Go ahead.

23 A. And that was on tokenization of
24 infrastructure finance. And my students, some of
25 my students, have spoken at the 2019 in-person

1 conference at UC Berkeley.

2 Q. What was the topic of your students'
3 presentation at the 2019 UBRI conference?

4 A. The development of a blockchain
5 application for -- to track opioid prescriptions.

6 Q. Did that blockchain application involve
7 the use of the XRP Ledger?

8 A. It did not.

9 Q. Did the topic of your speech involve the
10 use of XRP or the XRP Ledger.

11 A. It referred to the opportunity, future
12 opportunity, of the XRP Ledger. The topic is
13 really about tokenization of infrastructure, of
14 debt and equity financing of infrastructure. And
15 we talked about the globalization of financing of
16 infrastructure and, then, therefore, where the
17 opportunity might be for a Ripple -- for an XRP
18 application.

19 Q. Is the tokenization of financing
20 infrastructure a topic that you researched?

21 A. Yes.

22 Q. And is it a topic that you research as
23 part of the FinTech Collaboratory group?

24 A. In part, yes.

25 Q. Have you developed any applications

1 regarding -- strike that.

2 Have you developed any applications on
3 the XRP Ledger as part of your research at the
4 University of Michigan?

5 A. Not to date.

6 Q. Have you developed any applications
7 using XRP as part of your research at the
8 University of Michigan?

9 A. Not to date.

10 Q. Are you working on any -- strike that.

11 Are you researching any projects in
12 which either the XRP Ledger or XRP will be used
13 currently?

14 A. Personally, I am not, but
15 Blockchain@Michigan, which is a computer science
16 business student hub that focuses on decentralized
17 applications on the blockchain, is -- one of the
18 ledgers that they're exploring is XRPL.

19 Q. Is Blockchain@Michigan funded at all by
20 UBRI?

21 A. Their administrative structure has some
22 funding through UBRI as part of the Collaboratory.

23 Q. Are you personal friends with any
24 current or former Ripple employee?

25 A. No.

1 Q. Do you have a professional relationship
2 with any current or former Ripple employee?

3 A. I would say that Asheesh Birla and
4 Lauren Weymouth are the two people I have
5 professional -- professional relationships with.

6 Q. Do you have any role with respect to the
7 University of Michigan's running -- sorry. Strike
8 that.

9 Do you have any role with respect to the
10 University of Michigan's maintenance of the node
11 on the XRP Ledger?

12 A. Sorry. Can you repeat that question?

13 Q. Sure.

14 Do you personally have any role with
15 respect to the University of Michigan's
16 maintenance of the node on the XRP Ledger?

17 A. Depends how you define "personally."
18 One of the staff members in the department
19 receives the pings from Ripple and updates on the
20 software required, but that's it. It's basically
21 just to keep it up-to-date, but I don't personally
22 get involved in that.

23 Q. Can we turn to page 7 of your Appendix
24 A?

25 A. I have it.

1 Q. Okay. So under the "Research Grants and
2 Contracts" section, the last entry is "Ripple."

3 Do you see that?

4 A. Yes.

5 Q. Is this the \$1 million gift that we've
6 been discussing that's set forth in your report
7 around paragraph 12 or 13?

8 A. Yes.

9 Q. Okay. Can you explain what PL and 2
10 co-PLs mean?

11 A. Oh, it's the -- "PI" stands for
12 principal investigator and co-PI, co-principal
13 investigators, but essentially the three of us are
14 at the same level. So it's one person designated
15 in engineering, myself; one person designated in
16 the business school; and one person designated in
17 the School for Public Policy.

18 Q. And what does that term "principal
19 investigator" mean?

20 A. Sort of the lead. The lead. In the
21 context of a research grant, say from the National
22 Science Foundation or -- or anything like that, in
23 that context you're the one that's actually
24 leading and directing the research. In this case
25 it's basically the three of us that are

1 collaborating in the Collaboratory.

2 Q. Okay. Do you have the same status with
3 respect to the subsequent \$250,000 gift from UBRI?

4 A. We have maintained that relationship
5 among the three co-PIs. That's right.

6 Q. Do you have an understanding of why it
7 was that Ripple wanted the University of Michigan
8 to run a validator node on the XRP Ledger?

9 A. Why they wanted that to be part of the
10 gift?

11 Q. Yes.

12 A. No, I'm not sure.

13 Q. Have you ever had any discussions with
14 anyone at the University of Michigan with respect
15 to Ripple's request that the University of
16 Michigan run a validator node on the XRP Ledger?

17 A. No. So once the decision was made
18 higher up that we couldn't do it as part of the
19 gift, that discussion was stopped. But every
20 university has their own policy around that.

21 Q. Setting aside the University of
22 Michigan's maintenance of a node on the XRP
23 Ledger, have you ever run any kind of node on the
24 XRP Ledger?

25 A. I have not.

1 Q. Okay. Have you ever run any kind of
2 node for any blockchain?

3 A. Personally I have not, no.

4 Q. Okay. Let's turn to paragraph 19 of
5 your Exhibit 1, which was Opinion 1.

6 A. Page 19 of Exhibit 1?

7 Q. Sorry. Page 8, paragraph 19 of Exhibit
8 1.

9 A. Okay. Yes.

10 Q. Okay. And your first opinion is listed
11 here as "The XRP Ledger and its native currency,
12 XRP, represented an important innovation in
13 blockchain technology."

14 Do you see that?

15 A. Yes, I do.

16 Q. What criteria did you use to determine
17 whether XRP and the XRP Ledger represented an
18 important innovation in blockchain technology?

19 A. Going back to my background as a advisor
20 for venture capital firms where we look at new
21 technologies that come to market, we look at
22 innovation from the perspective of is -- is this
23 technology an improvement over, and a significant
24 improvement over, existing technologies and in
25 what capacity?

1 And my aspects that I looked at were
2 speed, cost, environmental costs, security.
3 Issues like that.

4 And I referred to the incumbent
5 technology or compared to the incumbent
6 technology.

7 THE REPORTER: Income?

8 THE WITNESS: Incumbent.

9 THE REPORTER: Thank you.

10 THE WITNESS: Existing.

11 Q. And is it your opinion that the XRP
12 Ledger is superior on the metrics of speed, cost,
13 environmental costs, and security to preexisting
14 blockchains?

15 MR. WHITE: Objection to
16 form.

17 A. There was a lot of information packed in
18 that question. Can you be more specific?

19 Q. Sure.

20 You -- my understanding of your previous
21 response when I asked what criteria you used to
22 determine whether something was an important
23 innovation with respect to XRP and the XRP Ledger,
24 the metrics that you mentioned were speed, costs,
25 environmental costs, and security, is that right?

1 Did I understand you correctly?

2 A. Those are among the ones that I looked
3 at, yes.

4 Q. Okay. So I'm asking if it's your
5 opinion that the XRP Ledger is superior to
6 preexisting blockchains with respect to the
7 metrics of speed, cost, environmental costs, and
8 security.

9 MR. WHITE: Objection to
10 form.

11 A. The transaction speed is faster than the
12 incumbent technology at that time when it came up,
13 which was bitcoin. The cost of a transaction was
14 lower. Again, in the proposition. The
15 environmental cost was lower just because of the
16 type of consensus mechanism that they were using.
17 And then the security features were different from
18 what they were for the incumbent technology that
19 led me to conclude security -- improved security.

20 Q. What were the features of the XRP Ledger
21 versus incumbent technology that in your view led
22 to improved security?

23 A. I'm mainly referring to the different
24 consensus mechanisms that the XRPL was use -- uses
25 to validate transactions.

1 Q. Okay. Does that mean that it's your
2 view that the XRP Ledger's consensus -- consen --
3 strike that.

4 Is it your view that the XRP Ledger's
5 consensus mechanism is more secure than bitcoin's
6 consensus mechanism?

7 MR. WHITE: Objection; form.

8 A. It's not necessarily kind of a binary
9 decision. It's -- it's a different kind of
10 security mechanism and validation mechanism that
11 would avoid 51 percent of tax, for example. And,
12 so, I was looking from that perspective.

13 Q. Okay. Let's turn to the next page,
14 paragraph 20, your Opinion 2.

15 A. Paragraph or page?

16 Q. Page 9, paragraph 20.

17 A. Okay.

18 Q. Opinion 2 reads "Ripple's iterative
19 development of its business model and products is
20 consistent with start-up practices in
21 high-technology industries."

22 Do you see that?

23 A. Yes.

24 Q. Okay. And then at the very last
25 sentence of that paragraph, you reference "market

1 demand."

2 Do you see that sentence?

3 A. The last sentence of that -- yes.

4 Market demand, yes.

5 Q. What steps, if any, did you take to
6 ascertain what market demand for Ripple products
7 existed over the years?

8 MR. WHITE: Objection to
9 form.

10 A. That was not the analysis that I did.
11 The analysis I -- I mean, what I opined on in
12 this -- in Opinion 2 is that Ripple, like other
13 digital companies, develops different products,
14 improvements on technology, to ultimately --
15 develops marketing -- marketing strategies to
16 actually position its technologies for broad
17 adoption by the market.

18 But I -- this statement does not say
19 whether they actually satisfy market demand. That
20 is not what I intended with this sentence here.

21 Q. And it wasn't part of your, sort of,
22 methodology to examine whether there was, in fact,
23 any market demand for any Ripple product.

24 MR. WHITE: Objection; form
25 and no question.

1 A. Ripple had a value proposition and part
2 of its value proposition was to make international
3 settlements easier, faster, and cheaper. And it's
4 sort of a -- a business hypothesis or a market
5 that they're going to. The question is, what is
6 the path to market to go from where you are with
7 your technology to servicing that ultimate market
8 that you want to -- or one of these markets that
9 you want to serve?

10 In fact, most of these technology
11 start-up companies don't really even know
12 necessarily what ultimately will become the
13 beachhead market or the growth market that their
14 technology will be -- will be deployed in nor what
15 the ultimate product will be.

16 So it's very hard to actually do that
17 analysis as -- as you're inquiring about.

18 Q. You just said most of the start-up
19 companies don't even necessarily know what
20 ultimately will become their beachhead market --

21 A. Mm-hmm.

22 Q. -- or -- I'm paraphrasing now -- what
23 product will ultimately be successful, is that
24 right?

25 A. Or which products, yes.

1 MR. WHITE: Objection; form.

2 Q. Is that true with Ripple as well?

3 MR. WHITE: Objection; form.

4 A. Well, if you look over the -- the arc of
5 products that Ripple has developed since its
6 inception and tested with different market
7 participants from the Ripple corridor all way
8 through to now Ripple Net, it is essentially a
9 trial and error kind of process. And you'll find
10 out over time if one has an open source ledger in
11 which applications can be built, then what the
12 ultimate use cases will become.

13 So that -- I would argue that they're
14 still moving in that direction where they
15 originally intended to move, but the diversity of
16 use cases, as I outline later on, are examples of
17 how third parties just use it for uses that are
18 originally not intended by -- by Ripple.

19 Q. Let's go to same page, paragraph 21.
20 Opinion 3 says "The XRP Ledger and its native
21 currency, XRP, have commercial utility that third
22 parties have leveraged in the creation or
23 advancement of their business models,
24 demonstrating the decentralized nature of the XRP
25 Ledger."

1 Do you see that?

2 A. Yes, I see that.

3 Q. How in your view does third-party
4 leveraging of XRP demonstrate the decentralized
5 nature of the XRP Ledger?

6 A. Well, the way in the context of my
7 experience, again, of -- of advising companies,
8 including blockchain companies, is when one has an
9 open source platform on which applications can be
10 built without a centralized authority to approve
11 transactions, that in the sort of -- the current
12 vernacular of both the academic and the business
13 use of the word "decentralized," it constitutes as
14 being a decentralized application.

15 Q. Let me ask a clarifying question. You
16 concluded that answer by referencing a
17 decentralized application.

18 Are you talking about the XRP Ledger
19 when you use the word "application" or something
20 else?

21 A. I'm sorry. I didn't mean to say
22 application. The decentralized nature of the
23 Ledger.

24 Q. Okay. So when you say "the
25 decentralized nature" of the XRP Ledger, are you

1 offering an opinion that the XRP Ledger is, in
2 fact, decentralized?

3 A. In the context of how currently the word
4 "decentralized" is used in the business literature
5 and actually even in the academic literature --
6 look at the MIT Digital Asset Lab -- it's still
7 not even clear what the actual definition is of
8 decentralized.

9 So in the way we're using it in that
10 vernacular, yes.

11 Q. What is the definition of
12 decentralized -- decentralization used in that
13 vernacular?

14 A. There is no definition. It is really
15 more of an understanding and an expectation.

16 Q. Can you describe the understanding and
17 expectation that is called forth by the use of the
18 word "decentralization"?

19 MR. WHITE: Objection; form.

20 A. Well, again, in that same context, from
21 the perspective of the blockchain being
22 permissionless, being open source and, therefore,
23 accessible to third-party developers, having no
24 central authority that verifies transactions, that
25 validates transactions, sort of constitutes that.

1 It is not a definition. It is a -- a working
2 understanding of decentralization as used in these
3 contexts.

4 Q. When you say "as used in these
5 contexts," which contexts are you referring to?

6 A. I mean in the venture capital investment
7 context, in the business context, business
8 literature context, and in other academic lenses
9 on, for example, as I said, just MIT digital
10 currency initiative. They say, look, we don't
11 really even know, we have to contextualize what we
12 mean by decentralization, so, therefore, we can't
13 adopt a definition of what it is. So we'll use a
14 working knowledge of what we think it is.

15 Q. Mm-hmm.

16 Is -- so the general understanding of
17 what decentralization means in your view, in the
18 context you just described, is a blockchain that's
19 permissionless, open source, accessible to
20 third-party developers, and has no central
21 authority that verifies transactions?

22 MR. WHITE: Objection. No
23 question.

24 A. These are some broad characteristics
25 that we use in sort of the -- the business

1 vernacular, yes.

2 Q. And are those the characteristics that
3 you're referring to when you use the words
4 "decentralized nature of the XRP Ledger" in
5 paragraph 21?

6 A. In that nondefinitional descriptive
7 understanding, that's what I did there, yes.

8 Q. Are there any academic publications that
9 endorse the general understanding of
10 decentralization as you just described it?

11 A. Well, in recent years, the scientific
12 literature has sort of moved into a direction of
13 trying to understand how decentralization should
14 be understood, how it should be measured, how it
15 should be defined. There's lots of working
16 definitions out there, but there's no governing
17 definitions -- governing definition at this point.

18 So there is no academic -- if that's
19 what you're asking -- paper that states this
20 working definition is the going definition. It
21 is -- it is an understanding. It's not a
22 definition.

23 Q. What's the distinction in your mind
24 between an understanding and a definition?

25 A. It is a -- sort of a working knowledge

1 of how people in general talk about a topic versus
2 how academicians in the scientific literature
3 would try to define a term and develop metrics and
4 tools to measure those metrics. So that's sort of
5 the difference. So the working level
6 understanding versus the academic definitional
7 approach.

8 Q. How is the existence of third-party
9 applications on a blockchain related to the
10 concept of decentralization of that blockchain, if
11 it is?

12 A. Well, again, sort of referring back to
13 my earlier answer, it goes to it being broadly
14 available to a large community of developers and
15 their users. That becomes an element of a
16 decentralized system in this nondefinitional
17 fashion, nondefinitional nature.

18 Q. In paragraph -- both paragraphs 21 and
19 22, you reference "Ripple's vision." Do you see
20 that? It's the second sentence of paragraph 21
21 and also the second sentence of paragraph 22.

22 A. Yes.

23 Q. How do you know what Ripple's vision is
24 or was?

25 MR. WHITE: Objection; form.

1 A. There's no firsthand knowledge, but I
2 used it from my working knowledge of Ripple, as
3 well as reading the business cases, as well as all
4 the publications in the business literature,
5 financial magazines, crypto magazines, of what the
6 aspirations were of what they sought to achieve.
7 So that was the vision.

8 Q. Are all those publications that you just
9 referenced cited in your report?

10 A. Yes, they are.

11 Q. Okay. You mentioned earlier that you
12 reviewed Ripple's financial statements for, I
13 believe, the years 2014 through 2020, is that
14 correct?

15 A. Yes, I did.

16 Q. You're aware that the vast majority of
17 Ripple's revenues over the years have come from
18 sales of XRP?

19 MR. WHITE: Objection; form.

20 A. I have seen the P & L statement, profit
21 and loss statements, within that, yes.

22 Q. Okay.

23 A. I'm referring to that.

24 Q. So you would agree with me that the vast
25 majority of Ripple's revenues have come from XRP

1 sales over the years?

2 MR. WHITE: Objection; form,
3 foundation.

4 A. I'm going to have to look at a specific
5 financial statement to actually verify my answer
6 to your question.

7 Q. Okay. Sitting here today, you can't
8 recall?

9 MR. WHITE: Objection; form.

10 A. It's been a while since I've read them
11 and it depends on what year you're talking about.
12 I don't recall.

13 Q. Okay. Professor, we talked a little
14 earlier about consensus.

15 What is consensus? What does that term
16 mean?

17 A. Consensus is a -- a set -- is a set of
18 different mechanisms where different validators on
19 a -- on a network decide as to whether or not to
20 move the Ledger forward and add a block to the
21 chain. And so there's different kinds of
22 consensus mechanisms where proof of work and proof
23 of stake and federated consensus mechanism that
24 Ripple has to actually make that final encrypted
25 decision to move the Ledger forward.

1 Q. Do you consider yourself an expert in
2 consensus?

3 A. Good enough working knowledge of it,
4 yes.

5 Q. That wasn't quite my question.
6 Do you consider yourself an expert in
7 consensus?

8 A. How do you define "expert"?

9 Q. I'm asking what you consider yourself,
10 sir. So do you consider yourself an expert in
11 consensus?

12 A. Yes.

13 Q. What is the relationship, if any,
14 between consensus and the question of the extent
15 to which a blockchain is decentralized?

16 MR. WHITE: Objection; form.

17 A. Can you repeat that question, please?

18 Q. Sure.

19 What is the relationship, if any,
20 between consensus and the question of the extent
21 to which a blockchain is decentralized?

22 MR. WHITE: Objection; form.

23 A. It's -- the way I understand it, it's
24 all about sufficient number of validators agreeing
25 on moving the blockchain forward. And that's part

1 of consensus mechanism. It's a consensus among
2 validators.

3 Q. And how is that related to the concept
4 of decentralization?

5 A. In that there is no single central
6 authority making that decision, but independent
7 nodes that do not -- validator nodes that do not
8 trust each other achieving a path forward on the
9 blockchain.

10 Q. Have you reviewed the paper entitled
11 "The Ripple Protocol Consensus Algorithm" authored
12 by David Schwartz, Noah Youngs, and Arthur Britto?

13 A. It sounds familiar, but I would have to
14 take a look at that.

15 Q. Are you familiar with the term "Sybil
16 attack"?

17 A. I've read about Sybil attack.

18 Q. What is Sybil attack?

19 A. As I'm sitting here, I cannot define it
20 for you.

21 Q. Let me pose a hypothetical regarding the
22 application of consensus using an example of
23 something other than a blockchain. Okay?

24 A. So what's the hypothetical?

25 Q. The hypothetical is let's suppose

1 there's a rocket and the rocket's direction is
2 controlled by a navigation system. Okay?

3 MR. WHITE: Objection; form.

4 A. Mm-hmm.

5 Q. Okay. Let's say the rocket has a single
6 navigation system to control its navigation.

7 A. Mm-hmm.

8 MR. WHITE: Objection, form,
9 to that last question.

10 Q. Is this a centralized system?

11 MR. WHITE: Objection; form.

12 A. I find the analogy hard to reconcile
13 with my notion of decentralized.

14 Q. I'm sorry. I didn't quite understand
15 your answer.

16 Would you say that is a centralized
17 system?

18 MR. WHITE: Same form
19 objection.

20 A. What I say is that I have a hard time
21 reconciling your example, your hypothetical, with
22 the decision as to whether or not centralized, not
23 centralized.

24 Q. Are you saying that my hypothetical
25 doesn't provide enough information for you to know

1 whether or not the system is centralized or
2 decentralized?

3 MR. WHITE: Objection;
4 mischaracterizes testimony.

5 A. That is not what I said. I was not
6 looking for more information. I was just trying
7 to find the context of your hypothetical to
8 actually try to answer my question -- to answer
9 your question.

10 Q. Okay. So can you answer the question as
11 to whether or not that's a centralized system?

12 MR. WHITE: Objection; form.

13 A. Can you repeat your system?

14 Q. Sure.

15 So there's a rocket.

16 A. Mm-hmm.

17 Q. It has a navigation system. It's
18 controlled by one single navigation system.

19 A. Mm-hmm.

20 MR. WHITE: Objection to form
21 to this -- continue.

22 MR. SYLVESTER: I have to
23 finish. Thank you.

24 MR. WHITE: I understand.

25 MR. SYLVESTER: Thank you.

1 Q. Is this a centralized system?

2 MR. WHITE: Objection to
3 form.

4 A. Given the narrowness of the information,
5 the limited information that you're providing me,
6 I would say there's a single point of failure.

7 Q. So does that mean the system is
8 centralized?

9 A. I've never thought about centralization
10 in that context so I can't answer your question.

11 Q. Okay. Generally, if there's a single
12 point of failure in a system, does that mean the
13 system is centralized?

14 MR. WHITE: Objection; form.

15 A. In a nondefinitional way, I mean, I
16 would say yes.

17 Q. Let's say -- we're still with the
18 rocket. Let's say instead of having one
19 navigation system, it has two: A primary
20 navigation system and a secondary navigation
21 system.

22 A. Mm-hmm.

23 MR. WHITE: Objection to --
24 sorry.

25 Q. Is that a centralized system?

1 MR. WHITE: Objection to
2 form.

3 A. It depends how these two navigation
4 systems come to a decision.

5 Q. How does it depend? Can you explain
6 your answer?

7 MR. WHITE: Objection to
8 form.

9 A. I was saying -- oh, yes. Do the two --
10 you said guidance systems? What did you call
11 them?

12 Q. Navigation systems.

13 A. Navigation systems.

14 -- whether they depend on one another or
15 not.

16 Q. Okay. Let's say the system is
17 designed -- two navigation systems. It's -- it's
18 designed -- the navigation systems are designed to
19 take the navigation data from the primary and, if
20 that one fails, then the secondary system.

21 Is that -- is that system centralized?

22 MR. WHITE: Objection; form.

23 A. I don't think there was enough of a
24 decision to actually -- enough of a definition
25 around centralization as to whether or not that

1 would be centralized or not.

2 Q. I just want to make sure I understand
3 your answer.

4 It's not that the hypothetical doesn't
5 have enough information. It's that the concept of
6 centralization isn't sufficiently defined to
7 answer, correct?

8 A. To be able to answer that question, yes.

9 MR. WHITE: Objection; form.

10 Q. Let's say instead a rocket has three
11 navigation systems and its navigation is
12 controlled by majority voting.

13 Are you familiar with the majority
14 voting system?

15 A. Yes.

16 MR. WHITE: Objection to
17 form.

18 Q. Let's say in this hypothetical with
19 three navigation systems one of those systems
20 fails. It just simply ceases to operate.

21 What impact would that have on the
22 rocket?

23 MR. WHITE: Objection; form,
24 and relevance of a rocket analogy to
25 blockchain.

1 A. So you have three navigation systems and
2 there's majority voting in these navigation
3 systems and one navigation system falls out or
4 fails. And then the question is?

5 Q. How would that affect the system's
6 ability to operate?

7 MR. WHITE: Objection; form.

8 A. Again, given the limiting parameters of
9 this hypothetical, those two remaining guidance
10 systems are still -- I'm not sure how you're
11 drawing the analogy there, but -- to centralized
12 operation. So there is no longer -- if there's
13 only two left, there is no longer a majority in
14 your hypothetical. And if there's no longer a
15 majority, then those decisions can't be -- the
16 system fails, I guess.

17 Q. Okay. Let's say we have the three --
18 three navigation systems, majority voting. Let's
19 say two of the navigation systems simply fail.

20 Is that system centralized?

21 MR. WHITE: Objection; form.

22 A. If they have no fail-safes, no backup
23 mechanisms? I think I -- there's just not enough
24 information to actually make a decision on
25 centralization.

1 Q. Okay. Let's say instead of -- same --
2 same rocket, same three navigation systems, same
3 majority voting. Let's say instead of two of the
4 systems simply failing they're taken over by the
5 enemy, by a malicious actor.

6 MR. WHITE: No -- sorry.

7 Q. Is that system centralized?

8 MR. WHITE: Objection; form.

9 A. I have -- so what are the parameters
10 again?

11 Q. The rocket has three navigation systems;
12 they majority vote on navigation; a malicious
13 actor takes over two of the voting systems.

14 Is that system centralized?

15 MR. WHITE: Objection; form.

16 A. Based on the information you're giving
17 me and the analogy you're making or the -- the
18 hypothetical you're providing me, it was still
19 decentralized -- is it centralized? Is that your
20 question?

21 Q. Yes.

22 A. No.

23 Q. Why not?

24 A. Because the original design was still
25 three.

1 Q. Is the system in my hypothetical
2 controlled by one authority?

3 MR. WHITE: Objection to
4 form.

5 A. After two are hijacked, or whatever you
6 said --

7 MR. WHITE: Objection to
8 form.

9 A. -- there's one left, but the rule of the
10 system was majority -- I don't know. I'm kind of
11 getting lost in the -- in the analogy here.

12 Q. Okay. Did you want me to repeat the
13 question or -- would that be helpful?

14 A. Were the same conditions still the same
15 in that analogy as in majority voting?

16 Q. Three navigation systems, majority
17 voting, malicious actor takes over two.

18 Is that a centralized system?

19 MR. WHITE: Objection to
20 form.

21 A. It would violate the majority protocol.

22 Q. Is it -- understanding your -- your
23 response, is that -- is that meant to be a
24 response to the question of whether or not it's a
25 centralized system?

1 A. I can't answer whether that's a
2 centralized system.

3 Q. Okay. How might -- so we have a rocket
4 with three navigation systems. How might we make
5 the rocket --

6 THE REPORTER: Repeat.

7 MR. SYLVESTER: Yes.

8 Q. We have a knock -- a rocket with three
9 navigation systems, majority voting.

10 How might we make the rocket's
11 navigation system more resilient from attack?

12 MR. WHITE: Objection to
13 form; calls for speculation.

14 A. Not being a rocket scientist, I mean, I
15 wouldn't -- I wouldn't know.

16 Q. Let's switch to a blockchain on that
17 analogy then. Let's take a --

18 A. Before you go there, can I go to the
19 restroom, please?

20 Q. Yeah. Absolutely. Let's take a break.

21 THE VIDEOGRAPHER: Going off
22 the record. The time is 11:50.

23 (Whereupon, a recess is taken.)

24 THE VIDEOGRAPHER: We'll go
25 back on the record. The time is

1 12:05.

2 BY MR. SYLVESTER:

3 Q. Professor, before I believe that you
4 testified that you're familiar with the Byzantine
5 generals problem, is that right?

6 A. As a -- at a high level, yes.

7 Q. Can you describe what that is?

8 A. It's basically where multiple -- I guess
9 we can put it in the context of nodes, in the
10 context of generals, that have to make a decision
11 as to whether or not to take a certain action. In
12 this case, for example, the action would be for
13 the blockchain to move forward, but not all of
14 the -- all of the generals actually have the same
15 opinion of what they should be doing.

16 And then the -- the -- the problem is
17 then how does one arrive at a consensus to move
18 forward even independent of what -- of the
19 majority to move forward independent of the ones
20 that are not part of the majority will be doing.

21 So the Byzantine problem is often put in
22 the context of -- of fault tolerance of a
23 blockchain where, since all the nodes of the
24 validators are untrusting of one another, the
25 question then is when transactions need to be

1 validated, we need to sort of get to a majority
2 vote or arrive at a consensus. That's what a
3 Byzantine problem is. And how do we communicate,
4 I guess, how we move forward with a majority of
5 generals or a majority of nodes.

6 Q. Professor, do you know how the XRP
7 Ledger consensus mechanism works?

8 A. Yes.

9 Q. Can you describe how the XRP Ledger
10 consensus mechanism works?

11 A. The Ledger -- and, again, I'm not going
12 to go too deep into this, but the Ledger has
13 unique node lists of multiple validators that will
14 ultimately -- will decide on whether or not a
15 transaction will -- well, first, there's the
16 verification of the transaction, then there's the
17 communication of the verification of the
18 transactions, and then there is the majority vote
19 on the -- any of the unique node lists that makes
20 then a decision as to whether or not there is
21 liveness on the blockchain as the transactions
22 move forward.

23 Q. What's the role of the unique node list
24 in validation on the XRP Ledger?

25 A. Ultimately they make the decision as to

1 whether or not the transaction was -- the Ledger
2 moves forward.

3 Q. The validators on the unique node list
4 ultimately make that decision?

5 MR. WHITE: Objection. No
6 question.

7 A. Unique node list make that -- makes that
8 decision, yes.

9 Q. Yeah. What I'm trying to draw the
10 distinction is, is it the list itself making the
11 decision or is it the validators on the list
12 making the decision?

13 A. I'm going to have to think about that.

14 So for consensus to -- to achieve
15 consensus, the validators in the unique node lists
16 have to agree, or 80 percent of them have to
17 agree, as to whether to move the transaction
18 forward.

19 Q. You testified earlier that one of the
20 improvements of the XRP Ledger is speed, is that
21 correct?

22 A. Yes.

23 Q. Is there any relationship between the
24 XRP Ledger's consensus mechanism and its speed?

25 MR. WHITE: Objection; form.

1 A. That is the information that I've taken
2 from what is provided on the various citations
3 that I've cited in my report, yes.

4 Q. Okay. So I think what you're saying is
5 it's not your expert opinion that the XRP Ledger
6 is faster, but you've gathered from the sources
7 you've reviewed that the XRP Ledger is, in fact,
8 faster?

9 A. It is my --

10 MR. WHITE: Objection to
11 form.

12 A. -- expert opinion in the comparison of
13 the XRP Ledger and bitcoin, Ethereum, that the
14 information that is available based on the type of
15 consensus mechanism that is being used, proof of
16 work or federate consensus, that the federate
17 consensus mechanism is, in fact, faster than the
18 two other ones.

19 Q. Do you know why it's faster than the two
20 other ones?

21 A. We --

22 MR. WHITE: Objection to
23 form.

24 Go ahead.

25 A. In the context of bitcoin, for example,

1 because there is no mining mechanism involved as
2 in their consensus program, there is no
3 requirement for six -- for agreement, I guess,
4 among the -- for establishment, I guess, for one
5 miner to be the fastest one to actually move a
6 transaction forward. So the mining mechanism
7 takes longer to allow a transaction to move
8 forward, whereas the voting mechanism on this dUNL
9 is a faster mechanism.

10 Q. What about the speed of the XRP Ledger
11 compared to the Ethereum blockchain?

12 MR. WHITE: Same objection.

13 A. Again, I'm going to refer to my report
14 where the information, I guess, in the comparison
15 of the speed and time, and Ethereum is also a
16 proof of work mechanism, though it's moving
17 towards proof of stake, that the time it takes to
18 ultimately validate and move a transaction forward
19 takes longer than -- than XRP. It's not a voting
20 mechanism. It's a mining mechanism.

21 Q. Is the XRP Ledger's consensus mechanism
22 faster than a proof of stake consensus mechanism?

23 MR. WHITE: Objection; form.

24 A. I have not made that comparison.

25 Q. Do you know?

1 MR. WHITE: Objection to
2 form.

3 A. I do not know. And when I -- the
4 opinion in my report on the innovation of the XRP
5 Ledger over what existed at that time in the
6 industry, that there was no Ethereum or proof of
7 stake mechanism out there at that time. Was the
8 second Ledger and so I could only compare it to
9 blockchain -- only compare it to bitcoin. But I
10 know from the literature, and I've cited to it,
11 that the Ethereum transactions are slower, but I
12 don't know about proof of stake.

13 Q. Okay. When was the XRP Ledger launched?

14 MR. WHITE: Objection; form.

15 A. What do you mean with the word
16 "launched"?

17 Q. When did it come into existence?

18 A. So that is also ambiguous. When was it
19 developed or when was it made public?

20 Q. Let's start with when was it developed?

21 A. I don't know the exact time of that, but
22 it was obviously developed before it was publicly
23 released.

24 Q. Who developed it?

25 A. The names of the people that developed

1 it?

2 Q. Sure, if you know.

3 A. I believe it was in the Coinbase. Not
4 Coinbase. What am I saying? OpenCoin. Sorry.

5 Q. Yeah, I meant the people who actually
6 coded the XRP Ledger.

7 Do you know?

8 A. Oh, you mean the people. I believe
9 David Schwartz was involved. Arthur Britto was
10 involved. And I forgot who the third person was.

11 Q. Okay.

12 A. Jim. I forgot his last name.

13 Q. And when was the XRP Ledger made
14 available to the public?

15 A. I don't know what the actual time was or
16 date was when it was released to the public, but
17 it was clearly after the development in -- maybe
18 2013, in that order, based on my reading of the --
19 of David Schwartz's deposition. I believe he
20 makes reference to that date, late 2012/early
21 2013.

22 Q. Who controlled the validators on the UNL
23 at the time of XRP Ledger's public launch?

24 MR. WHITE: Objection; form.

25 A. I'm going to need to refer to other

1 documents that would have that information in it.

2 Q. You're not sure sitting here today?

3 MR. WHITE: Same objection.

4 A. Ripple definitely controlled some
5 validators, but I don't know who controlled which
6 validator.

7 Q. I'm talking, just to be clear, at the --
8 at the start when the XRP Ledger was made public.

9 At that point in time, do you know who
10 controlled the validators?

11 MR. WHITE: Objection; form.

12 A. Again, I'm going to have to refer to a
13 document that refers to that date and that
14 information.

15 Q. And -- and that's because you don't
16 know.

17 MR. WHITE: Objection to form
18 and no question.

19 A. I'm not sure, but from what I've read,
20 again, from David Schwartz's deposition, that
21 Ripple controlled some of the validators.

22 Q. Did Ripple control all of the validators
23 at that time?

24 MR. WHITE: Objection; form.

25 A. I do not recall. I'm going to have to

1 refer to that deposition or other reports.

2 Q. Assuming that at the public launch of
3 the XRP Ledger, Ripple controlled all of the
4 validators on the UNL, would that make the XRP
5 Ledger at that point in time centralized?

6 MR. WHITE: Objection; form.

7 A. Well, you're calling for my analysis of
8 what is centralized and I am -- there's too many
9 complexities, as I mentioned earlier, involved in
10 what the definition is of centralized and
11 decentralized.

12 Q. Right. Well, I'll ask you just to apply
13 the general understanding that you described for
14 us earlier.

15 MR. WHITE: Objection. No
16 question.

17 Q. Do you understand what I mean or no?

18 A. Can you repeat that question?

19 Q. Sure.

20 Earlier, when we were discussing
21 paragraph 21 of your report where you describe the
22 decentralized nature of the XRP Ledger, you gave
23 me your general understanding of what
24 decentralized meant.

25 Do you recall that?

1 A. In that context, yes.

2 Q. In that context.

3 So I'm asking you to apply that general
4 understanding as you articulated it to this
5 context that I am asking you about, which is a
6 circumstance in which Ripple controls all of the
7 validators on the UNL.

8 In that circumstance, applying your
9 general understanding, would that make the XRP
10 Ledger centralized?

11 MR. WHITE: Objection; form.

12 A. Well, again, calls for between us a
13 common understanding of what the definition is of
14 decentralized. So at that time -- or when I used
15 "decentralized," I'm not defining centralized to
16 decentralized. But the way I stated my
17 understanding of -- the business level
18 understanding of centralized and decentralized was
19 that there were more aspects, I guess, to the XRPL
20 when it was released to the public in that it was
21 open. It -- it -- it allowed for third-party
22 contracts.

23 And then this question of, well, if
24 there was central authority that authorizes all
25 transactions.

1 Q. Right.

2 So even if there was a central authority
3 that was required to authorize all transactions,
4 in your view such a system could still be
5 decentralized?

6 MR. WHITE: Objection; form
7 and no question.

8 A. It could be because there are many
9 layers to the structure of a blockchain or there
10 are many layers to the structure of a blockchain.
11 There's the validation layers, there's the
12 governance layers, there's the network layers of a
13 blockchain. And, therefore, whether one decides
14 whether something is centralized or not depends on
15 how you query the entire structure of the
16 blockchain and not just the -- in your narrow
17 example in 2013, when it was first released,
18 making the assumptions that you are making is just
19 one aspect of the centralization question and
20 discussion.

21 Q. Okay. Can every block in every
22 transaction that ever occurred on the XRP Ledger
23 be viewed by anyone today?

24 MR. WHITE: Objection; form.

25 A. If you're referring to permissionless

1 blockchains, that's the intent. As a node on the
2 blockchain, as the University of Michigan is, we
3 have a -- a shadow ledger and I can see all
4 transactions in the blockchain.

5 Q. And are you -- is the University of
6 Michigan able to view through its node all
7 transactions on the XRP Ledger from its public
8 launch until the present time?

9 MR. WHITE: Objection to
10 form.

11 A. It is my understanding that if we wanted
12 to, we would be able to.

13 Q. Are you aware that the XRP Ledger halted
14 in November of 2021?

15 MR. WHITE: Objection; form.

16 A. No.

17 Q. Okay. Let's look at Exhibit 23.

18 (Whereupon, exhibit is
19 received and marked SEC Adriaens
20 Exhibit 23 for identification.)

21 BY MR. SYLVESTER:

22 Q. So Exhibit 23, Professor, is the
23 printout from the website -- I won't read the
24 entire URL as it appears at the bottom of the
25 document, but it's from xrplf.org.

1 Are you familiar with xrplf.org?

2 A. I've seen it, yes.

3 Q. Okay.

4 A. Seen reference to it.

5 Q. Is xrplf.org among the sources that you
6 cite in your expert report?

7 A. I'm going to have to check that. I
8 don't recall.

9 Q. Okay. So I take it -- let me ask the
10 question.

11 Have you seen this document before
12 today?

13 A. I have not.

14 Q. Okay. Take a minute to review it and
15 then I'll ask questions. Let me know when you're
16 ready.

17 (Pause)

18 A. I've had a chance to look through this
19 document.

20 Q. Okay. Great.

21 As you can see, the document describes a
22 network halt on November 3rd, 2021. And one of
23 the items, number 3, says "In the wake of quorum
24 loss, the system behaved as expected, valuing
25 safety over liveness. The halt was the correct

1 response."

2 Do you see that?

3 A. I see that.

4 Q. What does the phrase "quorum loss" mean
5 there?

6 MR. WHITE: Objection;
7 foundation.

8 A. I would have to speculate because I
9 don't know, but the general use of the word
10 "quorum" means that it is a majority.

11 Q. And does that have any relationship with
12 the way in which the XRP Ledger -- the way in
13 which the XRP Ledger's consensus mechanism works?

14 MR. WHITE: Objection; form
15 and foundation.

16 A. I don't have enough information
17 regarding this halt. I haven't done any analysis
18 on this to try to understand, a better
19 understanding of underlying theories behind these
20 top line statements.

21 Q. Okay. Do you understand the phrase "the
22 system behaved as expected, valuing safety over
23 liveness"?

24 A. Yes.

25 Q. What does that mean?

1 MR. WHITE: Objection.

2 A. So liveness means good things happen,
3 forward -- forward movement of the -- of the
4 blockchain. And safety is -- bad things can
5 happen. And so basically it says the system
6 behaved in a valued -- sort of protecting against
7 bad things that could happen rather than moving
8 the server forward.

9 But, again, that's just my analysis of
10 the language, the statement as -- as -- as
11 presented here. I really don't know more than
12 that.

13 Q. Okay. Do you know if the XRP Ledger is
14 designed to halt if a certain number of validators
15 on Ripple's UNL stop validating transactions?

16 MR. WHITE: Objection; form.

17 A. I would have to speculate and go back to
18 the workings of the XRPL on that.

19 Q. So you're not sure sitting here today,
20 is that right?

21 MR. WHITE: Same objection.

22 A. So what is the question again?

23 Q. Is the XRP Ledger designed to halt if a
24 certain number of validators on Ripple's UNL
25 stopped validating transactions?

1 MR. WHITE: Objection.

2 A. I would have to look at the information
3 that I provided in my report, if at all, regarding
4 that issue.

5 Q. Okay. So I just -- is your answer that
6 the answer is in your report, but you don't know
7 right now or --

8 MR. WHITE: Objection.

9 A. I cannot be certain, so I would have to
10 refer to my report.

11 Q. Okay. And do you believe the answer to
12 that question is in your report?

13 A. I have a discussion around safety and
14 liveness and I'm going to have to look back at
15 that section around safety and liveness in my
16 report.

17 Q. Okay.

18 (Pause)

19 A. Sir, what was your question again?

20 Q. Sure.

21 Is the XRP Ledger designed to halt if a
22 certain number of validators on Ripple's UNL stop
23 validating transactions?

24 MR. WHITE: Objection.

25 A. Is it designed to halt? I can answer

1 this more broadly that if validation protocol is
2 violated, that a blockchain would not move
3 forward.

4 Q. Right. And I'm asking a specific
5 question about the XRP Ledger's validation
6 protocol.

7 A. Mm-hmm.

8 Q. So is the XRP Ledger's validation
9 protocol designed such that the XRP Ledger will
10 halt if a certain number of validators on Ripple's
11 UNL stop validating transaction?

12 MR. WHITE: Objection.

13 A. I'll have to verify what the conditions
14 are under which the Ledger will halt.

15 Q. Okay. So you don't know either way
16 sitting here today?

17 A. Yes. No. Sorry. I -- I do not -- that
18 was a double negation there.

19 Q. Yes.

20 A. I do not know. I'll have to verify
21 that.

22 Q. Okay. Let's turn to page 12 of your
23 report, your Exhibit 1, paragraph 27. And I'm
24 looking at the top, point 1.

25 A. Uh-huh.

1 Q. Do you see where it says "Distributed
2 (Decentralized) Database"?

3 A. Yes.

4 Q. And that heading is followed by three
5 sentences.

6 Do you see that?

7 A. Yes.

8 Q. Do those three sentences describe a
9 database that is both distributed and
10 decentralized?

11 THE REPORTER: Repeat.

12 MR. SYLVESTER: Sure.

13 Q. Do those three sentences describe a
14 database that is both distributed and
15 decentralized?

16 A. The description here is pretty limited
17 when it comes to distributed and decentralized.
18 But, yes, each party in a blockchain has access to
19 the entire database that is part of being
20 distributed. There's no single party that
21 controls the data. That is one of the metrics
22 related to decentralization as to the validation
23 layer, but if you're asking does that describe
24 distributed and decentralized, if -- at a very
25 high level it talks to the elements of distributed

1 and decentralized.

2 Q. Okay. And did you -- strike that.

3 Did you create this description of
4 distributed or decentralized database or did you
5 draw it from another source?

6 A. Well, there's no citation here so this
7 would be from the working knowledge around
8 distributed and decentralized. My working
9 knowledge based on my experience on the -- the
10 boards of the venture funds.

11 Q. Okay. In general, in your report, when
12 you drew a definition or a description from
13 another source, was it your practice to cite that
14 source?

15 A. Yes.

16 Q. Okay. One of the aspects of
17 decentralization described here is no single party
18 controls the data or information.

19 Do you see that?

20 A. Yes.

21 Q. In your view, is a system centralized if
22 a single party does control the data or
23 information?

24 MR. WHITE: Objection; form.

25 A. Depends how you -- how one defines the

1 system. Because a -- a blockchain system has
2 multiple layers and each of these layers have to
3 be queried for centralized or decentralized.

4 Q. Okay. Narrowing just to the blockchain
5 context and the consensus mechanism, if a single
6 party controls the consensus mechanism, is the
7 blockchain decentralized?

8 MR. WHITE: Objection to
9 form.

10 A. The consensus mechanism or the protocol,
11 the validation protocol?

12 Q. Either. We can answer them one at a
13 time if you want. Let's start with consensus
14 mechanism.

15 If a single party controls the consensus
16 mechanism in a blockchain, is the blockchain
17 decentralized?

18 MR. WHITE: Objection to
19 form.

20 A. I cannot answer that question.

21 Q. Why is that?

22 A. Because the blockchain has more than
23 just a consensus mechanism associated with it.

24 Q. Okay. I'm going to ask the same
25 question the other way you put it.

1 In -- in the context of a blockchain, if
2 a single party controls the validation protocol,
3 is the blockchain decentralized?

4 MR. WHITE: Objection to
5 form.

6 A. The same answer because a blockchain is
7 more than a consensus mechanism.

8 Q. Okay. Have you read the -- strike that.
9 Let's go to paragraph 32, which is on
10 page 15.

11 Have you read the white paper under
12 the -- published under the pseudonym Satoshi
13 Nakamoto referenced in paragraph 32?

14 A. At some point in time I have, yes.

15 Q. When did you first read it?

16 A. I don't exactly know, but this was
17 between five and ten years ago, when I first got
18 into blockchain.

19 Q. Have you read it more recently?

20 A. I have not.

21 Q. Okay. The first sentence of paragraph
22 32, you describe -- strike that.

23 The first sentence of paragraph 32 is
24 "Blockchain technology enables (among other
25 things) a novel medium of exchange known as

1 cryptocurrency."

2 Do you see that?

3 A. I see that.

4 Q. Are you offering any opinions in this
5 case as to whether or not any cryptocurrency is a
6 generally accepted medium of exchange?

7 A. Can you repeat that question?

8 Q. Sure.

9 Are you offering any opinions in this
10 case as to whether any cryptocurrency is a
11 generally accepted medium of exchange?

12 MR. WHITE: Objection to
13 form.

14 A. I don't think that is explicit in my
15 opinions here, no.

16 Q. Okay. Let's go to the first sentence of
17 paragraph 33. "The primary purpose of bitcoin was
18 to securely store value in a public,
19 decentralized, and self-sustained system."

20 Do you see that?

21 A. Yes.

22 Q. What's your -- what's your basis for
23 that statement?

24 A. Just drawing on the general knowledge of
25 what the purpose and the objective was of bitcoin.

1 Q. And how did you obtain that general
2 knowledge?

3 A. Conversational discussions, working
4 knowledge in the financial technology space. No
5 specific reference.

6 Q. Okay. Further down in the paragraph, do
7 you see where it says "When a user sends bitcoin,
8 the transaction is bundled in a block with 1,000
9 to 2,500 other transactions and published to the
10 network"?

11 A. I see that.

12 Q. What's your basis for that statement?

13 A. This is something I read probably on the
14 specifics of how transactions were bundled.

15 Q. Is there any reason why there's not a
16 source cited for that statement?

17 MR. WHITE: Objection to
18 form.

19 A. It may have been not specific to this
20 sentence, but around bitcoin I have a number of
21 citations. So, no, I didn't specifically cite
22 this, but this information is available in other
23 references. It's in my report -- I mean it's in
24 the citations in my report, but I wouldn't be able
25 to point to the specific citation that actually

1 says this.

2 Q. Okay. Let's go to paragraph 38. The
3 bottom of -- the bottom of paragraph 38, so it's
4 actually on page 18. The last sentence says
5 "Ether follows the same principles as bitcoin in
6 that its rewards and distribution are regulated on
7 a yearly basis."

8 Do you see that?

9 A. Right above paragraph 39?

10 Q. That's right, yes.

11 A. Yes.

12 Q. What's your basis for that statement?

13 A. Again, information from the literature
14 on Ethereum.

15 Q. And which literature on Ethereum?

16 A. I don't know if it was from bitcoin.com.
17 One of the citations that I have in -- in my
18 report referred to that on a comparison of
19 different -- I think it had to do with the
20 different consensus mechanisms and the rewards of
21 the different consensus mechanisms.

22 Q. And do you recall which -- which article
23 you cited in your report has this proposition?

24 A. I do not, but as I indicated, I think it
25 is related to the different consensus methods that

1 at one point I describe. I'd have to go back and
2 see which of the cited references, cited
3 footnotes, actually gets -- has this information.

4 Q. Is -- is there any reason that you
5 didn't drop a footnote after this sentence here at
6 the end of paragraph 38?

7 MR. WHITE: Objection to
8 form.

9 A. I assume it to be common knowledge in
10 the industry and I didn't -- it was not material
11 to my opinion.

12 Q. Did you only include in your citations
13 sources that were material to your expert opinion?

14 MR. WHITE: Objection; form.

15 A. I would say that I provided citations
16 when the -- when I relied further on that
17 information to come to an opinion. And if I did
18 not rely on those -- that specific statement, then
19 I didn't include the reference even if that
20 reference was readily obtained from other
21 references that I cited.

22 Q. Okay. Viewing your report as a whole,
23 divorced from this paragraph 38, are there sources
24 that you reviewed but that you didn't cite in your
25 report because you did not rely on them?

1 MR. WHITE: Objection; form.

2 A. Not that I recall, no.

3 Q. Okay. In paragraph 39, the next
4 paragraph, there's a number of statements about
5 energy consumption.

6 A. Yes.

7 Q. There's -- just to take one as an
8 example, this -- "This is roughly equivalent to
9 the annual energy draw of countries like
10 Bangladesh and Chile."

11 Do you see that?

12 A. Yes, I see that.

13 Q. Where -- what are your bases for the
14 statements that you make in paragraph 39 regarding
15 the energy consumption of various countries?

16 MR. WHITE: Objection; form.

17 A. It's illustrative of the differences in
18 energy use between different currencies.

19 Q. Sure, but what was your source of that
20 information?

21 MR. WHITE: Objection; form.

22 A. I know that on the energy -- let's see.
23 Twenty-three. So you're specifically referring to
24 the specific sentence regarding Bangladesh and
25 Chile?

1 Q. There -- there's that sentence. The
2 next sentence refers to consumption of American
3 and Nigerian citizens. There's a sentence after
4 that about the average U.S. household's energy
5 consumption.

6 Just for any of these assertions, what
7 was your source?

8 MR. WHITE: Objection; form.

9 A. I'm going to have to look back at that.
10 And during the drafting of the report, later on in
11 the report, I also again talk about the energy
12 aspects of blockchains and there are citations
13 there. So they may have been there instead of
14 over here. I mean, I'm not entirely sure.

15 But even using this information is
16 not -- it's illustrative and it's not salient to
17 the opinion. What is salient to the opinion is
18 how much energy is being used, not whether or
19 not -- how it compares to energy consumption of
20 Bangladesh and Chile.

21 Q. Mm-hmm.

22 But sitting here today, you're not sure
23 from what source you drew that information
24 regarding energy consumption in paragraph 39, is
25 that right?

1 MR. WHITE: Objection to
2 form.

3 A. I'm going to have to -- sorry.

4 I'm going to have to go back over the
5 later citations and see if it was in there.

6 Q. Okay. Turning -- I'd like you to take a
7 look at, as a whole, paragraphs 41, 42, 43, 44,
8 45, 46, 47. It's just a few pages of your report.

9 A. Mm-hmm.

10 Q. I see a citation after the first
11 sentence of paragraph 41, and then I see another
12 one at the very end of paragraph 48, but I don't
13 see any intermediate citations.

14 So my question for you is just why did
15 you opt not to specifically cite the sources of
16 the information in those intermediate paragraphs
17 between 41 and 48?

18 MR. WHITE: Objection; form.

19 A. If you're asking was there a conscious
20 decision to not cite this? No, there was not.

21 Q. Okay. So why was it that you opted not
22 to provide citations to the individual
23 propositions within those paragraphs?

24 A. A lot of this information that is
25 presented in these paragraphs actually draws on

1 both my own knowledge of the Ledger, engagement
2 with Ripple, as well as references on the bottom,
3 whatever citations on the bottom of page 19 that
4 sort of state -- or refer to the text that I'm
5 writing here.

6 I -- also, again, if you recall, I do
7 talk about the product arc later on and some of
8 the aspects that may refer to that and then come
9 back over here.

10 So it's -- it's, I mean, overall
11 knowledge that I've gained from my -- essentially
12 my ten years of working in the blockchain space,
13 financial technology companies, familiarity with
14 Ripple. So there was no conscious decisions to
15 opt to cite to or not cite to.

16 Q. Okay. Let's -- let's focus on paragraph
17 43, "Decentralized Validation."

18 Do you see that?

19 A. Yes.

20 Q. For the statements in that paragraph,
21 what were your sources, if any, that informed the
22 statements in paragraph 43?

23 MR. WHITE: Objection to

24 form.

25 A. Well, if you look at these statements,

1 they're really very high-level statements about
2 essentially what -- how decentralized validation
3 is used in the context of -- as I referred to
4 earlier, of both the business literature, the
5 investor conversations, and even the academic
6 literature, not necessarily being clear.

7 So I just sort of provide high-level
8 statements here, not definitional statements. And
9 because they were not definitional statements, I
10 guess I must not have cited to them. They're just
11 high-level elements.

12 Q. Okay. Did you draft paragraph 43?

13 MR. WHITE: Objection.

14 I'm going to instruct you not
15 to answer on the same basis discussed
16 earlier today.

17 Q. What is the difference, if any, between
18 your description of decentralization in paragraph
19 43 and the definition of decentralization that
20 requires that no single authority is fully trusted
21 by all?

22 A. So you're referring to paragraph 43 and
23 what?

24 Q. There's a -- I want you to assume that
25 one definition of decentralization requires that

1 no single authority is trusted by all. That's one
2 possible definition.

3 And what I'm asking is, sir, what's the
4 difference between that definition and your
5 description of decentralization in paragraph 43,
6 if there is one?

7 MR. WHITE: Objection; form.

8 A. This is in the same high-level con --
9 used in the same high-level context.

10 Q. I'm -- can you say more? What do you
11 mean by "used in the same high-level context"?

12 MR. WHITE: Objection; form.

13 A. So you're asking me to compare what I
14 say in paragraph 43 to what? To another
15 definition?

16 Q. Yes.

17 A. So where did you get that other -- where
18 does the other definition come from?

19 Q. Well, I mean, it comes from Troncoso,
20 but it kind of doesn't matter. Assume it's a
21 definition.

22 MR. WHITE: Objection. No
23 question.

24 A. I -- I was not aware --

25 Q. Okay. So --

1 A. -- where you were citing.

2 Q. Okay. So there's a definition that
3 something is decentralized if no single authority
4 is fully trusted by all. Let's just assume that's
5 the definition.

6 A. It's a definition.

7 Q. Yes, exactly.

8 Is there any difference between that
9 definition and the description you set forth of
10 decentralized validation in paragraph 43?

11 MR. WHITE: Objection to
12 form.

13 A. I have not done that analysis and that
14 was not the intent of this opinion to define
15 decentralization.

16 Q. Okay. In the middle of paragraph 43,
17 you write "Decentralized networks strive to reduce
18 the level of trust (and thus dependence) that
19 participants must place in each other and deter
20 their ability to exert authority or control over
21 one another in ways that degrade the functionality
22 of the network."

23 Do you see that?

24 A. I see that.

25 Q. Okay. You write "decentralized networks

1 strive to."

2 Who or what is doing the striving?

3 MR. WHITE: Objection; form.

4 A. Who or what is doing the striving?

5 Q. Mm-hmm. Yes.

6 MR. WHITE: Same objection.

7 A. I think here I referred to the design of
8 decentralized networks and any design tries to
9 achieve a certain objective.

10 Q. Okay. Let me ask a question about the
11 last sentence of paragraph 43. You write "In
12 other words, the purpose of decentralized
13 validation is to avoid one party having outsized
14 control over one another to make a network
15 decision (to validate a transaction)."

16 Do you see that?

17 A. I see that.

18 Q. Okay. If one party must be trusted to
19 validate a transaction, is it fair to say that
20 that party has outsized control over others to
21 validate the transaction?

22 MR. WHITE: Objection; form.

23 A. Can you rephrase that question, please?

24 Q. Sure. Or I'll try to.

25 Let's assume that one party is in

1 control of transaction validation.

2 My question is, is it fair to say that
3 that party has outsized control over other parties
4 in making a network decision; i.e., validating
5 transactions?

6 MR. WHITE: Object to form;
7 incomplete hypothetical.

8 A. Sorry. I'm going to ask you to read --
9 I'm going to ask you to repeat it again because
10 I'm trying to read it in this sentence.

11 Q. Sure.

12 So the way I understand the sentence
13 is -- well, let me just read it again. You write
14 "The purpose of decentralized validation is to
15 avoid one party having outsized control over one
16 another to make a network decision (to validate a
17 transaction)."

18 And so my question is, if one party has
19 the authority or must be trusted to validate a
20 transaction, does that party have outsized control
21 over others?

22 MR. WHITE: Objection to
23 form; incomplete hypothetical.

24 A. In a generic sense, just like this is a
25 generic statement, that would be the implication,

1 yes.

2 Q. Okay. I want to show you what's been
3 marked PA 24.

4 (Whereupon, exhibit is
5 received and marked SEC Adriaens
6 Exhibit 24 for identification.)

7 BY MR. SYLVESTER:

8 Q. Here you go.

9 So PA 24 has a URL at the bottom, but I
10 can tell you that it's from Amazon.com. And I'd
11 like you to read the first two sentences under the
12 first question "What is decentralization?"

13 Do you see that?

14 A. Yes.

15 Q. Okay. Can you read those aloud, please?

16 A. "In blockchain, decentralization refers
17 to the transfer of control and decision-making
18 from a centralized authority (individual,
19 organization, or group thereof) to a distributed
20 network. Decentralized networks strive to reduce
21 the level of trust that participants must place in
22 one another, and deter their ability to exert
23 authority or control over one another in ways that
24 degrade the functionality of the network."

25 Q. Okay. So have you seen this document

1 before, this Amazon page?

2 A. No.

3 Q. Okay. Can you explain why the first two
4 sentences of your paragraph 43 are almost word for
5 word the text of this Amazon page?

6 THE REPORTER: The last part.

7 Are almost word for word...?

8 MR. SYLVESTER: The text of
9 this Amazon page.

10 A. Well, I am -- I don't know where -- as I
11 said, I've never seen this document. I don't know
12 where the language in this document was taken
13 from, whether that is originally from Amazon or
14 came from another reference. And I do not recall
15 at this point where and how through the literature
16 I arrived at the structure of the sentence.

17 Q. Did you copy the first two sentences --
18 sorry. Strike that.

19 Did you copy the text from this page in
20 Exhibit 24 into the first two sentences of your
21 expert report?

22 A. I did not.

23 Q. Did anyone else?

24 MR. WHITE: Objection.

25 I'm instructing you to

1 exclude from your answer any
2 communications with counsel.

3 A. Sorry. What was your question?

4 Q. Did anyone else copy the text from the
5 Amazon web page at Exhibit 24 into your report at
6 paragraph 43?

7 MR. WHITE: Same objection
8 and instruction.

9 A. That is outside of my knowledge. I
10 wouldn't know.

11 Q. You wouldn't know.

12 MR. WHITE: Same objection
13 and instruction.

14 A. I didn't -- how we arrived -- how I
15 arrived at the sentence structure and where it
16 came from relative to the other documents that I
17 cited. It's not clear what the reference or the
18 relationship is between the Amazon document and
19 the two sentences there and where this was derived
20 from, from other sources that I did cite.

21 Q. You would agree with me, though, that
22 it's an almost word-for-word recreation of the
23 Amazon document in your expert report?

24 A. It is very close, yes.

25 Q. And sitting here today, you're not sure

1 why?

2 A. That's correct. I don't know.

3 Q. Okay. Let's move on to paragraph 44.

4 The first sentence is "Since there is no central
5 authority present to validate and verify the
6 transactions, and every transaction in a
7 blockchain is considered completely secured and
8 verified, consensus protocols are a core part of
9 any blockchain network."

10 A. Yes.

11 Q. What's your source for that statement?

12 A. That is sort of a general statement
13 around how blockchains are designed.

14 Q. Okay. You say "considered completely
15 secured and verified."

16 Do you see that?

17 A. Yes.

18 Q. Considered by what or by whom?

19 A. It would be through the validation
20 mech -- the consensus mechanism.

21 Q. Okay. And -- and you go on to define
22 consensus mechanism in the next sentence, is that
23 right?

24 A. There are four consensus protocols or a
25 core part, right.

1 Q. Okay. And you go on to define consensus
2 mechanism in the next sentence, is that right?

3 A. Yes.

4 Q. What source did you rely on, if any, for
5 your definition of consensus mechanism?

6 A. Again, I'm going to have to refer to
7 some of my earlier citations from which I referred
8 for many aspects or components of my report. I --
9 I don't know.

10 Q. Okay. This isn't -- strike that.
11 You did not create the definition of
12 consensus mechanism described in paragraph 44, is
13 that right?

14 A. It's a description, a description that's
15 out there.

16 Q. Okay. Paragraph 45 you write that
17 the -- second sentence. "The Ledger is
18 standardized with regard to protocols (objectives
19 in the consensus algorithm) and acceptance of
20 validators on to the network, and it is
21 decentralized with respect to how transactions are
22 validated."

23 Do you see that?

24 A. Yes.

25 Q. Okay. What does "standardized with

1 regard to protocols (objectives in the consensus
2 algorithm)" mean?

3 A. Well, every consensus mechanism on a
4 blockchain has a consensus -- has a protocol that
5 is the standard how the blockchain is supposed to
6 operate and how it's supposed to validate
7 transactions.

8 Q. What does the word "standardized" mean
9 in describing that -- those protocols?

10 A. The protocol is essentially the
11 governing document of how the blockchain operates.

12 Q. Is that the underlying code of the XRP
13 Ledger?

14 MR. WHITE: Objection to
15 form.

16 A. You could refer to it as that, yes.

17 Q. Okay. You describe Ripple's release of
18 a recommended UNL in paragraph 45.

19 Do you see that?

20 A. In 45?

21 Q. Yes.

22 A. Okay.

23 Q. What is the process for the placement of
24 validators onto Ripple's UNL, if you know?

25 A. Well, if validator nodes are active,

1 they can be added to a UNL pending approval of the
2 other validators within that UNL.

3 We're talking in general about UNLs?

4 Q. No, just Ripple's UNL.

5 What's the process for the selection of
6 validators that are placed onto Ripple's UNL?

7 A. It is my understanding that Ripple has
8 to approve of those validators.

9 Q. And do you know what metrics, if any,
10 Ripple applies to its approval process for
11 validators to be placed on its UNL?

12 A. I don't know specifically. I know more
13 generally that a validator has to be trusted; has
14 to be active and online; has to be -- has to have
15 participated on the Ledger. So sort of a -- a
16 history, I guess, of that particular node or --
17 but I don't know exactly what the criteria are.
18 These are just some features, I guess, associated
19 with those nodes.

20 Q. When you say -- I'm repeating your
21 testimony as I understand it. "I don't know
22 specifically. I know more generally that a
23 validator has to be trusted; has to be active and
24 online; has to be -- has to have participated on
25 the Ledger."

1 In that sentence is it trusted by
2 Ripple?

3 A. I'm sorry. I misstated. It doesn't
4 have to be trusted. It has to be -- there has to
5 be historical evidence of that particular
6 validator to be an active validator, have -- is
7 online a lot of the time, has participated in
8 prior transactions. So some history of that.

9 That would make it into the -- you're
10 specifically referring to a dUNL. But I don't
11 know about the actual protocol and how they select
12 them. I just know some of the characteristics
13 because they referred to that in the Schwartz
14 document.

15 Q. Is it fair to say that if Ripple selects
16 validators for inclusion on Ripple's UNL, that
17 Ripple trusts those validators?

18 A. I did not opine on that.

19 Q. What -- let me ask you this.

20 In paragraph 45 you say "In addition,
21 Ripple releases a recommended unique node list
22 (UNL) of trusted and verified" validate --
23 "validators."

24 A. Mm-hmm.

25 Q. Do you see that?

1 A. Yes.

2 Q. Trusted by whom?

3 A. I would assume that would be by the
4 other validators on the UNL as well as by Ripple
5 because they published that dUNL.

6 Q. Okay.

7 A. In fact, I'm speculating there. I don't
8 know what the actual process is.

9 Q. I'm not sure I understand.

10 When you use the word "trusted" in this
11 sentence in your report, who was doing the
12 trusting?

13 A. The intent of the sentence was not to be
14 that specific around who is doing the trusting.
15 It's basically reliable validators. That's really
16 the intent of the statement.

17 Q. Okay. So fair to say that in Ripple's
18 view, Ripple includes validators on its list that
19 Ripple views as reliable?

20 MR. WHITE: Objection; form,
21 foundation.

22 A. That would be the intent of the
23 sentence, but, as I said, I don't really know the
24 actual protocol that Ripple used to select the
25 validator -- validators.

1 Q. Okay. The last couple of sentences of
2 paragraph 45, "XRP Ledger users are not required
3 to use these validators for transactions." I'll
4 stop there.

5 Do you see that?

6 A. Yes.

7 Q. With -- is the reference -- strike that.

8 Is the phrase "these validators" a
9 reference to the validators that are listed on
10 Ripple's UNL?

11 A. You know, that's a little confusing
12 here.

13 Sorry, what was your question?

14 Q. Is the phrase "these validators" that
15 appears in the second-to-last sentence of
16 paragraph 45 a reference to the validators that
17 are listed on Ripple's UNL?

18 A. Yes. It says essentially that the XRP
19 Ledger users are not required to use the dUNL for
20 transactions --

21 Q. Okay.

22 A. -- to validate transactions. That was
23 the intent of the sentence.

24 Q. Okay. If nodes do not use the
25 validators on Ripple's UNL, are there any risks to

1 the nodes who opt not to use that UNL?

2 MR. WHITE: Objection; form.

3 A. It is my understanding there are other
4 UNLs available and other UNLs in the future that
5 could be created.

6 Q. Focusing just on the present, what's
7 your understanding about the degree of overlap in
8 the lists among the various UNLs that Ripple
9 publishes?

10 MR. WHITE: Objection to
11 form.

12 A. It seems like there were multiple
13 questions in that question. Part of it is, are
14 there other UNLs?

15 Q. That's a fair point.

16 Ripple publishes its own UNL, correct?

17 A. Yes.

18 Q. Okay. In the current iteration of the
19 Ripple code, is Ripple's UNL the only Ripple UNL
20 available?

21 A. No.

22 Q. Okay.

23 THE REPORTER: I'm sorry?

24 THE WITNESS: No. Sorry.

25 THE REPORTER: Thank you.

1 Q. There are other UNLs that are currently
2 listed in the Ripple-D code, is that right?

3 A. There's other UNLs available, yes.

4 Q. Okay. Focusing just on the UNLs that
5 are listed in the Ripple-D code, are you aware of
6 the extent of the overlap of the validator lists
7 among those UNLs with Ripple's UNL?

8 A. Am I aware there's overlap?

9 Q. I'm asking if you know whether or not
10 there's overlap.

11 A. By reading some of the documents that
12 I'm citing to, I'm aware that there is some
13 overlap.

14 Q. But is it a perfect overlap between the
15 lists?

16 MR. WHITE: Objection to
17 form.

18 A. I do not have that information here as
19 I'm sitting here.

20 Q. Okay.

21 MR. SYLVESTER: Should we
22 break for lunch? We're right about
23 one. Does that work for you?

24 MS. ZORNBERG: Sure.

25 MR. WHITE: Yes.

1 MR. SYLVESTER: Okay.

2 THE VIDEOGRAPHER: Going off
3 the record. The time is 1:08.

4 (Whereupon, a luncheon recess
5 is taken.)
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1 A F T E R N O O N S E S S I O N

2 THE VIDEOGRAPHER: We'll go
3 back on the record. The time is 2:11.

4 BY MR. SYLVESTER:

5 Q. Professor, I'd like to start with
6 paragraph 46 on page 21 of your Exhibit 1.

7 A. Okay.

8 Q. The first sentence of that paragraph is
9 "The XRP Ledger's consensus protocol breaks up the
10 common notion of a shared set of validator nodes."

11 Do you see that?

12 A. Yes.

13 Q. What do you mean here by "a shared set
14 of validator nodes"?

15 A. As I understand in my writing, I
16 intended that to mean that every node can choose
17 who they -- can choose the UNL that they work
18 with.

19 Q. And that's reflected in the next
20 sentence, "Rather, it lets every node declare
21 other nodes it subjectively trusts in a UNL"?

22 A. Yes.

23 MR. WHITE: Objection. No
24 question.

25 Q. Okay. If a node departs from the Ripple

1 UNL and instead creates its own list of validators
2 it subjectively trusts, what, if anything, will
3 ensure that it remains on the XRP Ledger and does
4 not fork?

5 MR. WHITE: Objection; form.

6 A. I don't think I'm prepared to answer
7 that question. As I indicated this morning, my
8 knowledge on blockchain and consensus and the
9 features are at the business implementation and
10 business development level. And some of the
11 technical aspects and underlying code and
12 protocol, issues like what you're referring to
13 right now, I cannot -- I cannot directly answer.
14 I do not have that level of expertise.

15 Q. Okay. And when you say you cannot
16 answer, is it because you don't know?

17 MR. WHITE: Objection; form.

18 A. I do not have that expertise.

19 Q. Okay. Let's look at paragraph 47 of
20 your report. The first two sentences say "Not all
21 XRP Ledger validators participate in the consensus
22 process all the time. In fact, a smaller subset
23 of validators consistently is responsible for
24 approval of transactions, and serves three
25 functions," and the sentence continues, but my

1 question is about the approval of transactions.

2 Is the smaller subset of validators that
3 is consistently responsible for approving
4 transactions the validators that are listed on
5 Ripple's UNL?

6 MR. WHITE: Objection; form.

7 A. I don't think there's anything in this
8 paragraph that refers to Ripple's UNL.

9 Q. Right. I understand that, sir. I
10 meant -- I'm asking if that's -- if that's an
11 accurate statement.

12 So you write "a smaller subset of
13 validators consistently is responsible for
14 approval of transactions."

15 A. Uh-huh.

16 Q. What is that "smaller subset"?

17 A. Again, I think that asks to a level of
18 technical knowledge that I cannot respond to.

19 Q. But you wrote this, right?

20 A. Yes.

21 Q. So what was your basis at the time of
22 writing for your understanding that a smaller
23 subset of validators consistently is responsible
24 for approval of transactions?

25 A. As a matter of -- the intent was to

1 write these paragraphs, as I indicate at the
2 beginning in paragraph 41, as sort of an overview
3 of the XRP Ledger based on the references cited in
4 26 and it states sort of as a matter of knowledge
5 that is out there rather than as an analysis. It
6 was also not materially analysis to -- material to
7 my analysis and opinions.

8 Q. Sitting here today, do you know whether
9 or not it's true that a smaller subset of
10 validators consistently is responsible for
11 approval of transactions?

12 A. I have no reason to disagree with that.

13 Q. I'm asking if you affirmatively agree.

14 Do -- do you -- do you have a basis to
15 believe it's true?

16 MR. WHITE: Objection to

17 form.

18 A. Not beyond the information that I've
19 gathered, but not from my own practical knowledge.

20 Q. Okay. And -- and what is the -- what is
21 the source for this sentence in paragraph 47?

22 A. Again, I refer you back to the citation
23 26 which is for present purposes going forward.
24 And a lot of this actually refers to various
25 different sources consulted in 26, which was a lot

1 of sources including a lot of Ripple -- Ripple
2 sources, Ripple website information.

3 Q. Do you know which of those sources cited
4 in 26 support the proposition that a smaller
5 subset of validators consistently is responsible
6 for approval of transactions?

7 A. I don't know and I will have to review
8 some of these websites.

9 Q. Did you write paragraph 47?

10 MR. WHITE: Objection. I'm
11 going to instruct the witness not to
12 answer for the reasons previously
13 stated.

14 MR. SYLVESTER: And what are
15 the reasons previously stated?

16 MR. WHITE: That the drafting
17 process is protected by the work
18 product privilege.

19 MR. SYLVESTER: Okay.

20 BY MR. SYLVESTER:

21 Q. I want to show you what's been marked
22 Exhibit 22, please.

23 (Whereupon, exhibit is received
24 and marked SEC Adriaens Exhibit 22
25 for identification.)

1 MR. SYLVESTER: Great. So

2 here you go.

3 BY MR. SYLVESTER:

4 Q. So Exhibit 22 is a printout from a
5 website, that appears at the bottom of the
6 document, from xrpl.org.

7 A. Uh-huh.

8 Q. Professor, you did cite xrpl.org as one
9 of your sources in -- in your report, correct?

10 A. I do cite that in Footnote 26, yes.

11 Q. Okay. The portion of this -- well, let
12 me ask you this: Have you seen this -- this
13 publication on xrpl.org prior to today?

14 A. As I mentioned, I did look at xrpl.org.

15 Q. Mm-hmm.

16 A. And this may or may not have been, I
17 guess, the information that -- that I've seen.

18 Q. Okay. Let me ask a better question.

19 If you turn to the second page, do you
20 see where it says "Validator Overlap
21 Requirements"?

22 A. Yes.

23 Q. Have you -- have you read this section
24 about validator overlap requirements on xrpl.org?

25 A. If this is what was the link, xrpl.org,

1 then I have read it.

2 Q. Does it look familiar to you sitting
3 here today?

4 A. I cannot be certain.

5 Q. Okay. If you wouldn't mind taking a
6 moment just to review those few paragraphs under
7 "Validator Overlap Requirements," I just have a
8 few questions.

9 (Pause)

10 A. I've read it.

11 Q. Okay. Let's start here.

12 Did you disagree with anything that you
13 read in the three paragraphs under "Validator
14 Overlap Requirements"?

15 MR. WHITE: Object to form.

16 A. I do not have the technical background
17 to either agree or disagree. It's just stated
18 as -- as written.

19 Q. Okay. Do you see where it says --
20 strike that.

21 If a validator selects a UNL that
22 overlaps less than 90 percent with other UNLs,
23 what risk does that pose?

24 MR. WHITE: Objection; form,
25 calls for speculation.

1 A. You're asking me to do a technical
2 analysis that I am not qualified to do based on
3 this information.

4 Q. Okay. Separate and apart from this
5 document -- I just want to make sure I understand
6 your answer -- you're not able to answer the
7 question if a validator selects a UNL that is --
8 that overlaps less than 90 percent with other
9 UNLs, what risk that poses, is that right?

10 MR. WHITE: Objection; form.

11 A. I don't have the background to answer
12 that question.

13 Q. Okay. Do you have -- do you see the
14 reference in Exhibit 22, at the bottom of that
15 section where it says "If your chosen set of
16 validators does not have enough overlap with
17 others, your server may diverge from the rest of
18 the network and you could lose money by taking
19 action based on your server's divergent state."

20 Do you see that?

21 A. No.

22 Q. No? Okay.

23 A. Are -- are you referring to this?

24 Q. Yes.

25 A. Okay.

1 Q. So Exhibit 22.

2 A. Yes.

3 Q. The third paragraph under "Validator
4 Overlap Requirements."

5 A. Yes.

6 Q. And then the last sentence of that third
7 paragraph.

8 A. A chosen set of validators.

9 Q. That's right.

10 A. Okay. I'm sorry, your question was?

11 Q. My question is, do you know how it is
12 that one could lose money by taking action based
13 on one server's divergent state?

14 MR. WHITE: Objection; form.

15 A. I do not have enough information to
16 actually make that -- to explain that.

17 Q. Okay. Let's go back to your report,
18 Exhibit 1, paragraph 48, which is on page 22.

19 A. Yes.

20 Q. The first sentence of that paragraph is
21 "The features of decentralized validation and the
22 XRP Ledger's consensus protocol enabled an
23 increase in the speed with which it can validity
24 transactions, and make settlement of the
25 transaction faster than traditional payment

1 rails."

2 What's the basis for that statement?

3 A. This is information that is based on the
4 citation, I believe Citation Number 27 and, again,
5 was part of my providing -- providing background
6 on the XRP and XRPL.

7 Q. Do you --

8 A. Not an analysis.

9 Q. I see.

10 Do you know how fast transactions
11 settled via traditional payment rails?

12 A. Depends which payment rails we consider.

13 Q. Okay. I'm trying to determine the basis
14 for your statement that the speed of the XRP
15 Ledger is faster than traditional payment rails.
16 So I'd like to know, what -- what are the
17 traditional payment rails that you're referring to
18 here? How fast do they settle transactions?

19 MR. WHITE: Objection; form.

20 A. I don't have information on how many
21 seconds or microseconds or whatever time it would
22 take.

23 Q. Is -- is this statement, the first
24 sentence of paragraph 48, something that you drew
25 from a source that you read in preparing your

1 report?

2 A. I believe so, yes. Either it's going to
3 be based on Footnote 26 or on the difference
4 between XRP and other cryptocurrencies, 27, which
5 makes reference to the speed of transactions.

6 Q. Okay. Paragraph 49 on page 23, about
7 four lines down, there's a sentence that says --
8 that starts "To prevent malicious activity..."

9 Do you see that?

10 A. Yes.

11 Q. Okay. So my question is, does a
12 validator on the XRP Ledger have to take any
13 affirmative steps to create a Unique Node List?

14 MR. WHITE: Objection to
15 form.

16 A. I am not prepared to respond to the
17 technical requirements of a validator and the
18 Unique Node List.

19 Q. And, so, it's fair to say you don't know
20 sitting here today?

21 MR. WHITE: Objection; form.

22 A. I don't know beyond the information
23 that's available publicly.

24 Q. I'm sorry, what do you mean by the
25 information "available publicly"?

1 A. That's available based on the citations
2 I've used earlier. It's descriptive of the
3 process, not an analysis of the process.

4 Q. Okay. Do you see where it says, in the
5 same paragraph, 49, "Each XRP Ledger validator
6 must maintain and have approved a list of trusted
7 servers"?

8 A. I'm not sure where you are.

9 Q. Oh, it's the same sentence that starts
10 with "To prevent malicious activity..."

11 A. Yes.

12 Q. Do you know if bitcoin also has the same
13 requirement, that nodes must have a list of
14 trusted servers?

15 A. Bitcoin works through miners, as far as
16 I understand.

17 Q. And does that process entail having a
18 list of trusted servers?

19 A. They're competing servers.

20 Q. So is that a no, it does not?

21 MR. WHITE: Objection; form.

22 A. I am not sure in terms of the use of
23 this language, but I understand that process to be
24 a mining process as opposed to a federated
25 consensus process.

1 Q. Going down to paragraph 50, the first
2 sentence, second clause, says that "the system
3 only makes forward progress when a super-majority
4 of the validators each node trusts agree on the
5 state of the Ledger."

6 Do you see that?

7 A. Yes.

8 Q. What is this super-majority? What --
9 what percentage must agree?

10 A. Based on the information that I have
11 read, I believe it's on the order of 80 percent.

12 Q. Can 20 percent of faulty nodes on
13 Ripple's UNL halt the XRP Ledger?

14 MR. WHITE: Objection; form.

15 A. Are you specifically asking about the
16 dUNL?

17 Q. Yes. I'll repeat it, but, yes.

18 Can -- can 20 percent of faulty nodes on
19 Ripple's dUNL halt the XRP Ledger?

20 MR. WHITE: Same objection.

21 A. I would need more information. I think
22 that is unclear since there are multiple UNLs
23 available and we don't know who actually uses the
24 dUNL, so...

25 Technically, in the protocol, the

1 implications of the 20 percent that you're
2 mentioning, I cannot do an analysis on that based
3 on where I'm sitting right now.

4 Q. When you say "in the protocol," what do
5 you mean by "protocol"?

6 A. The consensus protocol. The code.

7 Q. Okay. Skipping back to paragraph 49,
8 right after the sentence that we were just looking
9 at that starts with "To prevent malicious
10 activity," there's a sentence that says "The
11 network is designed to rely on trusted validator
12 parties that grow organically, while pushing out
13 dishonest nodes."

14 Do you see that?

15 A. I see that.

16 Q. Okay. How does the group of trusted
17 validators on the XRP Ledger grow organically?

18 A. Because new validators become part of
19 the network. How do new validators become part of
20 the network? Is that part of what you're asking?

21 Q. I'm asking what you meant when you wrote
22 that trusted validator parties grow organically.

23 A. Again, I used it in the context of the
24 information that I reviewed on the XRP Ledger.

25 Q. Okay. But do you have a meaning of what

1 the phrase grow -- I'm confused because I don't
2 know what the meaning of "grow organically" is.
3 So what did you mean by "grow organically"?

4 A. That new parties -- individuals,
5 universities, companies, whatever it might be --
6 become validators in the network.

7 Q. And --

8 A. That's organically.

9 Q. How is that organic?

10 A. Organic as opposed to -- in the commonly
11 used meaning of the term "organic" as opposed to
12 sort of directed new validators. So these sort of
13 pop out independent of Ripple, independent of some
14 of the other validators. So organic growth of a
15 network.

16 Q. And how about the concluding part,
17 "While pushing out dishonest nodes"? How are
18 dishonest nodes pushed out of the XRP network?

19 A. Again, this kind of goes to technical
20 aspects of the operation of the ledger. I believe
21 there was a voting process involved and I can't
22 comment beyond that.

23 Q. Okay. So this sentence is -- is
24 something that you obtained from reviewing from
25 another source?

1 A. Yeah.

2 Q. That's fair?

3 A. To -- to provide general context and
4 overview, yes.

5 Q. Okay. Can you -- sorry, strike that.

6 The last sentence of paragraph -- strike
7 that.

8 The second-to-last sentence of paragraph
9 49 that starts with "However," do you see that?

10 A. Yes.

11 Q. I read the sentence to mean that one of
12 the vulnerabilities of the XRP Ledger is that it
13 requires an a priori agreement on common trusted
14 nodes with the UNL, is that correct?

15 MR. WHITE: Objection; form.

16 A. That's what the sentence says.

17 Q. Okay. Is that "a priori agreement on
18 common trusted nodes" a reference to a UNL?

19 A. Sorry. What is your question again?

20 Q. Is your reference to an "a priori
21 agreement on trusted nodes" a reference to a UNL?

22 A. Let me reread that sentence to remind me
23 of the intent.

24 (Pause)

25 A. This actually goes to a very technical

1 aspect of the protocol conditions --

2 Q. Mm-hmm.

3 A. -- that I'm not prepared to discuss or
4 analyze or interpret.

5 Q. Is it a technical aspect that you
6 understand?

7 A. At a level of -- high level of
8 understanding, yes.

9 Q. Okay. But at your high level of
10 understanding, why is an a priori agreement on
11 common trusted nodes a vulnerability of the XRP
12 Ledger?

13 MR. WHITE: Objection; form.

14 A. I'll have to take a look at the context
15 of the reference from which I pulled this
16 information.

17 Q. And what's that reference?

18 A. I believe it was one of the references
19 cited in 26 on XRP, XRPL.

20 Q. Sitting here today, do you know which of
21 the references in 26 is the source from which you
22 drew this sentence in paragraph 49?

23 A. Given the context of the paragraph, it's
24 probably one of the latter ones, XRPL overview.
25 It's all securities so I'm going to have to go

1 back to that reference.

2 Q. I'm sorry, what was the last thing you
3 said, the last sentence?

4 A. You said 49, right? In 49 -- paragraph
5 49, the sentence that you're referring to, what
6 makes XRP Ledger attractive for speed, et cetera,
7 is under the improved security subset on page 22.
8 So I'll have to go back to the reference that
9 discusses improved security to get that context
10 again.

11 Q. I see.

12 And just to be clear, this whole section
13 of improved security, this is not your expert
14 opinion. This is information that you drew from
15 sources you reviewed, is that right?

16 A. Information I drew from resources I
17 reviewed and were used in the context of
18 formulating the opinion on whether XRPL and XRP
19 aren't innovation of the existing blockchains.

20 Q. Okay.

21 A. Blockchain. There was only one at that
22 time.

23 Q. And to the extent the sources of
24 information you reviewed were Ripple or Ripple
25 affiliates, did you take any steps to verify the

1 veracity of that information that you then
2 included in your report?

3 MR. WHITE: Objection to
4 form.

5 A. Are you referring specifically to
6 this -- to this statement in paragraph 49?

7 Q. Let's start with that statement in
8 paragraph 49, sure.

9 A. I did not verify it independently.

10 Q. Okay. Now, backing up from paragraph
11 49, to the extent that there are any statements in
12 your report where -- that don't represent your
13 expert opinion and are, rather, just drawn from
14 sources of information from Ripple or Ripple
15 affiliates, did you take any steps to verify the
16 veracity of that information before including it
17 in your report?

18 A. Well, I didn't only look at 26. There's
19 other references that refer to comparison of
20 ledgers or statements, statements on CoinDesk and
21 whatnot that I've referenced earlier that speak to
22 this, but I did not specifically cite to here. To
23 see whether those same statements are made in
24 those same documents.

25 Q. Right. I'm asking more of a

1 methodological question.

2 A. Oh, okay.

3 Q. So, for instance, let's use this
4 improved security paragraph as an example. So
5 from the improved security paragraph, my
6 understanding of what you've told us is that this
7 is not your expert opinion. This is a -- a
8 summary or a recitation of information that you've
9 reviewed --

10 A. Background.

11 Q. -- from other sources.

12 A. Yes, background information.

13 MR. WHITE: Objection; form.

14 Q. To the extent that at any point in your
15 report, paragraph 49 or elsewhere, to the extent
16 that the information that you incorporated in your
17 report was coming straight from a Ripple source,
18 did you take any steps to verify from an
19 independent source that that information was true?

20 A. Well, as I mentioned, there are other
21 sources that refer -- now you specifically talk
22 about security. But those statements that came
23 from Ripple, if these statements also were
24 amplified elsewhere, I kept them in. If there was
25 a contradiction, I may have highlighted that

1 contradiction.

2 Q. Okay. So, again, I just want to get to
3 a methodological question. One approach that you
4 might have taken would be to just accept as true
5 whatever is stated in Ripple sources. Another
6 approach you might have taken is to not accept as
7 true anything that was stated in Ripple sources.
8 A third approach you might take is taking Ripple
9 sources and, if it's a Ripple-only source for that
10 information, trying to find an independent source
11 to verify the veracity of the Ripple source.

12 Do you understand the three scenarios
13 I'm setting out?

14 A. Sort of.

15 Q. Okay. Did -- did you do the third
16 thing? If -- if you were -- for instance, with --
17 going back to 49, when you're making a statement
18 in your report about improved security, did you --
19 did you search for any other independent source of
20 information about improved security of the XRP
21 Ledger independent of Ripple?

22 MR. WHITE: Objection; form.

23 A. In the context of this opinion, I was
24 not asked to render an opinion on the security of
25 the XRP Ledger. I basically took the information

1 that was available and in aggregate used it in my
2 opinion on the innovation of Ripple -- of -- of
3 XRP and XRPL over the existing blockchain.

4 Q. I hear you, but I -- I'm not sure
5 you're -- with all due respect, I'm just not sure
6 you're answering my question. And -- and, again,
7 I'm just asking a question as to your method.
8 Let's keep it to paragraph 49.

9 For paragraph 49, you make a series of
10 statements about improved security. I understand
11 from what you've said that you've drawn these
12 statements from other sources. They're not your
13 expert opinion. Correct?

14 A. Mm-hmm.

15 Q. Okay. When you drew -- if you -- with
16 respect to 49, if any of the facts in 49 come from
17 Ripple sources, did you make any efforts to verify
18 the veracity of those facts in 49 from sources
19 independent of Ripple?

20 A. I did not.

21 Q. Okay. Were there other occasions in
22 your report where you drew from -- strike that.

23 Were there other occasions in your
24 report where you set out in your report facts that
25 you obtained from your review of Ripple sources

1 and did not take any steps to independ --

2 independently verify the veracity of those facts?

3 A. Is your question were there other places
4 where I did not do that?

5 Q. Yes, exactly.

6 A. You'd have to go to very specific
7 places. So my -- what I was -- what I set to do
8 is to compare what was available about Ripple,
9 whether disclosed by Ripple or other parties,
10 relative to what the incumbent technology is.
11 That was actually the -- the objective of my -- of
12 my opinion, is to compare new versus incumbent and
13 take whatever aggregate information that I had to
14 actually compare these two.

15 Q. Okay. So from your perspective, you
16 didn't draw a distinction between whether or not
17 you learned information from a Ripple source or
18 from a non-Ripple source?

19 MR. WHITE: Objection; form.

20 A. Not necessarily, no.

21 Q. Okay. How -- how is a reader of your
22 report able to ascertain what portions of your
23 report are recitations of facts drawn from other
24 sources versus what portions of your report are
25 your expert opinion?

1 MR. WHITE: Objection; form.

2 A. Well, when I have citations to sources,
3 then that is not my own original, I guess,
4 opinion. It's just, using those sources, I have
5 to come to a conclusion: How did the aggregate of
6 these sources and of that information gained from
7 these sources stack up against what the incumbent
8 technology is? Which is kind of how we do,
9 generally, a business analysis for innovative
10 companies relative to companies that are already
11 in the market.

12 Q. Right.

13 I -- I guess what I'm trying to
14 determine is for something like -- focusing on the
15 example of 49, improved -- improved security --

16 A. Mm-hmm.

17 Q. -- how can the reader of your report
18 tell whether or not you, as an expert, are opining
19 that the XRP Ledger constitutes a ledger with
20 improved security over preexisting technology
21 versus your adopting others' views that that's the
22 case?

23 MR. WHITE: Objection; form.

24 A. Because the information is presented
25 regarding what the incumbent technology, bitcoin,

1 does or has or its speeds or its energy use or its
2 cost relative to what we know about the XRPL.

3 Now, when I cite, for example, that it
4 takes three to five seconds or four seconds on
5 average to, you know, validate a transaction, that
6 isn't only based on the Ripple source. If I've
7 seen it elsewhere, then, you know, I'm comfortable
8 with that information.

9 Q. Okay. I hear you, but I'm -- I'm still
10 struggling with how is a reader of your report
11 able to differentiate between when you, an expert
12 retained to provide expert witness services, are
13 expressing your expert opinion versus when you're
14 reciting the fact -- facts or information as
15 stated from other sources? Is there a way to do
16 that reading your opinion?

17 MR. WHITE: Objection; form.

18 A. What the reader will read is how the
19 XRPL compares to bitcoin. And that is the level
20 of information that is necessary in my expert
21 opinion as long as the information is derived from
22 credible sources.

23 Q. And how do we know that the information
24 is derived from credible sources without specific
25 citations, say, within paragraph 49?

1 MR. WHITE: Objection to
2 form.

3 A. This paragraph 49 is really a
4 descriptive overview of the security features. It
5 is not an independent validation of the security
6 features.

7 Q. It's not your independent expert --

8 A. It is not my --

9 (Indiscernible cross talk;
10 reporter requests one speaker.)

11 THE WITNESS: Sorry.

12 Q. Shall I finish? Is that okay?

13 A. Yeah. I think you were paraphrasing me,
14 but I don't know who was...

15 Q. Actually, strike that.

16 Did you have an answer you wanted to
17 provide me? I don't want to cut you off.

18 A. I provided aggregated information that
19 was available, whether from Ripple sources or from
20 other sources, brought it together in this section
21 where I was -- where I was asked to provide an
22 opinion on whether XRP or XRPL was an innovation
23 over bitcoin. And is -- or a better bitcoin.

24 And I used a number of features, looked
25 at a number of features. I looked at speed. Did

1 I independently verify the speed? I did not
2 independently verify the speed. I looked at
3 environmental -- environment -- energy use. I
4 looked at cost. At least cost as reported. And I
5 looked at the security aspects. But I did not --
6 as being four sort of aspects that XR -- that
7 Ripple with XRP and XRPL brought to the table.
8 And that's how I did the comparison. But I didn't
9 do an independent analysis of that. I just
10 aggregated the information in a different way to
11 allow us to compare between two blockchains.

12 And some of that is done in Table 1,
13 looking at features and attributes. It's
14 different ways of presenting information that is
15 already out there to compare. Is blockchain --
16 from a business perspective analysis. This is not
17 a technical analysis. It's an evaluation as a
18 business. With the technology and products, did
19 the company present -- was XRPL an improvement
20 over existing blockchains?

21 Q. Okay. Prior to your engagement in this
22 case, had you ever made any statement regarding
23 the topic of decentralization as applied to the
24 XRP Ledger?

25 A. No.

1 Q. Okay. Prior to your engagement in this
2 case, had you ever considered the question of
3 whether and to what extent the XRP Ledger was
4 decentralized?

5 A. No. It was more about whether
6 blockchains were decentralized.

7 Q. Prior to your engagement in this case,
8 had you ever compared the relative
9 decentralization of the XRP Ledger and bitcoin?

10 A. Sorry, can you repeat that question?

11 Q. Sure.

12 Prior to your engagement in this case,
13 had you ever compared the relative
14 decentralization of the XRP Ledger and bitcoin?

15 A. No. And I didn't do it in my engagement
16 either.

17 Q. Okay. Prior to your engagement in this
18 case, had you ever compared the decentralization
19 of the XRP Ledger to any other blockchain?

20 A. I had not and there was also not
21 directly a way to do that.

22 Q. Is it your view that there's no way to
23 compare the decentralization of the XRP Ledger to
24 any blockchain?

25 A. That is my position in my rebuttal

1 report.

2 Q. Prior to your engagement in this case,
3 had you ever read any statement about the
4 centralization or decentralization of the XRP
5 Ledger?

6 A. I probably read it on websites, as in
7 crypto websites.

8 Q. And what was it that you read?

9 A. Well, there's all sorts of discussion
10 forums on CoinDesk and, you know, crypto.com sites
11 and whatnot on decentralization. So that's sort
12 of the level of, you know, knowledge and
13 information that I looked at.

14 Q. Did you read any articles specific to
15 the topic of the decentralization of the XRP
16 Ledger?

17 A. Articles? Do you mean any information
18 that is available online?

19 Q. I do.

20 A. I probably did, yes.

21 Q. And what was -- what was the -- strike
22 that.

23 Did the articles that you read take the
24 position that the XRP Ledger was or was not
25 decentralized?

1 A. Before this case, at that time I wasn't
2 looking at this from that perspective. I was
3 looking from the perspective of being on the
4 advisory board of a fund and having to evaluate a
5 bunch of different FinTech companies and looking
6 at, you know, what do we know about FinTech
7 companies, the blockchains they operate on. You
8 know, what's being said about centralization and
9 decentralization. More at that level, not
10 specific to XRP or specific to...

11 So I didn't really take a position.

12 Q. Prior to your engagement in this case,
13 were you aware of any statements by Ripple about
14 the centralization or decentralization of the XRP
15 Ledger?

16 A. Prior to the case?

17 Q. Prior to your engagement in this case.

18 A. I didn't follow that level of detail,
19 no.

20 Q. Let's go to your rebuttal report,
21 Exhibit 2, please. Going to paragraph 36, which
22 is on page 20 and 21. And I'm looking just at the
23 last sentence of paragraph 36, which says "Each of
24 these features of the XRP Ledger offer
25 incentives - for example, to payment processors

1 who want to ensure their transactions clear more
2 quickly and cheaply than on the bitcoin or
3 Ethereum blockchains and therefore have an
4 incentive to ensure the XRP Ledger continues to
5 exist."

6 Do you see that?

7 A. I see that.

8 Q. Is this sentence an example of
9 information that you sourced from elsewhere or is
10 this your expert opinion?

11 MR. WHITE: Objection; form.

12 A. So we have to go back to the purpose of
13 the rebuttal report, in which case I wear my
14 academic hat because this is a discussion in the
15 scientific literature as to what the meaning of
16 decentralization -- what the definition is, how
17 you measure it, or what the metrics are that would
18 describe it. How you measure it. How -- what the
19 purpose is or what the role is of incentives,
20 whether incentives need to be economic incentives
21 or not economic incentives.

22 And I read all the papers that I
23 sourced, all the papers that are cited on that and
24 understood from, I believe in this case, the --
25 starting with the -- was that the side paper?

1 Let's see. I'll have to reread this paragraph, by
2 the way.

3 Even when you look at the Troncoso
4 papers, some of the other papers for discussion,
5 there was discussion around -- this was specific
6 around incentives, right. This paragraph that
7 you're referring to is a paragraph around
8 incentives. And my opinion on Dr. [REDACTED]
9 report as to whether these incentives and protocol
10 incentives are necessary to build a successful
11 decentralized system.

12 So I set out to test that assertion by
13 reading papers in the academic literature. And
14 based on these papers in the academic literature
15 that say it doesn't have to be one in protocol
16 incentive and it doesn't necessarily need to be an
17 economic incentive. The -- so that's a big part
18 that led into this sentence.

19 Second, practically, I'm advisor to a
20 blockchain company called Blockchain Triangle that
21 operates on a -- on a blockchain. And working
22 with them, the question is, also, do participants
23 need to be economically incentivized, as I said?
24 Now it's all about risk management. So they want
25 to keep a blockchain live for risk management or

1 reputational reasons.

2 The University of Michigan, as I
3 mentioned to you earlier, we actively -- we do not
4 actively run a node. We're not paid to run a
5 node. We're not compensated to run a node. We're
6 actually not running it. But the research that is
7 happening on the XRP and XRPL might incentivize
8 some of the researchers that are working in the
9 space to actually fund and be active on the
10 operations of the validator node. So that's what
11 I'm saying. It doesn't have to be a strictly
12 protocol economic incentive.

13 Q. Do you -- sorry, go ahead.

14 A. Yeah. Sorry.

15 Q. You said the University of Michigan is
16 no longer running a node on the XRP Ledger, is
17 that right?

18 A. We maintain the node. We do not
19 actively participate in the validation process.

20 Q. I see.

21 And that's true today?

22 A. That is true today.

23 Q. Okay. I want to focus you back on the
24 last sentence of paragraph 36.

25 A. Mm-hmm.

1 Q. Do you know whether payment processors
2 clear transactions on the XRP Ledger?

3 A. I think you'll have to be more specific
4 as in which payment processor.

5 Q. Well, that's actually my question to
6 you, Professor. So I'm trying to find the basis
7 for this assertion that "for example, to payment
8 processors who want to ensure their transactions
9 clear more quickly and cheaply than on the bitcoin
10 or Ethereum blockchains."

11 What payment processors are you
12 referring to in your rebuttal report?

13 A. It's more of a general statement here.

14 Q. What's the basis for -- I'm sorry. Go
15 ahead.

16 A. I was done.

17 Q. Oh, okay.

18 What's the basis for the statement that
19 "payment processors who want to ensure their
20 transactions clear more quickly and cheaply than
21 on bitcoin or Ethereum" have an incentive to use
22 the XRP Ledger?

23 A. I believe it's in the context of the
24 fact that they need XRP to clear their
25 transactions.

1 Q. Okay. But how do you know that?

2 A. Based on some of the examples that I
3 looked at at -- at the end of my first report.

4 Q. If you look at the paragraph 36 of your
5 rebuttal report, you can see there's -- there's
6 not a footnote to that sentence and -- and that's
7 why I'm inquiring.

8 What's -- what's the source of that
9 information?

10 A. You're right, there is no source cited
11 here and that's sloppy. I didn't refer back to my
12 first report where I identified some of the use
13 cases, some of whom were payment processors.

14 Q. I see.

15 A. And I did not carry that over.

16 Q. And which -- which payment processors
17 from your first report are you referring back to
18 at the end of paragraph 36 of your rebuttal
19 report?

20 A. I did not refer back to a specific
21 payment processor, but just payment processor as
22 an exemplar on a use case.

23 Q. I see.

24 Do you know whether payment processors
25 use the -- the XRP Ledger to clear their

1 transactions today?

2 A. If they accept XRP?

3 Q. Okay. But do you -- I'm sorry, maybe --

4 A. Are you looking for names or --

5 Q. Yeah. Let's just start with yes or no.

6 Do you know whether payment processors
7 use the Ledger, the XRP Ledger, to clear their
8 transactions today?

9 A. I'm going to have to check into that.

10 Q. Okay. So that means you're not sure one
11 way or the other sitting here today?

12 A. I'm clearly not certain --

13 Q. Okay.

14 A. -- whether they use the XRP or the XRPL,
15 yeah.

16 Q. Can we look at Exhibit 3, please?

17 (Whereupon, exhibit is
18 received and marked SEC Adriaens
19 Exhibit 3 for identification.)

20 MR. SYLVESTER: Thank you
21 very much.

22 BY MR. SYLVESTER:

23 Q. Exhibit 3, Professor, is Dr. [REDACTED]
24 report dated October 4th, 2021. And my question
25 for you is going to be on page 26 of his report.

1 A. Page 26?

2 Q. Yes.

3 On page 26, do you see that Figure 1,
4 which is entitled "Ripple validators and
5 validators operated by entities funded by Ripple,
6 given as a fraction of the dUNL membership over
7 time"?

8 A. I see that.

9 Q. I believe you -- you did not comment on
10 this figure in your rebuttal report, is that
11 correct?

12 A. I would have to check.

13 (Pause)

14 A. I finally found the link here. Sorry.
15 I believe I did not specifically cite
16 Figure 1 in my rebuttal report.

17 Q. Okay. And sitting here today, do you
18 have any reason to dispute the data that's
19 displayed in Figure 1?

20 MR. WHITE: Objection; form.

21 A. I have not verified these data, so I
22 wouldn't know.

23 Q. Right. I'm not asking you to
24 affirmatively agree with the data. I'm asking if
25 you have any reason to dispute the data displayed

1 in Figure 1.

2 MR. WHITE: Objection; asked
3 and answered.

4 A. I don't really have the technical
5 background to assess whether or not this is
6 correct or not.

7 Q. Okay. If -- let me pose a hypothetical
8 then.

9 Let's say there was a period where
10 Ripple controlled 100 percent of the validators
11 that were on Ripple's UNL.

12 Did Ripple then, as a practical matter,
13 control the validation of the transactions on the
14 XRP Ledger?

15 MR. WHITE: Objection; form.

16 A. It's a hypothetical, of course, so one
17 would have to speculate.

18 Q. You're permitted to speculate.

19 A. Under those conditions and not knowing
20 anything else, they would control -- what was the
21 question again? Do they --

22 Q. I -- sorry. Go ahead. Did you want me
23 to reask it?

24 A. Oh, yeah, if you could reask it.

25 Q. Of course.

1 The hypothetical is, let's say there was
2 a period where Ripple controlled 100 percent of
3 the validators that were on Ripple's UNL.

4 Did Ripple, then, as a practical matter,
5 control the validation of the transactions on the
6 XRP Ledger?

7 A. I don't know what the meaning of
8 "control" is in this hypothetical and how that
9 would be impacted by the protocol, the validation
10 protocol, so it would be hard for me to give a
11 yes-or-no answer to that.

12 Q. Let's assume that the XRP Ledger for
13 this hypothetical works the way it works as you
14 described earlier, that it's 80 percent majority
15 voting.

16 A. Mm-hmm.

17 Q. And Ripple controls 100 percent of the
18 validators.

19 So under those circumstances, does
20 Ripple, as a practical matter, control the
21 validation of transactions on the XRP Ledger?

22 MR. WHITE: Objection; form,
23 calls for speculation.

24 A. Do you also assume -- I mean, what are
25 the other assumptions in that? Are there other

1 UNLs?

2 Q. Let's say that's the UNL that the nodes
3 are -- have selected as the UNL they use.

4 MR. WHITE: Objection.

5 A. So you're assuming there's only one UNL
6 and Ripple controls 100 percent of all the
7 validators in the UNL?

8 Q. That's exactly right.

9 A. As a hypothetical.

10 Q. That's -- that's correct. That's my
11 hypo.

12 Under those circumstances, does Ripple,
13 as a practical matter, control the validation of
14 transactions on the XRP Ledger?

15 MR. WHITE: Objection to
16 form; calls for speculation.

17 A. Of course my answer would be
18 speculative, but it would appear yes, while
19 knowing that that is not the case.

20 Q. What do you mean, "while knowing that is
21 not the case"?

22 A. You're referring to 100 percent control
23 and there being only one UNL.

24 Q. Those are the terms of my hypothetical,
25 that's right.

1 A. Those are the terms of your
2 hypothetical. Okay.

3 Q. Let's go to your original report again.
4 Let's start with Appendix C.

5 MR. WHITE: If we're moving,
6 going to a new topic, would now be a
7 good time for a break?

8 MR. SYLVESTER: Sure. That's
9 fine.

10 MR. WHITE: All right.

11 THE VIDEOGRAPHER: Off the
12 record. The time is 3:13.

13 (Whereupon, a recess is taken.)

14 THE VIDEOGRAPHER: We'll go
15 back on the record. The time is 3:38.

16 BY MR. SYLVESTER:

17 Q. Professor, let's turn to page 8 of your
18 expert report, Exhibit 1.

19 A. Page 8?

20 Q. Yes.

21 A. Okay.

22 Q. Paragraph 19 where it says "Opinion 1."
23 Do you see that?

24 A. Yes.

25 Q. And your opinion here is "The XRP Ledger

1 and its native currency, XRP, represented an
2 important innovation in blockchain technology."

3 Do you see that?

4 A. Yes.

5 Q. Before the break we were talking about
6 various aspects of the XRP Ledger as to which you
7 gathered information from sources --

8 A. Mm-hmm.

9 Q. -- such as speed, cost, environmental
10 impact, security.

11 Do you recall that conversation?

12 A. Yes, I do.

13 Q. Okay. My question is, are those the
14 factors that you considered when you concluded for
15 your Opinion 1 that the XRP Ledger in its nature
16 currency, XRP, represented an important innovation
17 in blockchain technology?

18 A. These were factors I considered, yes.

19 Q. Okay. And as to -- strike that.

20 As to those factors -- the speed of the
21 Ledger, the cost of transactions, the
22 environmental impact of the Ledger and the
23 relative -- the security of the Ledger, of the XRP
24 Ledger, versus other blockchains -- those are all
25 topics on which you don't have your own

1 independent expert opinion but, rather, read the
2 sources cited in your report and have recited what
3 you read, is that right?

4 MR. WHITE: Objection; form.

5 A. Yes. I aggregated information that was
6 available on the XRPL, yeah.

7 Q. As to any of those factors -- speed,
8 cost, environmental impact, security of the XRP
9 Ledger -- was there ever any dispute in the
10 sources that you reviewed? For instance, was
11 there any article that said, well, actually, the
12 XRP Ledger is less secure than bitcoin?

13 MR. WHITE: Objection; form.

14 A. Oh, okay. Was there any -- sorry, what
15 was the question?

16 Q. Was there any dispute among the sources
17 as to any of these factors? And my example was --
18 was, did you ever look at a source that said,
19 well, the XRP Ledger is actually less secure than
20 bitcoin?

21 MR. WHITE: Objection; form.

22 A. Specifically on security, I believe
23 there is the paper of Chase and MacBrough,
24 nonpeer-reviewed paper, I believe, that refers to
25 that. But, again, I did not do an independent

1 analysis as to which assertion was the correct
2 assertion. When I look at important innovations,
3 we look at a new product that comes in the market,
4 in what extent and in what characteristics is it
5 superior to existing products.

6 So from a -- a VC/business analyst, you
7 very often look at a -- sort of a commonly used,
8 how should I say, metric in discussions among
9 venture capitalists is, oh, can we achieve a 5 or
10 a 10x improvement?

11 I do not cite a 5 or 10x. It's just
12 sort of a common way of looking at this. Is it
13 five times faster? ten times faster? Order of
14 magnitude is always an important sort of metric in
15 the business community, in the venture community,
16 and I looked at it more from that perspective.

17 Of course on securities, we can't talk
18 about order of magnitude. It's not a -- can't be
19 metricized. In fact, it can't even -- can't even
20 be well measured.

21 And, so, yes, I was aware of Chase and
22 MacBrough paper.

23 Q. And the Chase MacBrough paper expresses
24 the opinion that the XRP Ledger is actually less
25 secure than bitcoin, is that right?

1 A. To my recollection -- and, again, I'm
2 not a technical expert in analyzing security
3 issues on blockchains -- it was that there are
4 conditions under which there might be problems
5 with the server -- with the -- with the
6 blockchain. Sorry.

7 Q. So in -- in reaching the conclusion
8 within your paragraph 49 that the XRP Ledger
9 represented improved security, how was it that you
10 chose to disregard the concerns set forth in the
11 Chase MacBrough paper?

12 MR. WHITE: Objection; form.

13 A. Well, at the time when the XRP Ledger
14 was introduced in the market, there was only
15 bitcoin and there had been some issues with
16 exchanges, with an exchange Mt. Gox, I believe, or
17 around that time. There had been issues with 51
18 percent of tax. And the argument was, at least in
19 some of the readings that I did, that the
20 federated consensus mechanism that Ripple
21 deployed -- that -- sorry, that XRP uses is less,
22 I guess, vulnerable to that type of attack. And I
23 used that.

24 And the other one, Chase and MacBrough
25 paper, I used a little more as context to know

1 about it.

2 THE REPORTER: I used the?

3 THE WITNESS: Sorry.

4 A. The Chase and MacBrough paper, I used
5 that more as background to know about the
6 concerns.

7 I, actually, want to go back to the
8 discussion we had before our break. One of the
9 lines that you asked, where you asked me what's
10 the citation to that regarding the a priori
11 agreements --

12 Q. Mm-hmm.

13 A. -- in the security, I did not
14 double-check it, but thinking about it, that might
15 have been the Chase and MacBrough or related to
16 that paper.

17 Q. Okay.

18 A. So I did take it into account in my
19 considerations.

20 Q. And -- and how -- do I understand
21 correctly that the Chase MacBrough paper outlined
22 weaknesses in security of the XRP Ledger?

23 MR. WHITE: Objection to
24 form.

25 A. Again, I'm not a -- it's a very highly

1 technical paper and I -- I do not have that level
2 of technical background to do that kind of
3 analysis. But reading the conclusions of that
4 paper, they argued that under certain conditions,
5 there might be security issues or problems with
6 the Ledger. But I cannot independently verify
7 that, so I decided to look at what most sites and
8 most reports around the XRPL we're talking about,
9 which was that it did appear to not have that
10 vulnerability, that 51 percent tax as sort of an
11 added security as a different consensus metric.
12 Different consensus method.

13 But, again, we have to look at not each
14 of them separately. It's really the aggregate.
15 Again, when we discuss where the innovations are,
16 we write reports where innovations are with new
17 companies, digital companies, FinTech or
18 otherwise. We discuss what is -- what the current
19 baseline is in the market and what these new
20 companies are capable of achieving relative to
21 that and, therefore, what their potential market
22 opportunity is.

23 And I looked at a subset of features
24 that have come up in these discussions like the
25 ones you just iterated.

1 Q. Was your -- was the Chase MacBrough
2 paper part of that baseline of the market views on
3 how secure the XRP Ledger was vis-a-vis other
4 blockchains?

5 A. Well, the Chase and MacBrough, I forgot
6 where that is published -- was published. I'm
7 going to have to look that up relative to the
8 innovation that existed at the time when the XRP
9 Ledger was introduced to the market. So probably
10 I did not take it explicitly into consideration.
11 As I said, it isn't just about security. It's
12 about all -- the aggregate of all of these
13 benefits.

14 Q. Setting aside the Chase MacBrough paper,
15 were there other instances where a source that you
16 read expressed the view that on any of the factors
17 you listed -- speed, cost, environmental impact or
18 security -- the XRP Ledger was actually inferior
19 to other blockchains?

20 A. You mean on speed, cost, and energy
21 benefits? It was inferior to other blockchains?

22 Q. Yes.

23 A. I have not come across a reference that
24 would state that.

25 Q. How did you select the sources that you

1 reviewed to inform your views about what the
2 market opinion was about the speed, cost,
3 environmental impact, or security of the XRP
4 Ledger?

5 A. Keyword searches. Use cases I looked at
6 that selected the XRP or XRPL, for example,
7 because of their environmental -- its
8 environmental benefits or costs. So we have -- I
9 mean, there were -- it's not academic literature.
10 In that case it is information that is out there
11 in the cryptosphere. And overwhelmingly what I
12 came across were these benefits.

13 Q. When you say "keyword searches," do you
14 mean Google searches?

15 A. Yes, among others. Google searches,
16 Ripple reports, Insights, crypto.com. You know,
17 those types of websites that evaluate and look at
18 cryptocurrencies and blockchains. CoinDesk,
19 Medium.

20 Q. Did you make any attempt to seek out
21 sources on these topics that might have been
22 skeptical of Ripple or XRP Ledger?

23 MR. WHITE: Objection to
24 form.

25 A. I would have assumed that negative

1 reports would have come out with the same
2 searches.

3 Q. With the keyword searches?

4 A. Yes.

5 Q. Okay. Understood.

6 But just to make sure I understand the
7 answer to my question, did you -- did you take any
8 affirmative steps to try to seek out sources that
9 might have been skeptical about these features
10 about the XRP Ledger?

11 MR. WHITE: Objection; form.

12 A. I wouldn't know how to go about doing
13 that. When I look at sources that say how this
14 XRPL compared to other blockchains -- I mean, in
15 this case, it would have been just bitcoin, right,
16 because that was the only one that was antecedent.

17 There was nothing that came -- that came
18 up, I guess, that would refer to that negative
19 effect.

20 Q. Okay. Let's go to your Appendix C,
21 please.

22 Professor, do you know who created this
23 list that appears as Appendix C?

24 A. It was -- I requested the lists, as I
25 mentioned earlier, that was referred to in the

1 Wells report that I referred earlier. I had
2 information myself of radio news cases and I
3 requested from counsel whether there is a list,
4 either the list that was referred to in the Wells
5 report or otherwise, available for me to take a
6 look at.

7 Q. Okay. But do you know who -- who
8 actually drafted this list?

9 A. No.

10 Q. Column 2 on the list says "Category."
11 Do you see that?

12 A. Yes.

13 Q. Is that the category of company that's
14 listed under the "Entity Name" column?

15 A. Yes. Sometimes we call category primary
16 use case. That's how I refer to it in -- in -- in
17 my report. It's sort of the industry or the use
18 case that gets that.

19 Q. That -- that was my question about
20 actually the distinction between the category of
21 company and the use case. And why this brings to
22 mind is on the very top of the second page of
23 Appendix C --

24 A. Mm-hmm.

25 Q. -- I'm sorry, I don't know how to

1 pronounce the name. It looks like Beliani.

2 Do you see that?

3 A. I'm sorry, where?

4 Q. The very top of the second page of
5 Appendix C.

6 A. Beliani, yeah.

7 Q. Okay. And do you see how the category
8 listed is "Furniture"?

9 A. Yes.

10 Q. So, clearly, I think we can agree that
11 XRP can't be used as furniture?

12 MR. WHITE: Objection; form.

13 A. Of course not.

14 Q. The Ledger can't be used as furniture?

15 A. No.

16 Q. Okay. So --

17 A. It's the market. It's -- essentially
18 the category is the market. What is the market
19 you're trying to attract, that the use case tries
20 to address?

21 Q. Okay. So I -- what should I take from
22 the designation of furniture for the Beliani
23 entry?

24 A. Purchasing. It's an e-commerce company,
25 I believe. I haven't looked at this one recently,

1 but what -- what I would take away -- I'm going to
2 have to look at it again -- is that one could
3 purchase furniture with XRP in the context of this
4 use case.

5 Q. Okay. And is it -- is that connection
6 that you just made, that one could purchase
7 furniture from Beliani using XRP, is that set out
8 anywhere in your report?

9 A. No, that is based on going on to the
10 website of those -- of that company.

11 Q. Okay. I have one question about the
12 relationship between Appendix C and Appendix D.

13 A. Yes.

14 Q. So if you look at Appendix D, there's a
15 second column that's unlabeled.

16 Do you see that?

17 A. Yes.

18 Q. It just starts with "uConektPAY," the
19 first entry.

20 Is that second column in Appendix D a
21 copy of the category listed in Appendix C?

22 A. That would be the category or the -- the
23 market, yeah.

24 Q. Okay.

25 A. Yeah.

1 Q. But I guess what I'm trying to say is
2 did -- did you copy over the category listed in
3 Appendix C into the second column of Appendix D?

4 A. I believe so, but I first did go to the
5 website of that company to see whether they were
6 actually in that industry or in that category.

7 Q. Okay. Going back to Appendix C -- and
8 we'll get to your work that Appendix D represents,
9 but I just want to focus on C.

10 In order for a company to be included on
11 this list of use cases, does there have to be a
12 use for XRP or the XRP Ledger that actually exists
13 in the world or is it possible that some of these
14 use cases are theoretical or in development?

15 A. For this list?

16 Q. For Appendix C.

17 A. I went in with the assumption when I
18 initially received it that they were use cases,
19 either current or may have had or -- or
20 potentially they're exchanges; had XRP -- use of
21 XRP or XRPL. But my analysis was done then on
22 analyzing these use cases.

23 Q. Okay.

24 A. Assuming this to be true, then let's go
25 validate and verify that in my own analysis.

1 Q. Did counsel ask you to assume that this
2 list of use cases in Appendix C was a list of
3 genuine use cases for XRP or the XRP Ledger?

4 A. They didn't have me assume anything.

5 Q. Okay. When you say "I went in with the
6 assumption when I initially received it that they
7 were use cases, current or potentially if they're
8 exchanges," that was just an assumption you
9 generated on your own?

10 A. A starting -- that's right. Starting
11 assumption. Starting hypothesis I was going to be
12 testing, yes.

13 Q. Okay. And then some subset of Appendix
14 C is also listed in Appendix D, is that right?

15 A. Sorry, a subset of?

16 Q. Of C.

17 A. Is in D.

18 Q. Okay.

19 A. Yes.

20 Q. So if we just focus on the Appendix C
21 and we carve out anything that's listed on
22 Appendix D, did you take any steps to verify
23 whether those use cases that appear only on
24 Appendix C actually were genuine use cases for XRP
25 or the XRP Ledger?

1 A. So your question is, did I look at the
2 use cases that remained after I extracted Appendix
3 D from Appendix C?

4 Q. Right. I think I understood your
5 testimony earlier to be that you took a number of
6 steps to --

7 A. Yes.

8 Q. -- examine the use cases with respect to
9 D.

10 A. Mm-hmm.

11 Q. So I'm saying if you take out the -- the
12 companies listed on D from C, did you do any
13 independent analysis of the remaining companies on
14 C?

15 A. I did not.

16 Q. Okay.

17 A. Which meant that either -- that they
18 could still -- that they could also be use cases
19 that were nonequity investment use cases.

20 Q. Sure. You just don't know one way or --
21 sorry.

22 A. Yes.

23 Q. You just don't know one way or the other
24 because you didn't look into it, is that right?

25 A. I didn't validate or verify each of the

1 companies with respect to the use, XRP or XRPL.

2 Q. Okay. Let's turn to paragraph 124 of
3 your Exhibit 1. That's page 64.

4 A. Sorry, where are we looking?

5 Q. Page 64 of your opening report.

6 A. Yes.

7 Q. Okay. So in paragraph 124, the first
8 bullet, the last sentence, you say "I rely on
9 Crunchbase because it is a leading firm that, in
10 my experience as an expert in this space, is a
11 reliable source of information regarding whether
12 particularly innovative firms received equity
13 funding."

14 A. Right.

15 Q. Do you see that?

16 A. Yes.

17 Q. Okay. Is it a generally accepted view
18 in your field that Crunchbase is a reliable source
19 of information regarding whether particularly
20 innovative firms received equity funding?

21 MR. WHITE: Objection; form.

22 A. Crunchbase is a reliable database to
23 find equity funding on companies and the implicit
24 assumption for equity financing of companies is
25 that they're reviewed and, sort of, verified in

1 the market to have innovative value propositions.

2 So that's why I conflated these two concepts.

3 Crunchbase probably doesn't say
4 particularly innovative firms receive equity
5 funding, define that here. They probably don't
6 say it like that. This is my own wording.

7 Q. In your last answer when you say you
8 conflated the two concepts, you mean you conflated
9 the concepts of particularly innovative firms with
10 firms that received equity funding?

11 A. Right. So companies that receive equity
12 funding often are viewed as being companies with
13 substantial growth potential and market traction
14 in the industry or in the markets that they're
15 trying to address.

16 Q. Okay. So let's move on to the second
17 bullet.

18 So will you walk me through, again, what
19 steps exactly you took with respect to any dates
20 to arrive at the subset of companies on Appendix
21 C?

22 A. Right. So, again, going back over Step
23 Number 1, having been given a list of 660, I --
24 and not having had the time to look at each of the
25 660 separately, I said let's look at those that

1 are considered by the industry with sort of a
2 market validation of equity financing. So at
3 least I have a subset of those.

4 So then I looked at that subset. And I
5 said, okay, now the question is, did that subset
6 of growth companies with at least market indices
7 that they are growth companies, what -- did they
8 have access or when would they have access to XRP
9 or XRPL? And they couldn't have had access to XRP
10 or XRPL -- XRPL until after 2013, roughly.

11 And that's why I used the founding date
12 of Ripple as a cutoff. I said, okay, let's look
13 first at all the companies founded after 20 --
14 2013 and having received equity financing.
15 Because in those equity comp -- those
16 equity-financed companies had access to -- or let
17 me -- at that time XRP and XRPL were in the
18 market.

19 The second step, then, was -- because
20 that filters out a subset of companies. Actually
21 filters out -- let's see. 153 companies were
22 founded after -- so 153 companies were founded
23 after Ripple, Ripple's incorporation. I guess
24 they used 2012, not 2013. Of those founded after
25 Ripple's incorporation, instead of 91 use cases,

1 it's actually 83. I think that was the other
2 modification we talked about this morning. It's
3 83 use cases had equity investment data of those
4 companies founded after 2012.

5 Then I looked at all the remaining
6 companies that had equity financing that were
7 older than Ripple, incorporated before Ripple, but
8 where the equity financing didn't happen until
9 after the founding date of Ripple. So only --
10 that's -- and that's about eight companies.

11 So basically now we have 83 plus 8 is 91
12 use cases. 91 use cases are 83 companies with
13 equity -- that were founded after Ripple's
14 founding and received equity financing, and the
15 additional eight are companies founded before
16 Ripple that received equity financing after
17 Ripple's founding.

18 And that's the total -- the list
19 total -- that's the methodology I applied and
20 that's the list that is in Appendix D.

21 Q. Okay. I think I followed that.

22 Whenever you used the phrase "equity
23 funding" in that answer, you're referring to your
24 use of Crunchbase to see which companies received
25 equity funding, that's correct?

1 A. That's correct, yes.

2 Q. Okay. Did you -- as to any of the 91
3 companies, did you make any attempt to ascertain
4 whether or not the equity funding the companies
5 received had anything to do with the company's
6 engagement with XRP or the XRP Ledger?

7 A. No, that was not material to my
8 analysis. I wanted to find high-growth companies
9 that are after 2012, of being the cutoff date,
10 using either XRP or XRPL. But it is not material
11 whether they got the financing because of XRP or
12 XRPL. What I want to find is fast-growing
13 companies in the market that are using XRP or
14 XRPL, which even by itself is a validation of XRP
15 and XRPL as a useful currency in the market and
16 technology in the market.

17 Q. So in your view, it would not be more
18 persuasive to demonstrate that the company
19 received funding because of some use of XRP or the
20 XRP Ledger?

21 MR. WHITE: Objection; form.

22 No question. Mischaracterizes
23 testimony.

24 A. It -- it is impossible to ascertain that
25 relationship or correlation, but also was not

1 material to my analysis. So my analysis was, can
2 you identify high-growth companies or companies
3 that are viewed to be high growth with a market
4 presence in different industry sectors that use
5 XRP or XRPL?

6 And the fact that they continued to get
7 equity funding after the founding of Ripple and,
8 therefore, and the availability of XRP and XRPL in
9 the market, is an indicator of broad market
10 adoption.

11 Q. Okay. You said it's impossible to
12 ascertain any relationship or correlation between
13 the funding received by these companies and their
14 engagement with XRP or the XRP Ledger, is that
15 right?

16 A. The problem is that we would be looking
17 at a causality which is -- yes, based on my
18 experience, venture funds looking at equity
19 finance companies, very difficult to ascertain.

20 Q. Okay. I understand you said it's very
21 difficult, but did you try?

22 A. It was not material to my analysis.

23 Q. And so because it was not material to
24 your analysis, you didn't take any steps to try to
25 find any link between the funding and the

1 company's use of XRP or the XRP Ledger, is that
2 fair?

3 A. That's fair.

4 Q. Okay. Would you agree that if companies
5 were funded prior to any engagement with XRP or
6 the XRP Ledger, that engagement could not have
7 been a factor in receipt of the funding?

8 A. Can you rephrase that? I'm not sure I
9 understand.

10 Q. Sure.

11 Let's use a hypothetical. Let's say a
12 company was -- received equity funding in 2014 and
13 that company didn't have anything to do with XRP
14 or the XRP Ledger until 2018.

15 I think under your rubric, that company
16 would be included within Appendix D, is that
17 right?

18 MR. WHITE: Objection; form.

19 A. It would -- sorry.

20 MR. WHITE: Go ahead.

21 A. It would be.

22 Q. Okay. And so I'm just saying in that
23 circumstance, in that hypothetical, there's no
24 basis to conclude that the funding in 2014 had
25 anything to do what -- whatsoever with the

1 company's use of XRP or XRP Ledger in 2018?

2 MR. WHITE: Objection to
3 form.

4 A. Again, which is -- which is not material
5 to my analysis. The analysis, do high-growth
6 companies use XRP as part of -- do they leverage
7 XRP or XRPL as part of their business model? Even
8 if they used 15 or 20 other currencies and one of
9 them happens to be XRP, it doesn't matter. It is
10 a high-growth company and, therefore, becomes a
11 validation of the use of XRP in the market.

12 Q. Okay. So the --

13 A. The funding time point in the --
14 adoption time point of that company of XRP or XRPL
15 are not material to this -- to this process.

16 Q. I -- I'm sorry. Go ahead.

17 A. Yes.

18 Q. I totally hear you that it's not
19 material, but I just want to see if you agree with
20 my hypothetical.

21 So the company's funded in 2014, nothing
22 to do with the XRP Ledger or XRP until 2018. We
23 can both agree that the funding itself had nothing
24 to do with any connection between the company and
25 XRP and the XRP Ledger?

1 MR. WHITE: Objection to
2 form.

3 A. The funding of that company had nothing
4 to do with the XRP or XRPL Ledger.

5 Q. Okay.

6 A. However, that company did decide to use
7 the XRP or XRPL Ledger and, therefore, it did
8 become relevant.

9 Q. If you're just looking at the
10 high-growth company measure, not tied to the
11 timing of any use of XRP or the XRP Ledger, then
12 why did you exclude the pre-2013 companies?

13 A. I did not exclude the pre-2013
14 companies.

15 Q. I see. I -- I thought that was a step
16 that we discussed. Maybe I misunderstood --

17 A. No, that was the -- that was the
18 inaccuracy in bullet number 2.

19 Q. I see.

20 A. So it's the companies founded after 2013
21 that received equity financing -- really the
22 operational variable is, when did companies that
23 have equity financing have access to XRP and XRPL?

24 So, basically, I looked also at
25 companies that were founded before 2013 that

1 received their equity finance, their growth
2 financing, after 2013. So I have both before and
3 after.

4 And, again, this was just -- this --
5 this whole equity financing piece, this step
6 number 1, was really just to come up with an
7 illustrative spectrum of companies that, based on
8 my experience in the industry, would be viewed as
9 being a relevant subset of companies. I didn't
10 look at IBM, for example. Didn't look at -- there
11 are lots of big corporates that use blockchain and
12 potentially use XRP. So I just used the subset --
13 used this subset to come up with an illustrative
14 use case -- set of use cases.

15 Q. This method where you observed equity
16 financing of specific high-growth companies on
17 Crunchbase to evaluate the use case of a digital
18 asset, which you did in your report, have you ever
19 employed that methodology anyplace else other than
20 in your expert report in this case?

21 A. Yes. We do these on the funds as well,
22 the Lurie Venture Fund, the Lurie
23 Commercialization Fund. FinTech group funds which
24 I am involved in but did not talk about in this --
25 this report.

1 There's always lots of applications of
2 companies wanting to, of course, get equity
3 financing. And one of the triaging that we do is
4 look at what do we know about these companies?
5 What do we know about similar companies in this
6 space? How are they funded? How were they
7 financed? To sort of figure out is there a
8 similar company like the company we're looking at
9 on Crunchbase that is equity financed.

10 So, yes, we look at that as a triaging
11 mechanism.

12 Q. That -- that makes sense to me, but I'm
13 asking a little bit of a different question.

14 When evaluating in terms of the
15 viability of a digital asset --

16 A. Mm-hmm.

17 Q. -- which it seems the -- strike that.

18 Have you ever in your -- outside of the
19 context of the report of this case, evaluated the
20 viability of a digital asset or a blockchain by
21 observing equity investment in companies unrelated
22 to that digital asset or to that blockchain?

23 MR. WHITE: Objection; form.

24 A. That's a specific hypothetical that I
25 have not -- that specific structuring, I guess, of

1 the question. I have not.

2 Q. Okay. When you -- when you composed the
3 list that -- of 91 companies that appears in
4 Exhibit -- Appendix D, did you take into account
5 whether any of those companies received funding
6 from Ripple?

7 A. Did I take it into account? I did for
8 those where I had that information available.

9 Q. And are there any -- any companies on
10 your list of 91 in Appendix D that did, in fact,
11 receive funding from Ripple?

12 A. I believe there are. These are --
13 definitely [REDACTED] is definitely one of them. I
14 don't know if STYRA is on here. Yes, where was --
15 yes, [REDACTED] is here.

16 So, actually, Crunchbase does provide
17 information when you search who the financiers are
18 behind each round. And so I would know that.

19 Q. Okay. Can we turn to page 9 of your
20 report, Exhibit 1?

21 A. I'm sorry, page 9?

22 Q. Page 9, paragraph 21.

23 A. Oh, okay.

24 Q. Do you see where it says "Opinion 3"?

25 A. Yes.

1 Q. Okay. So I just want to focus on the
2 first clause of Opinion 3. "The XRP Ledger and
3 its native currency, XRP, have commercial utility
4 that third parties have leveraged in the creation
5 or advancement of their business models."

6 Do you see that?

7 A. Yes.

8 Q. Is your work as described on Appendix
9 D -- strike that.

10 Does your work encapsulated by Appendix
11 D have any relationship to this Opinion 3 that I
12 just read?

13 MR. WHITE: Objection; form.

14 A. Yes.

15 Q. Okay. Can you explain to me how the
16 methodology that you described demonstrates that
17 any of the companies listed in Appendix D
18 leveraged XRP or the XRP Ledger in the creation or
19 advancement of their business models?

20 A. If they use it as a payment mechanism.
21 If they use it as a way to conduct e --
22 e-commerce. If they list XRP in their exchange.
23 If they -- any of the activities that any of the
24 companies in Appendix D undertake that uses XRP or
25 XRPL, in my view, leverages or uses XRP or XRPL in

1 their business model.

2 Q. Okay. So if a retail online seller
3 accepts 100 different digital assets for payment,
4 one of them is XRP, in your view, that would be a
5 good example of a business that leveraged XRP in
6 the creation or advancement of that company's
7 business model?

8 MR. WHITE: Objection; form.

9 A. Yes. They use it as part of their
10 business. And business model is not necessarily
11 the same as revenue model. There's a lot of
12 discussion around that, but the business model is
13 how they conduct their business.

14 Q. Okay. So the -- the sort of phrase --
15 strike that.

16 The phrase "creation or advancement of
17 their business models" in your Opinion 3
18 encompasses any contact whatsoever between XRP or
19 the XRP Ledger and the company's businesses listed
20 in Appendix D.

21 Is that fair?

22 A. That's fair. And it kind of ties back
23 to a statement that I make earlier in my report on
24 what constitutes successful currency. And it is a
25 currency that is viewed to be one that is

1 broadly -- I'm going to have to check where --
2 where that is.

3 All right. On page 26, paragraph 57.

4 So for currencies to be useful and be successful,
5 the usability and breadth of applicability of that
6 particular cryptocurrency in any market so that
7 people feel comfortable using it anywhere is --
8 becomes a very important driver for the market
9 access and the utility of that currency. And,
10 therefore, if a Korean supermarket uses, in your
11 example, 50 cryptocurrencies, one of which is XRP,
12 then that is a validation of the currency and is
13 a -- it's part of the business model of that
14 Korean supermarket.

15 Q. Okay. Are you offering any opinion in
16 this case about whether XRP is or is not a
17 currency?

18 A. No, I'm not.

19 Q. Okay. The paragraph 57 that you pointed
20 me to, that doesn't have any citations that I can
21 see, at least not on page 26. I do see one at the
22 very end on page 27.

23 Are the -- the bullets -- the first four
24 bullets on page 26 -- value proposition, usability
25 and breadth of applicability, design, and

1 liquidity -- are those your expert opinion or is
2 this a case of sort of information aggregation
3 from other sources?

4 A. It's information aggregation from other
5 sources.

6 Q. Okay.

7 A. Including -- including many of the ones
8 that are cited on the bottom of page 27.

9 Q. Okay. Going back to the discussion we
10 were just having about your Opinion 3 --

11 A. What page?

12 Q. Let's see.

13 A. Nine?

14 Q. Page 9.

15 If a company accepts XRP, but no one
16 ever actually pays for anything with XRP, in your
17 view, is that company's business model -- strike
18 that.

19 If a company accepts XRP, but no one
20 actually ever pays for anything in XRP, does XRP
21 advance the -- have any involvement in the
22 creation or advancement of that company's business
23 model?

24 MR. WHITE: Objection to
25 form.

1 A. In the context of my analysis, if the
2 company offers it, even if the customers don't use
3 it, it's still -- or initially don't use it, it is
4 still part of the business model of that company
5 that offers it.

6 Q. Okay. With respect to the companies
7 that are listed on Appendix D, did you take any
8 steps to determine whether or not for companies
9 that accept XRP as payment anyone actually pays
10 for goods and services with XRP?

11 A. So is your question did I check the
12 revenue, essentially, of each of these companies
13 to see if they -- whether -- to see if there were
14 any transactions in XRP?

15 Q. My question's a bit broader in that it's
16 did you take any steps at all to determine whether
17 or not any company listed on Appendix D as
18 accepting XRP actually in the course of its
19 business receives payment in XRP?

20 MR. WHITE: Objection; form.

21 A. Not as part of this analysis, no.

22 Q. When you say "this analysis," do you
23 mean your expert report?

24 A. Not as part -- yes, not as part of the
25 expert report.

1 Q. Okay.

2 A. It also includes, say, a company that
3 used to use XRP and, for example, no longer uses
4 XRP because of, for example, the -- you know, the
5 current litigation that's underway. It still was
6 an XRP use case. But if a company that was equity
7 financed but -- in 2013, let's say, went bankrupt
8 in 2018, but during that time used XRP, it's also
9 a use case.

10 Q. Okay. I think what you're saying --
11 strike that.

12 So Appendix D is not intended to be a
13 snapshot of the current ways XRP or the XRP Ledger
14 are actually used in the world.

15 MR. WHITE: Objection. No
16 question.

17 A. Is your question it's not a snapshot?

18 Q. That's right.

19 A. Or it is a snapshot?

20 Q. It's not. I'm ask -- let me ask it
21 again.

22 A. Okay.

23 Q. Was it -- was it your intention with
24 Appendix D to create a snapshot of the current
25 ways XRP or the XRP Ledger are actually used in

1 the world as of the time of your report?

2 A. As a proxy for "being used in the
3 world," it means do these companies in Appendix D
4 either use XRP or XRPL? It was a snapshot. Just
5 that the companies offer the opportunity is not
6 necessarily whether the users use it.

7 Q. Okay.

8 A. That's, I think, where you're making the
9 distinction.

10 Q. And there was one other distinction I
11 think you drew which is that there could be cases
12 or maybe there -- strike that.

13 There are cases, if I understand your
14 testimony correctly, on Appendix D, where the
15 company once had some connection to XRP or the XRP
16 Ledger but no longer does.

17 MR. WHITE: Objection. No
18 question.

19 A. Right. But, again, it really doesn't
20 change the opinion. The diversity of use cases
21 where XRP or XRPL is being used as part of the
22 business model of these companies, whether it's
23 91, 90, 89, or even let's take off -- you want to
24 take off all the ones from before 2013, 83 is
25 still a substantial set of use cases.

1 And I didn't -- it's, again, just
2 illustrative of the equity financed use cases.
3 And to your earlier point, all the other companies
4 that are currently on the -- that are on that list
5 of 660, even though I did not analyze these
6 companies, it might very well be there's a lot of
7 use cases on there as well.

8 And, in fact, since I submitted the
9 report in October, just because of, you know, the
10 way I follow the industry, there's at least a half
11 dozen more use cases that I've become aware of
12 that use XRP or XRPL.

13 So it's a constantly evolving industry
14 with new use cases being built that cannot be
15 anticipated at any given point in time. So it is
16 a snapshot in time.

17 Q. I guess with my question I was trying to
18 draw the distinction between a use case and a use
19 that exists in the world at the time of your
20 report.

21 So, for instance, using something you
22 testified about, if a company once accepted XRP as
23 payment but no longer does, that's, in your view,
24 still a use case that's -- that's included in
25 Appendix D, is that right?

1 MR. WHITE: Objection; asked
2 and answered.

3 A. Of course, that particular use case that
4 I brought up, I think I -- I don't know where I
5 included it. Maybe I didn't include it yet.

6 The change happened later. So that's --
7 that's why I did the snapshot in time. You have
8 to keep looking at are these companies still
9 accepting?

10 But as -- as of the time, 20 --
11 whatever, October 4th, I believe? Yes, October
12 4th, or the last time I checked the list before we
13 submitted the report, these companies were still
14 using XRP or XRPL.

15 Some companies were acquired. I
16 think it was -- I forgot what the names of that
17 company now. Harbor, I believe. So Wallet was
18 acquired by another company. And that's fine. I
19 mean, it's -- it's part of the evolving industry
20 over time. There was acquisitions. There was
21 bankruptcies. There are different use cases that
22 evolve and develop. And I just wanted to
23 illustrate that using a subset of companies from
24 the list of 660.

25 Q. Okay. Let's go to page 64, paragraph

1 124.

2 A. Yes.

3 Q. The last bullet says "Third, I examined
4 the applications for the remaining use cases."

5 What does the word "applications" mean
6 in that sentence?

7 A. "Applications"? Seems like an odd word
8 here.

9 Basically this is I examined all the
10 remaining use cases after Step 1 and Step 2.

11 Q. Okay. Is that --

12 A. I'm not sure what -- how the word
13 "applications" and why the word "applications" is
14 in here.

15 Q. Did -- did you put the word
16 "applications" in your report?

17 A. It may have been a carryover on one of
18 the iterations.

19 MR. WHITE: Objection.

20 I'm going to instruct you not
21 to disclose the substance of
22 communications with counsel.

23 A. But Bullet Number 3 is clearly about the
24 91 companies that resulted from Step 1 and Step 2.

25 Q. Okay. So setting aside the word

1 "applications," taking the sentence in total, "I
2 examined the applications for the remaining use
3 cases," what -- what exactly did that entail?
4 What steps did you take?

5 A. Well, I went on the website of each of
6 these companies and I looked at, one, what kind of
7 company it was, how they were using XRP or XRPL,
8 and essentially what they were doing. So -- so
9 what markets were they serving?

10 Q. Okay. For each of the 91 companies
11 listed in your Appendix D, were you able to
12 determine from your review of the company's
13 website how the company was using XRP or XRPL?

14 A. In terms of availability and in terms of
15 media statements that the company made or in terms
16 of keyword searches between XRP, XRPL, and the
17 name of the company, I wanted to verify whether
18 they were still using and whether they were using
19 and how they were using XRP or XRPL.

20 Q. Okay. I think I understand your answer
21 to mean that to determine how the companies listed
22 on Appendix D were using XRP or XRPL, you went to
23 the company's website and then, at least on some
24 occasions, also did Google searches.

25 Does that sound right?

1 A. As well as media releases on these
2 company sites, yes.

3 Q. When you say the "media releases on the
4 company sites," you mean that company's website,
5 right?

6 A. That company's websites, yes.

7 Q. Okay. Other than Google searches and
8 review of the company's websites, did you take any
9 other steps to examine the applications for the
10 remaining use cases?

11 A. I -- other than that, no.

12 Q. Okay.

13 A. So then I developed descriptions of how
14 these companies were using the XRP or XRPL.

15 Q. And when you say you "developed
16 descriptions of how the companies were using XRP
17 or XRPL," where are those descriptions?

18 A. They start at paragraph 126 -- no, 128.
19 So I just illustrated a few of these companies,
20 not all 91 of them, but a few of these companies,
21 how they were using it just to illustrate the
22 spectrum.

23 Q. It looks like, if I'm counting
24 correctly, this is a description of six companies,
25 is that right?

1 A. Six companies representing 91 companies
2 or 90 companies if you take STYRA out.

3 Q. Okay. Sorry.

4 Is there any part of your report,
5 setting aside the six companies that are discussed
6 in paragraphs 128 through 133, that describes the
7 use of XRP or the XRP Ledger by the remaining
8 companies on Appendix D?

9 A. No. I just illustrated a subset of
10 companies in each industry.

11 Q. Okay.

12 A. In each market.

13 Q. Are there any other steps that you took
14 with respect to your preparation of Appendix D or
15 your examination of the use cases reflected in
16 Appendix D that we have not already discussed?

17 A. I don't think so. Except for, of
18 course, assembling all of the information on the
19 capital invested and aggregating the information
20 of what industries these 91 -- or 90 companies
21 represented. And, again, it was just meant to be
22 an illustrative set of use cases.

23 Q. How did you select the illustrative set
24 of use cases in paragraphs 128 to 133?

25 A. Based on more -- the level of detail of

1 information that I could find on that company's
2 use of XRP or XRPL.

3 Q. Okay. So fair to say that these six
4 companies are the companies that you were able to
5 find the most detail about their use of XRP or XRP
6 Ledger?

7 A. I think that's a mis -- that's not what
8 I said, "the most" information. Actually, I want
9 to double-check something here.

10 I believe one of the other pieces of
11 information that I considered is the value of the
12 company if they had their own coin and we knew
13 something about their coin market cap or whether
14 they were -- had large financing rounds just to
15 illustrate some of the bigger companies or the
16 companies with more -- higher financing rounds.

17 Q. Your answer reflects other factors that
18 you took into consideration when selecting the six
19 to highlight in paragraphs 128 to 133, is that
20 right?

21 A. Yes.

22 Q. Okay. Can we look at 132, paragraph
23 132, page 68? The last two lines on the page have
24 a single full sentence. It says "Data443 chose to
25 work with Ripple's technology because the XRP

1 Ledger is enterprise-focused with a level of
2 maturity and capability in the blockchain realm."

3 Do you see that?

4 A. Yes.

5 Q. How do you know why Data443 chose to
6 work with Ripple's technology?

7 A. That was based on Data443's own media
8 disclosure as cited below.

9 Q. Okay. The phrase "Ripple's technology"
10 in that sentence, what is it that you're referring
11 to?

12 A. Actually, I mean here the -- it's a
13 misstatement. The XRP Ledger.

14 Q. So for the purposes of this sentence,
15 "Ripple's technology," the reference is to the XRP
16 Ledger?

17 A. It is the XRP Ledger, yes.

18 Q. Okay. Going back to Appendix D, we
19 discussed that the second column is a carryover
20 from Appendix C.

21 Do you recall that?

22 A. Yes.

23 Q. Did you -- did you rely on the category
24 in Appendix D that counsel provided in Appendix C?

25 A. If it is a carryover, yes, it came from

1 that table.

2 Q. Okay.

3 A. And I do recall making some adjustments
4 with some of these companies, but -- after looking
5 at their websites, but I don't recall which ones.
6 I'm going to have to cross-reference that.

7 Q. You recall making adjustments to the
8 second column of Appendix D, is that right?

9 A. For some of the companies, yes, but I
10 forgot which ones.

11 Q. Okay.

12 A. The challenge with categorization is
13 that there is no standard. Different exchanges
14 use different methods. And -- and Consensus
15 itself and other management consulting groups,
16 they all have different categorizations, so...

17 Q. Okay.

18 A. I tried to cross-verify.

19 Q. Let's look back at paragraph 57.

20 A. Paragraph 57?

21 Q. Mm-hmm. I'd like to focus on the "Value
22 Proposition" bullet.

23 A. Yes.

24 Q. Can you read the "Value Proposition"
25 bullet into the record, please?

1 A. "A cryptocurrency is more likely to
2 achieve wide adoption if it solves a
3 well-understood problem and is coupled to a
4 transparent business model, so the marketplace
5 understands how the cryptocurrency is used and how
6 it creates value."

7 Q. In the context of that sentence, what's
8 a "transparent business model"?

9 A. When it's -- transparent business model
10 is business model that is well understood by
11 outsiders how a company generates revenue and how
12 it sets up partnerships.

13 Q. In your view, if a company was touting
14 acceptance of a product, but was not disclosing to
15 the market that it was also heavily subsidizing
16 users to use that product, is that a transparent
17 business model?

18 MR. WHITE: Objection; form.

19 A. Can you restate that question?

20 Q. Sure.

21 MR. SYLVESTER: Actually,
22 Bridget, would you mind reading that
23 back?

24 (Whereupon, the record was
25 read back.)

1 MR. WHITE: Same objection.

2 A. This is a hypothetical. I would need to
3 know more information about that.

4 Q. What would --

5 A. More context.

6 Q. What would you need to know?

7 A. Well, transparency, there's no binary in
8 transparency of a business model. It's a -- it's
9 a spectrum, I guess, of what is being disclosed to
10 the market. Public companies disclose their
11 business model; private companies, you know, are
12 less open about their business model. Sometimes
13 it's obvious; sometimes it's not obvious.

14 So I would need to know what is the
15 company? What were they disclosing? What were
16 they holding back? Did they call it transparent
17 themselves, what they were doing, or were they --
18 was the media telling -- telling the world that
19 this was a transparent business model?

20 So it's hard to assess that.

21 Q. Why is it that private companies are
22 less open about their business model?

23 MR. WHITE: Objection; form.

24 A. Excuse me.

25 So private companies, particularly

1 equity investable companies -- and I'm wearing my
2 hat as a -- as an investor in venture funds --
3 initially are, one, not even clear -- they know
4 what -- potentially what their value proposition
5 is, but they're not clear how they're going to be
6 making money, how they're going to be generating
7 revenue.

8 And so the transparency of a business
9 model can only be so transparent as to even what
10 the company knows itself. It doesn't want to get
11 pinned down out -- on the outside, I guess, as in
12 this is your business model or this is not part of
13 your business model.

14 It maintains flexibility as the
15 investors, the private investors, negotiate the
16 growth and the change and the product development
17 within that company.

18 So that's why it's -- usually or often
19 the business model isn't -- it's only partially
20 known.

21 MR. WHITE: Mark, would now
22 be an okay time for a break?

23 MR. SYLVESTER: Yeah, fine.
24 Sure.

25 MR. WHITE: Okay.

1 THE VIDEOGRAPHER: Off the
2 record. The time is 4:44.

3 (Whereupon, a recess is taken.)

4 THE VIDEOGRAPHER: We'll go
5 back on the record. The time is 5:04.

6 BY MR. SYLVESTER:

7 Q. Professor, I want to make sure I
8 understand your rubric for inclusion of companies
9 on Appendix D, so I'm going to go back to a hypo.

10 Let's assume there's a company that
11 accepts XRP as payment for its goods, but, in
12 fact, no one has ever paid for any of that
13 company's goods in XRP.

14 Would that company, using your
15 methodology, be included on Appendix D?

16 MR. WHITE: Objection; form.

17 A. So XRP is available, but it's -- or it's
18 possible to pay in XRP, but nobody actually pays
19 in XRP? Is that --

20 Q. Exactly right.

21 A. Well, from -- again, from the business
22 analysis perspective, it is still part of -- it is
23 still a use case.

24 Q. Okay.

25 A. Because, again, we're taking a snapshot

1 in time and we have to figure out has it never
2 used XRP -- I'm sorry, have people never paid in
3 XRP? Is it at an inception point? So everything
4 is a snapshot in time in use and growth.

5 Q. Okay. So I think I understand your
6 answer to be that hypothetical company would be
7 included on Appendix B -- sorry, Appendix D, as in
8 dog, using your rubric?

9 A. It would be.

10 MR. WHITE: Objection.

11 THE WITNESS: I'm sorry.

12 MR. WHITE: You can proceed.

13 Q. So going back to page 9 of your expert
14 report, paragraph 21, could you explain to me --
15 again, sticking with the hypo that I just used --
16 how XRP in that case could arguably be part of the
17 creation or advancement of the business model of
18 that company?

19 MR. WHITE: Objection;
20 incomplete hypothetical.

21 A. Well, of course, you're asking me to
22 speculate on a hypothetical use case --

23 Q. Yes.

24 A. -- that is an extreme, you know, tail of
25 a spectrum of use. In that case the argument

1 would be harder to make, but, regardless, it is
2 still -- the company still made the decision to
3 allow payment in XRP; i.e., the company actually
4 trusts XRP and payments in XRP enough for them to
5 include it in their business model.

6 Q. Would you say the -- in that
7 circumstance of the hypothetical that I described
8 that the company's acceptance of XRP advances that
9 company's business model?

10 A. Well, from the company's expect -- we
11 can't -- of course, it's a hypothetical, so we
12 can't really know why that company decided that
13 they were going to include XRP as a possible
14 payment mechanism. But, clearly, the company must
15 have made some decision that we're not privy to as
16 to why they decided to allow payment in a certain
17 set of currencies that would advance their
18 business model and access in the market.

19 Q. Are there any companies on your Appendix
20 D that accept XRP as payment but as to which
21 nobody has ever paid in XRP?

22 A. I did not do that analysis. And, one,
23 it would be very difficult to do that kind of
24 analysis, if not impossible.

25 Q. I want to return to the issue of

1 Ripple's UNL.

2 If a hacker hacked into Ripple's website
3 and replaced Ripple's genuine UNL with a list of
4 50 malicious nodes, what would be the effect on
5 the XRP Ledger?

6 MR. WHITE: Objection; calls
7 for speculation.

8 A. That is speculative and I don't know if
9 Ripple or the Ledger protocol has ever considered
10 such a case, so I cannot comment or opine on what
11 the implications of that would be.

12 Q. Let's turn to paragraph 58 of your
13 report, which is page 27.

14 Do you see Table 1 there on page 27?

15 A. Yes, I do.

16 Q. And Table 1's labeled "Comparison of
17 Features/Attributes of Top Successful
18 Cryptocurrencies."

19 Do you see that?

20 A. Yes, I did. Yes, I do.

21 Q. Is this table your expert opinion as to
22 these features of these cryptocurrencies or is
23 this an occasion of an aggregation of information
24 from sources you reviewed in preparing your
25 report?

1 A. This table is a result of a combination
2 of both. I, first, on page 26, laid out some of
3 these characteristics that are brought up in the
4 industry as features, as possible features.
5 There's no absolute comparison, but what are
6 example features. So those are the attributes
7 that was aggregated from the literature.

8 Then I decided to apply these to
9 bitcoin, Ethereum or bitcoin, Ether and XRP. And
10 for that I ended up using the references that are
11 cited on the bottom of that page to fill in what
12 is where.

13 Q. Okay. With respect to security risk for
14 XRP Ledger/XRP, what's written there is "potential
15 vulnerability from attacks on specific nodes due
16 to openness and liquidity of system."

17 Do you see that?

18 A. Yes.

19 Q. What does that -- what -- sorry. Strike
20 that.

21 What does "potential vulnerability from
22 attacks on specific nodes due to openness and
23 liquidity of system" mean?

24 A. I did not do an independent analysis of
25 what that meant. It's -- it's information that I

1 took from MIT Technology review when I looked for
2 where the potential risks were that are being
3 talked about, I guess, on the various, you know,
4 networks and in the cryptosphere and did it each
5 for, again, not complete, but examples of security
6 risks for the three currencies.

7 Q. Sitting here today, do -- do you have an
8 understanding of -- of the potential vulnerability
9 being described in that cell of Table 1?

10 A. I have no technical understanding of
11 what that would mean in the context of the Ledger
12 protocol.

13 Q. Do you know what kind of security risk
14 it describes?

15 A. Malicious impacts on specific nodes.

16 Q. How --

17 A. Attacks -- I guess attacks on specific
18 nodes.

19 Q. How about the portion "due to openness
20 and liquidity of system"? Do you know what that
21 means?

22 A. Not on a technical level, no.

23 Q. Do you know at a nontechnical level?

24 A. I'm not going to comment to that until
25 or unless I've had a chance to review the MIT

1 Technology review paper to, again, look at the
2 context in which they use that particular
3 statement.

4 Q. Okay. The category of liquidity under
5 "Attributes," do you see that?

6 A. Yes.

7 Q. What does liquidity mean in this
8 context?

9 A. A high -- sorry. High-trading volumes
10 and, therefore, availability on the market.

11 Q. And how did you determine that all three
12 of these digital assets have high-trading volumes?

13 A. Based on information that's available on
14 various different sites and how much is being
15 traded on a daily basis and -- for all three of
16 these currencies, in addition to others, as I list
17 in other -- where is it? -- in Chart 4 gives us
18 information on liquidity. But "high" is not a
19 numeric designation, of course.

20 Q. Let's look at paragraph 60 on the next
21 page. Looking at the third sentence, it says
22 "Much like bitcoin became the digital peer-to-peer
23 money transfer standard, XRP became the digital
24 standard for currency exchange, asset settlement
25 and remittances."

1 Do you see that?

2 MR. WHITE: Objection;
3 misstates the document.

4 MR. SYLVESTER: Does it?

5 MR. WHITE: Yes.

6 THE WITNESS: Actually, I
7 state "a digital standard."

8 MR. SYLVESTER: Thank you for
9 the correction, both of you.

10 BY MR. SYLVESTER:

11 Q. My question is whether or not that
12 sentence, with the correction from counsel and
13 from yourself, is that your expert opinion or is
14 that something that you drew from one of the
15 sources that you reviewed in preparation of your
16 report?

17 A. It is drawn from sources in my report.

18 Q. Okay. And I see that there's not a
19 footnote here.

20 Sitting here today, do you know where
21 you drew that information that we just read
22 together?

23 A. I'm going to have to look that up. I
24 don't know right off --

25 Q. Okay.

1 A. -- as I'm sitting here.

2 Q. The next sentence that begins "Usability
3 and standardization," do you see that?

4 A. Yes.

5 Q. Take your time to read it, obviously,
6 but is that also a case of -- strike that.

7 Is that sentence your expert opinion or
8 is that an example of information that you drew
9 from other sources in preparation of your report?

10 A. The information that we need, custodial
11 and noncustodial actors, or specifically this
12 sentence?

13 Q. The entire sentence.

14 A. Okay. That's how I understand -- what I
15 understand custodial actors to be. So it was my
16 own kind of statement.

17 Q. Okay. Do all cryptocurrencies in your
18 view need to have institutional investors such as
19 hedge funds regardless of their use cases?

20 MR. WHITE: Objection; form,
21 calls for speculation.

22 A. Can you repeat the question, please?

23 Q. Sure.

24 Do all cryptocurrencies need to have
25 institutional investors such as hedge funds

1 regardless of their use cases?

2 A. It is -- it is speculative. I will turn
3 it around in that having institutional investors
4 that move a lot of assets on exchanges creates
5 liquidity. So it's sort of the other way around,
6 so...

7 Q. Let me read the sentence and -- and see
8 if we can come to a common understanding. So it
9 says -- your sentence says "Usability and
10 standardization require the cryptocurrency to have
11 well-functioning custodial actors, including
12 exchanges, institutional investors such as hedge
13 funds, and e-commerce with viable scalable use
14 cases."

15 A. Uh-huh.

16 Q. So I'm just picking out the requirement
17 of "institutional investors such as hedge funds"
18 and asking is it the case that all
19 cryptocurrencies need to have institutional
20 investors such as hedge funds in order to be
21 usable?

22 A. It would help in creating liquidity
23 depending on what the cryptocurrency --
24 cryptocurrency's use case is. AND you're asking
25 about all. There's now nine -- twelve thousand

1 cryptocurrencies, so I am not sure which
2 cryptocurrencies would benefit from that.

3 Q. Okay. Let's go to 63, please, on the
4 next page. Paragraph 63. This paragraph states
5 "The importance of liquidity and trading volume on
6 exchanges cannot be overstated. Liquidity
7 attracts users and is a key underpinning of the
8 value of a cryptocurrency."

9 Do you see that?

10 A. I see that.

11 Q. Okay. Is that your expert opinion or is
12 that information that you drew from other sources
13 in the course of preparing your report?

14 A. That is my opinion or information that
15 I've -- sorry. How did you differentiate? Is it
16 your opinion or is it -- would you repeat that?

17 Q. Absolutely.

18 Is paragraph 63 your expert opinion in
19 this case that you applied your expertise to and
20 your methodology as set forth in the report?
21 That's one option. The other option is, or is it
22 information that you drew from any of the sources
23 that you reviewed in preparing your report?

24 A. This is what I applied my expert opinion
25 to.

1 Q. Okay. Can you explain to me what -- how
2 you applied your expertise to generate the opinion
3 set forth in paragraph 63?

4 A. It sort of goes back to the statements
5 that I made earlier in the report regarding --
6 regarding some of the characteristics of
7 successful currencies, successful
8 cryptocurrencies, and including the table that we
9 discussed, Table 1 that we discussed.

10 That broad availability and
11 liquidity of a currency, of a cryptocurrency, in
12 an ecosystem that can readily access this -- this
13 currency for all sorts of applications is -- sort
14 of a more high-level statement, is important to
15 attract users of the cryptocurrency. It's really
16 a high-level statement more so than and derives
17 from my earlier statements in my report.

18 Q. You say in 63 that liquidity "is a key
19 underpinning of the value of a cryptocurrency," is
20 that right?

21 A. Yes.

22 Q. Is price one way to measure a
23 cryptocurrency's value?

24 MR. WHITE: Objection.

25 A. It is, but what -- what I intended here

1 with "value of a cryptocurrency" is the utility of
2 the cryptocurrency. Value as in utility.

3 Q. In general, all other things equal, if
4 an asset becomes more liquid, what effect does
5 that have on the asset's price?

6 MR. WHITE: Objection; calls
7 for speculation.

8 A. I think I would have to speculate. I
9 don't think there is a unique answer to that of
10 how liquidity is directly correlated to price.

11 Q. Okay. You write that "The importance of
12 liquidity and trading volume on exchanges cannot
13 be overstated."

14 Do you see that?

15 A. Yes.

16 Q. Given the importance of listing on
17 exchanges to the value of a cryptocurrency, in
18 your view would the holders of a cryptocurrency
19 find it important if a company said they were
20 trying to obtain listings for that
21 cryptocurrency?

22 MR. WHITE: Objection; calls
23 for speculation.

24 A. Was your question users? Sorry, can you
25 repeat -- repeat the question?

1 Q. It was holders, but I'll repeat the
2 whole thing.

3 A. Holders. Okay.

4 Q. Given the importance of listing on
5 exchanges to the value of cryptocurrency -- as set
6 forth in your paragraph 63 -- in your view would
7 the holders of a cryptocurrency find it important
8 if a company said they were trying to obtain
9 listings for that cryptocurrency?

10 MR. WHITE: Same objection.

11 A. From an investment perspective that may
12 be important, but I wouldn't speculate on that. I
13 don't know.

14 Q. What do you mean by "from an investment
15 perspective that may be important"?

16 MR. WHITE: Objection --

17 A. What do you mean with holders of
18 cryptocurrencies? Owners in their wallets, or
19 what do you mean by "holders"?

20 Q. By holder I meant owner, right.

21 MR. WHITE: Same objection to
22 this line of questioning.

23 Q. The question was what do you mean by
24 your testimony "from an investment perspective
25 that may be important"?

1 A. I'm going to rephrase that. It depends
2 on what --

3 MS. ZORNBERG: Hold on.

4 THE WITNESS: Sorry.

5 MR. WHITE: I believe the
6 court reporter only read back part of
7 the statement, so if we could
8 please -- let's go -- let's go back.
9 Let's see.

10 Please reread your full
11 question as fully stated.

12 MR. SYLVESTER: You want me
13 to reread my entire full question? I
14 was asking him about his testimony.

15 MR. WHITE: Yes.

16 THE WITNESS: And I want to
17 strike my answer, if that is possible,
18 or modify my answer.

19 BY MR. SYLVESTER:

20 Q. You can always modify your answer.

21 A. Okay. I want to modify my answer.

22 Q. You're welcome to. Please, go ahead.

23 A. That it depends on what the objective is
24 of the holder of a crypto asset.

25 Q. Okay. If the holder of a crypto asset

1 has an investment objective, then in that case
2 would that cryptocurrency holder find it important
3 if the company said they were trying to obtain
4 listings for that cryptocurrency?

5 MR. WHITE: Objection; calls
6 for speculation.

7 A. Again, I would need more context, and I
8 cannot answer that question with a yes or no.

9 Q. Okay. Let's turn to page 31, paragraph
10 69.

11 A. Yes, I have it.

12 Q. Okay. My -- my question on that is just
13 what source you used to -- strike that.

14 What's the basis for the facts set forth
15 in paragraph 69?

16 A. That was a follow-up on the citations
17 that I cited in -- in 68 on how the crypto space
18 is developing, institutional -- is developing,
19 institutional investors are getting involved. So
20 within these documents they provided more
21 information on the breadth of the investment space
22 in cryptocurrency.

23 Q. When you say "these documents," which
24 documents are you referring to?

25 A. I'm sorry. I meant the citations.

1 Citation 41. Citation 41 and 42, which I cited in
2 the previous paragraph. It was from those same
3 citations.

4 Q. Okay. The very last sentence of
5 paragraph 70 says "Although individual purchasers
6 made up just 36 percent of the exchange's volume
7 during the quarter ending December 31, more than
8 90 percent of Coinbase's revenue came from retail
9 trades."

10 Do you see that?

11 A. I see that.

12 Q. Was that fact drawn from the article
13 referenced at Footnote 43?

14 A. I believe so, yes.

15 Q. Okay. Other than the reference at
16 Footnote 43, do you have any other basis to
17 believe that that 36 percent or 90 percent figure
18 are accurate?

19 A. I didn't do any independent analysis of
20 that.

21 Q. Okay.

22 A. Again, it's a snapshot in time.

23 Q. In paragraph 71, in the first sentence,
24 you write "In summary, increased involvement of
25 institutional and retail users benefits the

1 liquidity of cryptocurrencies on exchanges and, in
2 turn, increases business opportunities for new
3 start-ups and corporate use cases."

4 Do you see that?

5 A. Yes.

6 Q. Okay. In the context of benefiting
7 liquidity of cryptocurrencies on exchanges, does
8 "involvement" in your first sentence mean trading?

9 MR. WHITE: Objection; form.

10 A. I'm going to have to reread the previous
11 paragraphs because this is a summary of the
12 previous paragraphs, but trading definitely is
13 part of it.

14 I don't think there was any -- looking
15 back at these paragraphs, a specific meaning to
16 "involvement" or "engagement" in.

17 Q. But you said trading is part of it, is
18 that right?

19 A. Yes. I think, again, it refers to
20 Footnote 41, talking about institutional investors
21 getting -- are getting involved. So the use of
22 "involve" includes trading.

23 Q. Okay. How does trading -- strike that.

24 How does increased trading by
25 institutional or retail investors increase

1 business opportunities for new start-ups and
2 corporate use cases?

3 A. The more -- the more liquid and
4 available a cryptocurrency is in the market, the
5 more likely businesses might use that currency,
6 for example, as a payment mechanism for their
7 businesses. That's really what it means.

8 Q. In the second paragraph of -- strike
9 that.

10 In the second sentence of paragraph 71,
11 you write "It is important to a given
12 cryptocurrency that both institutional and retail
13 market participants can take advantage of the
14 benefit of liquidity, which is one of the key
15 value propositions of integrating such a
16 cryptocurrency in current and new use case
17 applications."

18 Do you see that?

19 A. I see that.

20 Q. How is it that a retail market
21 participant can take advantage of the benefit of
22 liquidity?

23 A. Well, increasingly retail market
24 participants are participating in various
25 exchanges, as I noted in paragraph 70. Buy-sell

1 opportunities. I don't know if I need to say
2 anything beyond that.

3 Q. When you say "retail market participants
4 are participating in various exchanges," you mean
5 trading on those exchanges, is that right?

6 MR. WHITE: Objection; form.

7 A. In the context of this sentence,
8 "institutional and retail market participants" is
9 not only the institutional retail -- I mean going
10 to the previous sentence. And not only
11 institutional and retail investors but, also,
12 large and small companies.

13 So "market participants" is a pretty
14 broad umbrella or participant in the market.

15 Q. Okay. Let's go to paragraph 101,
16 please. That is on page 46.

17 A. Okay.

18 Q. Okay. So near the bottom of the
19 paragraph, you write "Ripple sought to reduce
20 these friction costs by enabling participants to
21 message, clear, and settle transactions at low
22 cost and high speed."

23 Do you see that?

24 A. I see that.

25 Q. What steps did Ripple take to accomplish

1 the ends you describe in this paragraph?

2 MR. WHITE: Objection; form.

3 A. Well, it goes back to the vision of the
4 company and the products that it would release on
5 the market to -- it says "sought to reduce." So
6 it is really working towards that process if you
7 look at the product arc of -- of Ripple, where it
8 seeks to develop software that allows -- that
9 would allow banks to reduce or to message, clear,
10 and settle transactions at low cost and high
11 speed. It goes back to the products that Ripple
12 develops.

13 Q. The last sentence of paragraph 101 says
14 "With the Internet of Value, a value transaction
15 such as a foreign currency payment can happen
16 instantly, just as how people have been sharing
17 words, images, and videos online for decades."

18 Do you see that?

19 A. Yes.

20 Q. Is that sentence your expert opinion?

21 A. That sentence has been used very
22 colloquially in the -- in the crypto industry and
23 at meetings, my UBRI meetings, and other
24 conversations that we've had in the context of --
25 of the FinTech Collaboratory.

1 Q. When you say "it's been used
2 colloquially at UBRI meetings," who is it that has
3 used this -- this sentence in the past?

4 A. I don't know specifically about a -- a
5 "who," but it was -- I'm not sure who initially
6 promoted it, but it became sort of a, I guess, a
7 statement or a value proposition or a vision that
8 people in the industry were starting to use, but I
9 forgot who actually originally made the statement
10 of Internet of Value. It's become a verbiage, a
11 term, of the blockchain era.

12 Q. If this is a statement from someone else
13 in the marketplace, is there a reason why you
14 didn't cite it?

15 MR. WHITE: Objection.

16 A. It would have been -- there's no reason
17 why it was not cited. I mean, it's sort of a
18 general statement around this whole Internet of
19 Value. It would have been a personal
20 communication or...

21 Q. What do you mean by "a personal
22 communication"?

23 A. Well, I mean, I spend my life day in and
24 day out in this industry. So there's a lot of
25 terms in the context of expert opinion that aren't

1 necessarily cited to a specific citation, but are
2 sort of part of the vernacular in the industry.
3 But it has come up at these UBRI meetings, as I
4 mentioned, when the group of 27 universities meet
5 and then I don't know how -- how it came about.

6 And I apologize that there's no specific
7 citation, but I -- I wouldn't know which one to
8 cite.

9 Q. Did you write that last sentence of
10 paragraph 101?

11 MR. WHITE: Objection.

12 I'm going to instruct you not
13 to answer on the basis of the work product
14 privilege.

15 Q. Okay. Paragraph 102 -- actually, let's
16 move -- let's move to paragraph 110, please. That
17 is on page 51. The first sentence of paragraph
18 110 is "Separate from its equity investment, I
19 understand that Ripple distributed XRP to an array
20 of counterparties with the goal of increasing
21 liquidity in the market."

22 Do you see that?

23 A. Yes.

24 Q. Okay. My first question is, does the
25 word "distributed" encompass Ripple's sale of XRP?

1 A. Excuse me.

2 Does it encompass sales?

3 Q. Yes.

4 A. Yes.

5 Q. The citation for that first sentence is
6 the -- is Ripple's Wells submission.

7 Do you see that, Footnote 79?

8 A. Yes.

9 Q. What was it about the Wells submission
10 that you relied on for the text of that sentence?

11 A. Sorry, what is the -- can you rephrase
12 that question?

13 Q. Sure.

14 What -- what was it that you learned
15 from or drew from the Wells submission that
16 informed the text of the first sentence of
17 paragraph 110?

18 MR. WHITE: Objection. You
19 can show him the Wells.

20 A. It -- from my reading of the Wells. I
21 mean, I guess that's where I got the information.

22 Q. Separate from your review of the Wells
23 submission, did you have an understanding that
24 Ripple sold XRP?

25 A. Yes.

1 Q. How did you acquire that understanding?

2 A. I looked at the consolidated financial
3 statements of Ripple.

4 Q. And those demonstrated that Ripple sold
5 XRP?

6 A. Yes. Those are the XRP information on
7 the sales of XRP.

8 Q. You write in the second sentence of 110,
9 "Such distributions are fully consistent with the
10 methods of product adoption of high-technology
11 companies identified above and the milestone
12 expectations of Ripple's equity investments."

13 Do you see that?

14 A. Yes.

15 Q. How was it in your view that Ripple's
16 sales of XRP were consistent with the methods of
17 product adoption of high-technology companies?

18 A. Well, digital companies and other
19 companies, but companies like Ripple, that sell
20 software on the market that depends on, in this
21 case, XRP to function is consistent with what
22 these start-up companies do or start-up companies
23 try to do with new products that they sell in the
24 market. They drive -- they try to drive market
25 adoption. They try to get more people to use

1 these products. But the product cannot be used
2 without the availability of liquidity in this case
3 in the market.

4 So, therefore, what Ripple did is they
5 undertook a -- what we call a penetration pricing
6 strategy to sell part of its technology, often at
7 a discount, as I talk about later on, in the
8 market to various different parties to allow the
9 markets to better use the software, the different
10 products that Ripple was releasing in the market.

11 Q. What software does Ripple sell that
12 requires XRP to function?

13 A. Well, ODL, On-Demand Liquidity, which I
14 guess was the former, I guess, xRapid. But
15 essentially any transactions that need to happen
16 on exchanges require the fee that is paid in -- in
17 XRP as well. There's multiple products that
18 existed out in the market that require the
19 availability of XRP for market participants to use
20 those products. So payment processors, yeah.

21 Q. Focusing on ODL, does -- does ODL
22 require the availability of liquidity in the
23 market to function?

24 MR. WHITE: Objection; form.

25 A. Well, specific, you know, payment rails,

1 I guess, between different countries. I mean,
2 yes, they require that.

3 Q. What -- what do you know about how
4 Ripple's ODL product works?

5 MR. WHITE: Objection; vague.

6 A. XRP functions at the level -- that I
7 understand it, XRP functions as a bridge currency
8 between one fiat currency and another fiat
9 currency.

10 Q. Do you know who Ripple's customers are
11 that purchase the ODL product from Ripple?

12 A. Who the current buyers are, what the
13 current -- yeah, current market is?

14 Q. Yes.

15 A. I believe it's mainly payment
16 processors.

17 Q. What's an example --

18 A. Large industrials. Some banks, I
19 believe. But, anyhow, I don't have the full list.
20 I have to check. I have to look that up.

21 Q. To your knowledge, do individual retail
22 users use Ripple's ODL product?

23 A. Not to my knowledge.

24 Q. Would Ripple's sales to individual --
25 strike that.

1 Would Ripple's sales of XRP to
2 individual users promote the adoption of ODL as a
3 successful product?

4 MR. WHITE: Objection; calls
5 for speculation.

6 A. I mean, there's too much -- too many
7 uncertainties and context missing to be able to
8 respond to that with a yes or no.

9 Q. Given what you know about the ODL
10 product, is it safe to say that Ripple's sales of
11 XRP to individual users were not in connection
12 with promoting adoption of the ODL product?

13 MR. WHITE: Objection; form.

14 A. I'm not sure I understand your question.
15 Could you rephrase that, please?

16 Q. Sure.

17 I think we've established that
18 individuals do not use ODL, is that right?

19 A. That's not my understanding, sir.

20 Q. Okay. So if an individual purchases
21 XRP, it's not for the purpose of using ODL, right?

22 MR. WHITE: Objection; form.

23 A. That's not my understanding.

24 Q. I can't tell if you're agreeing or
25 disagreeing. I'm sorry.

1 A. That's not my understanding. Sorry.

2 No.

3 Q. It's probably because I'm asking the
4 question poorly.

5 You would agree that if an individual
6 purchases XRP, that individual is not purchasing
7 the XRP for the purpose of using ODL, is that
8 right?

9 MR. WHITE: Objection.

10 A. It's my understanding that it's only
11 large corporates and institutionals, but I would
12 have to review that.

13 Q. Okay. Let's move to paragraph 120,
14 please. That's on page 59. The first sentence of
15 120 says "During its product development, Ripple
16 has enabled several important use cases related to
17 payment services, cross-currency settlements, and
18 FX (foreign exchange) solutions."

19 Do you see that?

20 A. Yes.

21 Q. In the context of this sentence, does
22 "enabled" mean that Ripple developed these use
23 cases?

24 MR. WHITE: Objection; form.

25 A. Based on the ones that I list below, I

1 guess ripple designed these products.

2 Q. Moving to the bullet that starts "ODL"
3 on page 60, do you see that?

4 A. Yes.

5 Q. It says "ODL, formerly known as xRapid,
6 is a liquidity solution for banks that uses XRP as
7 a bridge currency," and then continues.

8 Do you see that?

9 A. Yes.

10 Q. Do any banks currently use ODL today?

11 MR. WHITE: Objection;
12 foundation.

13 A. I have to defer to -- or refer to the
14 deposition by Dr. Birla -- or Mr. Birla, I'm not
15 sure -- who said that -- I think he indicated that
16 ODL was currently not used by banks.

17 Q. Okay. Moving to the last bullet on page
18 60, you write "Ripple products also make use of
19 ILP, an open protocol suite for sending payments
20 across different ledgers, most often cited by
21 third-party developers as a key differentiator for
22 adopting XRP or use of the XRP Ledger."

23 Do you see that?

24 A. I see that.

25 Q. Okay. Who are the third-party

1 developers that you're referencing in this
2 sentence?

3 A. Third-party use case developers.

4 Q. And who are they? Who are you
5 describing in this sentence?

6 MR. WHITE: Objection; form.

7 A. These are not individuals. These are
8 companies that have adopted XRP or used the XRP
9 Ledger because ILP allows them to cross over
10 between multiple different ledgers and even
11 between regular bank accounts and ledgers.

12 Q. Right. I'm trying to get at which
13 third-party developers have made the claim --

14 A. Oh.

15 Q. -- as expressed in your first sentence.

16 A. I am going to have to check my Footnote
17 92 and 93 to make reference to that statement.

18 Q. Sitting here today, do you know whether
19 or not the references cited in Footnotes 92 or 93
20 support the statement that "ILP is most often
21 cited by third-party developers as a key
22 differentiator for adopting XRP or the use of the
23 XRP Ledger"?

24 A. I do not know which of these two
25 references would have that specific statement in

1 it.

2 Q. Are you certain that one of them does?

3 A. I would have to --

4 MR. WHITE: Objection.

5 A. I would have to look back at these
6 footnotes to -- to check that.

7 Q. Let's turn to paragraph 123 on page 63.
8 The second sentence starts with "Aside from
9 multiple e-commerce companies using the XRP Ledger
10 because of its speed and cost benefits..."

11 Do you see that?

12 A. Yes.

13 Q. Which e-commerce companies use the XRP
14 Ledger?

15 A. Well, many of the e-commerce companies
16 are listed on the -- both Appendix C and Appendix
17 D., and any company that accepts XRP for its, you
18 know, product sales.

19 Q. Okay. So to make sure I understand the
20 sentence, when you say "multiple e-commerce
21 companies use the XRP Ledger because of its speed
22 and cost benefits," you're referring to e-commerce
23 companies that accept XRP as payment, is that
24 right?

25 A. Yes. This is -- 120 -- paragraph 123 is

1 a setup for paragraph 124, which refers to "these
2 use cases." So it's connected between two -- for
3 example, the example of furniture that you brought
4 up earlier would be an example.

5 Q. Going back to paragraph 123, how do you
6 know that these e-commerce companies are using the
7 XRP Ledger because of its speed and cost benefits?

8 A. This goes back to some of the previous
9 citations related to some of the companies I
10 listed before, as well as other readings on
11 companies where there are specific quotations from
12 business owners saying "I like it because of
13 speed."

14 Q. Which companies are you --

15 A. For example, TapJets mentioned that
16 because of speed, but I did not cite specifically
17 to the statement of the business owner of TapJets
18 who actually said that. That's an omission on my
19 behalf. I apologize.

20 Q. Aside from the TapJets statement that
21 you just described, were there other occasions
22 where you were able to determine that e-commerce
23 companies had elected to use the XRP Ledger
24 because of its speed and cost benefits?

25 A. There are other quotes that I've come

1 across in my research, yes.

2 Q. Are those incorporated in your report
3 anywhere?

4 A. I'm going to have to check which of
5 these use cases those were. I apologize that I
6 did not cite specifically those, to those
7 companies and those business owners who explicitly
8 stated that.

9 Q. Okay. Let's turn to paragraph 33,
10 please.

11 A. Sorry, paragraph?

12 Q. Thirty-three on page 16.

13 The sentence near the end of the
14 paragraph starts "When a user sends bitcoin, the
15 transaction is bundled in a block with 1,000" to
16 20 -- strike that.

17 Let's move to paragraph 35. The last
18 sentence of paragraph 35 says "Current estimates
19 suggest there are over 700,000 blocks on the
20 bitcoin blockchain."

21 Do you see that?

22 A. I see that.

23 Q. What's your source for that statement?

24 A. It's probably one of the ones that was
25 cited earlier such as 20, but I did not

1 specifically cite to that.

2 Q. Do you know sitting here today what
3 source you used to come up with that sentence in
4 paragraph 35?

5 A. I am not sure.

6 Q. Okay.

7 A. But I'm assuming that where it came from
8 was cited in one of the earliest -- earlier
9 references when I described bitcoin.

10 Q. Okay. The same question for paragraph
11 38 on page 18. About the center of that paragraph
12 it reads "By design, the rewards halves after
13 210,000 new blocks, or about every four years,
14 until reaching the maximum supply of 21 million
15 coins. In May 2020, the block reward was halved
16 for a third time to 6.25 BTC."

17 Do you see that?

18 A. I see that.

19 Q. What was your source for that
20 information?

21 A. I'm going to have to look back at where
22 that came from.

23 Q. Sitting here today, you're not sure what
24 source you used?

25 A. Which source are the ones that I -- that

1 I cited, I don't know. Don't know, no.

2 Q. Let's look at paragraph 46 on page 22.

3 This is in reference to the XRP Ledger. The last
4 sentence says "The number of validators has grown
5 to 150 around the world, including clients, users,
6 and company servers; notable validators include
7 Microsoft and Massachusetts Institute of
8 Technology."

9 Do you see that?

10 A. On the top of 22?

11 Q. Yes.

12 A. Yes.

13 Q. What is your source for that
14 information?

15 A. I believe it's both information based on
16 the -- my Reference 26, information that's
17 available on Ripple sites. And since MIT is one
18 of the -- one of the UBRI universities, it's one
19 of -- one of our colleagues in the partnership.
20 So I knew -- I knew about that one.

21 Q. Okay.

22 MR. SYLVESTER: I would like
23 to take a brief break and then we can
24 wrap this up if that sounds all right.

25 THE VIDEOGRAPHER: Going off

1 the record. The time is 6 p.m.

2 (Whereupon, a recess is
3 taken.)

4 THE VIDEOGRAPHER: We'll go
5 back on the record. The time is 6:13.

6 BY MR. SYLVESTER:

7 Q. Professor, how did you come to be
8 retained as an expert in this case?

9 A. I initially received a call from
10 counsel. I --

11 MR. WHITE: I caution you not
12 to disclose the substance of
13 conversations with counsel.

14 THE WITNESS: All right.

15 A. I received a -- a call; we had a
16 discussion. They disappeared and came back at one
17 point and said "We'd like to retain you."

18 Q. Which counsel reached out to you?

19 A. I believe it was Michael Kellogg.

20 Q. When was that initial -- sorry. Go
21 ahead.

22 A. At least the firm, but I don't know who
23 it was within the firm.

24 Q. When was that initial call?

25 A. Would have been April 2021.

1 Q. Okay. Did you do anything today to
2 prepare for your deposition? Strike that. Taking
3 out "today."

4 Did you do anything to prepare for your
5 deposition today?

6 A. Oh. Yes.

7 Q. What did you do?

8 A. I reread all the reports, my reports,
9 rebuttal reports, filings, depositions. So did a
10 reread of all of the materials and we had a couple
11 preparation sessions.

12 Q. Who participated in your preparation
13 sessions?

14 A. It was counsel at Debevoise, Kellogg
15 Hansen. And I forgot the other counsel.

16 Q. About how long did you spend in
17 preparation with counsel prior to your
18 deposition?

19 A. As in hours?

20 Q. Yes.

21 A. In total, probably two days.

22 Q. Two eight-hour days?

23 A. Two half days and one full day. So
24 three separate meetings.

25 Q. Other than counsel, did anyone else

1 assist with your preparation for your deposition
2 today?

3 A. No.

4 MR. SYLVESTER: That's all
5 the questions I have.

6 Thank you.

7 THE WITNESS: Thank you.

8 MR. WHITE: So we will have
9 some redirect and we can go now if you
10 want.

11 MR. SYLVESTER: Go ahead.

12 MR. WHITE: Do we want to
13 switch?

14 MR. SYLVESTER: I'm
15 comfortable here, but if you'd like to
16 switch, that's fine by me.

17 MS. ZORNBERG: I think you
18 should switch because it's video.

19 MR. WHITE: Because of video,
20 yeah. Go off the video.

21 THE VIDEOGRAPHER: Going off
22 the record. The time is 6:16.

23 (Pause)

24 THE VIDEOGRAPHER: We'll go
25 back on the record. The time is 6:17.

1 CROSS-EXAMINATION

2 BY MR. WHITE:

3 Q. Dr. Adriaens, earlier today you were
4 asked about some language in paragraph 43 of your
5 report that is similar to language in another
6 source that was marked as Exhibit PA 24.

7 Do you recall that line of testimony?

8 A. Yes, I do.

9 Q. Would you focus with me on the two
10 sentences you were asked about in that paragraph,
11 which is the first two sentences of paragraph 43?
12 Do you view the statements made in those sentences
13 to be in any way controversial?

14 MR. SYLVESTER: Object to
15 form.

16 A. No, I do not. I think they're very
17 high-level descriptions.

18 Q. Since reviewing Exhibit PA 24 earlier
19 today, have you looked into whether -- into
20 whether Exhibit PA 24 is the only source that uses
21 that language?

22 A. Yes. After I was asked by SEC counsel
23 regarding these two sentences, I decided to take
24 advantage of one of our breaks to do a search on
25 the exact statements, a basic Google search. And

1 I found that these exact sentences -- or these
2 sentence -- these sentences, give or take one word
3 or two, did actually appear in a lot of crypto
4 sites, such as Medium, in book chapters, and
5 other -- other places.

6 Q. Was it ever your intention to take
7 language from some particular source and not
8 provide a citation?

9 A. No, it was never my intention to not
10 cite if this was identical to something that we
11 find somewhere else.

12 Q. Let me shift to another topic.

13 You recall that Mr. Sylvester spent
14 quite some time today questioning you about
15 back -- background factors set forth in Part 2 of
16 your report.

17 Do you recall that testimony?

18 MR. SYLVESTER: Object to
19 form.

20 A. Yes.

21 Q. Look with me at paragraph 23 of your
22 report. Let me know when you're there.

23 A. I'm there.

24 Q. Do you see there that you characterize
25 Part 2 as "background"?

1 MR. SYLVESTER: Object to
2 form.

3 A. Yes.

4 Q. Are you a technical expert in the
5 operational details of how the XRP Ledger or other
6 blockchains work?

7 No. As I stated or testified earlier in the -- today's
8 deposition, my background is in the business analytics,
9 business development, and business applications of the
10 blockchain and digital currencies.

11 Q. And that's the expertise you brought to
12 bear in this case, correct?

13 MR. SYLVESTER: Object to
14 form.

15 A. That's the expertise I brought to bear.

16 Q. Look with me now at paragraphs 19
17 through 21. Let me know when you've had a chance
18 to review them.

19 A. Yes.

20 Q. Those paragraphs summarize the opinions
21 that you've offered in this case, correct?

22 A. Yes, they do.

23 Q. Is expertise in the technical details of
24 how XRP Ledger validation works necessary for any
25 of the opinions that you've offered?

1 A. No, it isn't.

2 MR. WHITE: That's all the
3 questioning I have subject to any
4 further questioning. I will request
5 to read and sign and designate the
6 transcript confidential.

7 MR. SYLVESTER: I don't have
8 anything. Thanks.

9 THE VIDEOGRAPHER: That
10 concludes today's deposition. The
11 time is 6:21.

12 (Whereupon, the deposition
13 was concluded at 6:21 p.m.)
14
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1 STATE OF NEW YORK)

2) ss:

3 COUNTY OF NEW YORK)

4 I hereby certify that the witness in the
5 foregoing deposition, DR. PETER ADRIAENS was by me duly
6 sworn to testify to the truth, the whole truth and
7 nothing but the truth, in the within-entitled cause; that
8 said deposition was taken at the time and place herein
9 named; and that the deposition is a true record of the
10 witness's testimony as reported by me, a duly certified
11 shorthand reporter and a disinterested person, and was
12 thereafter transcribed into typewriting by computer.

13 I further certify that I am not interested in
14 the outcome of the said action, nor connected with nor
15 related to any of the parties in said action, nor to
16 their respective counsel.

17 IN WITNESS WHEREOF, I have hereunto set my hand
18 this 10th day of February 2022.

19 Reading and Signing was:

20 x requested waived not requested.
21
22

23 _____
24 BRIDGET LOMBARDOZZI, CSR, RMR, CRR
25

1 CERTIFICATE OF WITNESS

2
3
4 I, PETER ADRIAENS, do hereby declare under
5 penalty of perjury that I have read the entire
6 foregoing transcript of my deposition testimony,
7 or the same has been read to me, and certify that
8 it is a true, correct and complete transcript of
9 my testimony given on February 8, 2022, save and
10 except for changes and/or corrections, if any, as
11 indicated by me on the attached Errata Sheet, with
12 the understanding that I offer these changes and/or
13 corrections as if still under oath.

14 _____ I have made corrections to my deposition.

15 _____ I have NOT made any changes to my deposition.

16
17 Signed: _____
PETER ADRIAENS

18
19 Dated this _____ day of _____ of 20____.

ERRATA SHEET

Deposition of: PETER ADRIAENS
 Date taken: FEBRUARY 8, 2022
 Case: SEC v. RIPPLE LABS, INC., et al.

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Exhibit 13

**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK**

SECURITIES AND EXCHANGE COMMISSION,

Plaintiff,

v.

RIPPLE LABS INC., BRADLEY GARLINGHOUSE, and
CHRISTIAN A. LARSEN,

Defendants.

No. 20-cv-10832 (AT)

REBUTTAL EXPERT REPORT OF DR. PETER ADRIAENS

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I. Introduction

1. I am a Professor of Engineering, Finance and Entrepreneurship, Director of the Center for Smart/Digital Infrastructure Finance, and co-founder of the University of Michigan FinTech Collaboratory. My complete CV and the nature of my retention and compensation in connection with this case were set forth in my expert report of October 4, 2021.

2. I have been provided the expert report of Dr. [REDACTED] (the “Report”) and asked to evaluate the methodology and conclusions set forth in that report.

3. The facts and data I have relied on and considered in forming my opinions are disclosed in the report. Should additional relevant documents or information be made available to me, I may adjust or supplement my opinions as appropriate.

4. As further set forth below, I conclude:

(1) Dr. [REDACTED] principal opinion – that “the XRP Ledger does not satisfy a basic definition of a decentralized system” (Report at 27) – is not the product of a generally accepted methodology for evaluating the decentralization of a distributed ledger. That is because of three facts that the relevant academic literature establishes, but the Report ignores: (i) neither the scientific community nor the blockchain community¹ has reached consensus about the appropriate definition of “decentralization;” (ii) neither community has reached consensus about the appropriate criteria that should be used to determine

¹ See Angela Walch, *Deconstructing ‘Decentralization’: Exploring the Core Claim of Crypto Systems*, in CRYPTOASSETS: LEGAL, REGULATORY, AND MONETARY PERSPECTIVES 41–42, 47–48, 68 (Chris Brummer ed., 2019) (discussing how “decentralization” is used “in academic works of relevant disciplines, in discussions within the crypto space, in conference names galore, and in countless reports by businesses, governments and international organizations” and yet “in mainstream discourse, it has been rare to see clear explanations of ‘decentralized’ or ‘decentralization’ when they are used”).

whether a given blockchain satisfies any such definition; and (iii) neither community has reached consensus about the appropriate metrics to use to quantify whether a given ledger satisfies such criteria. Given the reasonable disagreement within the literature about the appropriate criteria to define decentralization, and the appropriate metrics to quantify those criteria, Dr. [REDACTED] identification of what he calls “four main aspects of decentralization” (Report at 5) can only be described as novel; it rests on assumptions and choices he has made that are, in the respects discussed below, unsupported by or inconsistent with the prevailing literature and/or lacking in reliability.

(2) Dr. [REDACTED] related opinion that “[t]he XRP Ledger is centralized compared to Bitcoin and even Ethereum” (Report at 24) also is not the product of a generally accepted methodology. That is so, first, because it rests on an unstated assumption – that it is even possible to compare those three blockchains based on uniform criteria – that fails to account for the fundamental differences in their respective consensus mechanisms. That assumption is demonstrably in conflict with the prevailing literature. Moreover, Dr. [REDACTED] application of his stated methodology is unreliable because the metrics by which he purports to quantify whether the Bitcoin, Ethereum, and XRP blockchains are decentralized do not have an agreed-upon system of measurement. Accordingly, even if Dr. [REDACTED] methodology were reliable (and it is not), his application of that methodology to this case is fundamentally flawed in ways independently sufficient to undermine his conclusions.

II. Dr. [REDACTED] Opinions Regarding Whether the XRP Ledger is Decentralized Rest on a Selective Methodology of His Own Creation That Finds Insufficient Support in the Prevailing Literature.

A. There is no accepted definition of “decentralization” for purposes of evaluating a particular distributed system, like a blockchain.

5. Dr. [REDACTED] report depends on his adoption (Report at 5) of a particular definition of a decentralized system. [REDACTED] draws this definition from a 2017 paper by Troncoso et al., which defines decentralized systems as “a subset of distributed systems where multiple authorities (parties) control different system components and no authority is fully trusted by all.”² Dr. [REDACTED] then, in his own words, “refine[s]” this definition by selecting the “four main aspects of decentralization” that comprise his methodology for applying the definition, which then leads him to conclude that “the XRP Ledger does not satisfy the basic definition of a decentralized system.” (Report at 5.) Accordingly, his opinion rests, in the first instance, on the assumption that the Troncoso definition is authoritative.

6. One immediately apparent flaw in Dr. [REDACTED] approach is that he selectively chooses the Troncoso definition of decentralization and treats it as authoritative, when in fact the Troncoso definition is not generally accepted within the literature – indeed, given the nascency of the field, *no* particular definition of a decentralized system has achieved general acceptance within the literature. Even within the peer-reviewed literature, there is disagreement regarding what features of a system must be examined, and how, when evaluating decentralization. The Troncoso paper cited by Dr. [REDACTED] for a purported “basic definition of a decentralized system”

² Carmela Troncoso et al., *Systematizing Decentralization and Privacy: Lessons from 15 Years of Research and Deployments*, PROC. PRIV. ENHANCING TECH. (4) 307, 307 (2017).

(Report at 5) itself recognizes that, within the relevant literature, “there does not exist a foundational treatment *or even an established common definition* of decentralization.”³

7. While the Troncoso paper was one attempt to craft such a definition, Dr. [REDACTED] report offers no basis to conclude that the Troncoso definition has become an accepted definition within the field. To the contrary, the Sai paper that Dr. [REDACTED] cites (Report at 9–11), which was published in March 2021 (five years after the Troncoso paper), undertakes a “systematic literature review” to “study decentralization in blockchain” and present “the first in-depth analysis of centralization in blockchains.”⁴ The Sai paper identifies 89 articles as “relevant blockchain literature”⁵ – yet does not cite the Troncoso paper at all. Rather, the Sai paper relies on a definition of decentralization from a paper by Davidson et al., published in 2016, that Dr. [REDACTED] report does not consider. Davidson offers a substantively distinct definition of decentralization from Troncoso, namely that a system is decentralized “where participants can read, write data, and contribute to consensus without authorization.”⁶ To give another example, Wu et al., in a 2020 paper, defined decentralization as a system where “no single individual can destroy transactions in the network, and any transaction request requires the consensus of most participants.”⁷ This definition again is substantively different from the Troncoso paper and emphasizes participation as opposed to authorization.

³ *Id.*

⁴ A.R. Sai et al., *Taxonomy of Centralization in Public Blockchain Systems: A Systematic Literature Review*, 58 INFO. PROCESS & MGMT. 1, 3 (2021).

⁵ *Id.* at 3, 32–35.

⁶ *Id.* at 4 (citing Davidson et al., *Economics of Blockchain* (Mar. 8, 2016), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2744751).

⁷ Keke Wu et al., *A Coefficient of Variation Method to Measure the Extents of Decentralization for Bitcoin and Ethereum Networks*, 22 INT’L J. NETWORK. SEC. 191, 192 (2020).

8. Moreover, in connection with drafting this report, I have reviewed the sources cited by Dr. [REDACTED] as well as others I identified through my own research. They do not offer an accepted definition of “decentralization” or the factors relevant to determining whether a particular distributed system or blockchain is or is not “decentralized.” In my reading of the peer-reviewed literature, there is currently no generally settled opinion on the definition of decentralization, nor any generally accepted, reliable tools or metrics to compare or quantify different systems.

9. Dr. [REDACTED] report neither acknowledges the ongoing lack of consensus (in both the scientific and professional blockchain communities)⁸ on a definition of “decentralization,” nor defends his choice to adopt the Troncoso definition. That is, he never explains why he chose that definition, let alone whether or why it is superior to other proposed definitions in any respect. This approach renders his opinions fundamentally flawed. It is important and necessary, as a baseline starting point for analyzing the issue of decentralization, to acknowledge the lack of consensus among scientific and professional blockchain communities, which continue to wrestle with, debate, and study what “decentralization” means and how to measure it – as even the papers on which Dr. [REDACTED] relies make clear.⁹

⁸ Walch, *supra* note 1, at 41–42 (providing a descriptive account of the varied and inconsistent uses of the term “decentralized” among the academic, professional, governmental, and international communities, and noting “it has been rare to see clear explanations of ‘decentralized’ or ‘decentralization’ where they are used”); *see id.* at 47 (“No One Knows What Decentralization Means”); *id.* at 39 (noting that, on June 15, 2018, one day after an official of the Securities and Exchange Commission gave a speech discussing decentralization, the Director of the MIT Digital Currency Initiative said on Twitter, “I’m a little worried people from government agencies are throwing around the word ‘decentralization’ like we know what it means and how to evaluate it”).

⁹ Those papers set forth a range of metrics for analyzing centralization or decentralization that Dr. [REDACTED] ignores without explanation even as he relies on the literature for other, narrower purposes. I offer no opinion as to the utility of these metrics, since Dr. [REDACTED] does not apply them in his Report, but rather identify them as evidence of the lack of

B. There are no accepted criteria to use to determine whether a given system satisfies a given definition of decentralization.

10. Dr. ██████ report, as part of his “refine[ment]” of the Troncoso definition of decentralization, asserts that there are four main criteria by which to evaluate decentralization: (1) Resilience (which Dr. ██████ states should be measured by a metric called the Nakamoto Coefficient), (2) Inclusiveness, (3) In-Protocol Incentives, and (4) Governance (which Dr. ██████ further refines to (a) Public Face and (b) Tokens Allocated at Genesis). (Report at 5.) These criteria form the structure of Dr. ██████ application of the Troncoso definition of decentralization to Bitcoin (Report at 15–17), Ethereum (Report at 18–19), and the XRP Ledger. (Report at 22–24).
11. Dr. ██████ putative refinement of the Troncoso definition compounds his selection of that definition’s flaws, because it, too, rests on an unproven assertion rather than any authoritative source or methodology. To start, Dr. ██████ offers no citation or support for the proposition that these four factors are either necessary or sufficient to determine whether a particular system is decentralized. To the contrary, Dr. ██████ himself recognizes that there are “additional aspects of decentralization” that relate to various aspects of a blockchain system (sometimes grouped into “layers,” to which I return below), but states without explanation or

consensus around appropriate metrics to evaluate the basic concept Dr. ██████ Report purports to address. *See, e.g.,* Sarah Azouvi et al., *Egalitarian Society or Benevolent Dictatorship: The State of Cryptocurrency Governance*, in FIN. CRYPTOGRAPHY AND DATA SEC. 127, 132 (Aviv Zohar ed., 2018) (analyzing “centrality metrics” including Interquartile range, Interquartile mean, Kolmogorov-Smirnov test, Nakamoto index, Satoshi index, and the Sorensen-Dice index); Adem Gencer et al., *Decentralization in Bitcoin and Ethereum Networks*, in FIN. CRYPTOGRAPHY AND DATA SEC. 439, 440 (Aviv Zohar ed., 2018) (presenting “a comprehensive measurement study on decentralization metrics” including “(1) direct measurements of [Bitcoin and Ethereum] from multiple vantage points, (2) a Bitcoin relay network called *Falcon* that we deployed and operated for a year, (3) blockchain histories of Bitcoin and Ethereum”); Sai et al., *supra* note 4, at 12 (summarizing in Table 2 a taxonomy of centralization-related aspects of public blockchains that includes 6 layers and 13 factors within those layers).

citation that his report “opt[s] to focus on decentralization aspects of systems proper.” (Report at 11.) Dr. [REDACTED] offers no explanation or justification for his decision to abandon those “additional aspects,” nor why his methodology and conclusions remain sound despite that decision.

12. A basic methodological step in creating any novel definition in social and informational sciences¹⁰—which I argue includes key applications of blockchain technology¹¹—is to establish that the components of the definition are both *necessary* and *sufficient* to the conclusion.¹² This is because the purpose of definitions is to establish sufficient shared meaning such that a class of entity can be investigated by a scientific community. This does not preclude that a definition may be adjusted in the light of new understandings as they emerge. However, without meeting the necessary-sufficient criteria, a definition will become either overinclusive (if it contains components that are not necessary) or underinclusive (if its components are not sufficient) to reach a relevant conclusion. Yet Dr. [REDACTED] does not attempt to establish that his four selected criteria are necessary or sufficient to define a blockchain as decentralized. To be clear, I do not deny that the four aspects he focuses on are (or, at least, can be) relevant. But others are discussed in the literature, and it appears that Dr. [REDACTED] subjectively chose those four metrics, omitted others, and ignored key insights from the literature in that regard.

¹⁰ Blockchain is an emerging technology in the field of computer science, with many of its applications relating to the field of information science, an academic field primarily concerned with analysis, collection, classification, manipulation, storage, retrieval, movement, dissemination, and protection of information.

¹¹ See Jaideep Ghosh, *The Blockchain: Opportunities for Research in Information Systems and Information Technology*, 22 J. GLOBAL INFO. TECH. MGMT. 4, 235–242 (2019).

¹² Geoffrey M. Hodgson, *Taxonomic Definitions in Social Science, with Firms, Markets and Institutions as Case Studies*, 15 J. INST. ECON. 207, 212–13 (2019).

13. To understand this point, recall from my opening report (at ¶¶ 30–40) that not all blockchains share an identical basic architecture. Bitcoin is an example of a proof-of-work blockchain. (Expert Report of Peter Adriaens (Oct. 4, 2021) (“Adriaens Report”) at 17.) The current state of Ethereum is another example of a proof-of-work blockchain (though, as Dr. ██████ recognizes, Ethereum is transitioning to a different model known as proof of stake). The XRP Ledger uses neither proof-of-work nor proof of stake, but rather a federated consensus model.¹³ Dr. ██████ use of the four factors he selects depends on an assumption that they provide a reliable way to assess, objectively test, quantify, or compare substantively distinct blockchain architectures. That assumption is flawed. First, as the Troncoso paper itself underscores, the criteria used to measure decentralization in a particular blockchain system must account for differences in **network infrastructure** (“the distribution of tasks needed for maintaining service within the system”), **network topology** (“the connections between nodes used to route traffic”), and **authority topology** (“the power relations between the nodes”), lest they ignore important differences in how different blockchains realize or achieve decentralization in practice.¹⁴ Dr. ██████ report does not address this.

14. An example helps to illustrate the importance of having reliable mechanisms to compare substantively different architectures before reaching useful conclusions. For decades, “miles per gallon” (MPG) was a reliable mechanism for comparing the efficiency of two different cars, and an observer who was only aware of gasoline-powered cars might therefore assume that all cars can be assigned an MPG measurement. If, however, that observer were then introduced to a Tesla, which does not run on gasoline and cannot be assigned an MPG, the measurement

¹³ See *Consensus Protections Against Attacks and Failure Modes*, XRPL.ORG, <https://xrpl.org/consensus-protections.html>.

¹⁴ See Troncoso et al., *supra* note 2, at 309–13, 320.

criterion would fail to recognize the Model 3 as a car, because it failed to account for differences in the underlying architecture.

15. Dr. [REDACTED] assumption that his four selected criteria can be reliably applied to assess and compare Bitcoin, Ethereum, and the XRP Ledger is further flawed because it does not consider decentralization at various *layers* of those three blockchain systems. A recent review on the taxonomy of metrics to characterize and measure (de)centralization indicates that the techniques that are useful depend on the layer in the blockchain one wants to compare, and on the particular blockchain architecture at issue.¹⁵ Whereas the subsystems (or “layers”) are defined differently between Srinivasan and Lee¹⁶ or Sai, the results in Chart 1, taken from Sai, indicate that multiple techniques are favored.¹⁷ Sai identifies a total of 13 aspects spread over six architectural layers that are relevant to the issue of decentralization in public blockchains – and for several of those aspects, Sai observes that no measurement techniques can even be found yet within the literature (see the “Not found” notations in Chart 1).¹⁸

Layer	Centralization factor	Measurement techniques
Application layer	Wallet concentration Exchange concentration Reference client concentration	Not found Centrality & Percentage value Satoshi index
Operational layer	Storage constraint Specialized equipment concentration	Ratio of growth Not found
Incentive layer	Wealth concentration	Gini coefficient & Percentage value
Consensus layer	Consensus power distribution	Percentage value & Gini coefficient & Theil index & Centralization factor
Network layer	Node discovery protocol control Geographic distribution Bandwidth concentration Routing centralization	Not found Gini coefficient & Latency Clustering of provisioned bandwidth AS-Level coverage
Governance layer	Owner control Improvement protocol	Fractional measurement Centrality metrics

Chart 1. Decentralization metrics considered across blockchain layers (from Sai et al., 2021)

¹⁵ Sai et al., *supra* note 4, at 5, 12–28.

¹⁶ Balaji S. Srinivasan & Leland Lee, *Quantifying Decentralization*, EARN.COM (July 27, 2017), <https://news.earn.com/quantifying-decentralization-e39db233c28e>.

¹⁷ Sai et al., *supra* note 4, at 12.

¹⁸ *Id.*

16. The active study of decentralization factors – and the development of appropriate metrics and techniques to measure them – in the scientific literature indicates an on-going need for research to compare blockchains, and demonstrates that this area is unsettled, and that there is currently no standard or benchmark for use in the profession.¹⁹ This observation is exemplified in Chart 1 by measurement techniques labeled “Not found,” indicating that even as to factors relating to decentralization that have been proposed, there is no reliable way to measure or objectively assess different blockchains as to those factors.

17. By way of further example, a 2020 study called “Measuring Decentrality in Blockchain Based Systems” emphasizes the need to measure decentralization at different layers of the system, using “various metrics” to capture decentrality in “respective layers.”²⁰ For measuring decentrality at the governance layer (the layer in which the nodes reach a consensus), the authors propose using seven different metrics including: “fairness index, entropy, Gini coefficient, Euclidean distance, Minkowski distance, cosine similarity and Kullback-Leibler divergence metrics.”²¹ I express no view on whether those seven metrics are the right ones or not – as this is an emerging area of study lacking consensus on approach – but it is striking that the prevailing literature is both layer-sensitive and architecture-sensitive in proposing metrics, whereas Dr. [REDACTED] approach is not.

18. Hence, the differences in incentive, governance, operational, and validation mechanisms (proof-of-work for Bitcoin and Ethereum; federated consensus for the XRP Ledger) do not allow

¹⁹ See *id.* at 5 (explaining that the “study of centralization in public blockchain is still fragmented” and current models “do not provide adequate insights,” therefore setting out to design a “novel centralization taxonomy” to “overcome th[at] limitation”).

²⁰ Sarada Prasad Gochhayat et al., *Measuring Decentrality in Blockchain Based Systems*, 8 IEEE ACCESS 178372, 178376 (2020).

²¹ *Id.* at 178373.

for a direct metrics comparison on the same basis. Given there is no consensus in the literature and the practice to measure these metrics objectively **at the subsystem or layer** evaluated, there is a lack of methodology and process to compare **entire blockchains** at a systems level. Dr.

██████ does not acknowledge this lack of consensus, nor does he offer a basis to conclude that his novel four-factor framework is (or is based on) a generally accepted methodology.

C. There are no accepted metrics to use to quantify whether a given ledger satisfies criteria for decentralization, especially for purposes of comparing Bitcoin, Ethereum and the XRP Ledger.

19. In addition, to the extent that Dr. ██████ identifies a series of criteria that he asserts are relevant to whether a particular blockchain is decentralized, he does not substantiate – and the relevant literature does not provide – metrics by which one may reliably and consistently quantify the four criteria in question. I will address each of the four in turn.

20. **Resilience (Nakamoto Coefficient).** The concept of resilience is often described as a major benefit of blockchains, and it refers generally to a blockchain’s persistence in moving forward in a trusted way and ability to withstand challenges such as hacking, malware, fraud, server or network failure, and human error. Dr. ██████ report decides to assess and measure Resilience across the Bitcoin, Ethereum, and XRP Ledger systems using a metric he calls the “Nakamoto Coefficient” – “the number of parties that need to be corrupted to subvert key properties of a distributed system.” (Report at 5 n.1.) I am not aware of any peer-reviewed literature that considers the Nakamoto Coefficient, as a term or as defined by Dr. ██████ as a suitable or accepted metric for measuring the decentralization of a blockchain. Dr. ██████ cites

a (non-peer-reviewed) YouTube video and blog post in relying on the concept of a Nakamoto Coefficient for this purpose.²²

21. The blog post Dr. [REDACTED] cites explains that calculating the Nakamoto Coefficient requires that one:

- (a) enumerate the essential subsystems of a decentralized system,
- (b) determine how many entities one would need to be compromised to control each subsystem, and (c) then use the minimum of these as a measure of the effective decentralization of the system. The higher the value of this minimum Nakamoto Coefficient, the more decentralized the system is.²³

22. That post concludes by stating that the authors “recognize that there is plenty of room for debate over which subsystems of a decentralized system are essential.”²⁴ Dr. [REDACTED] does not offer, and I am not aware of, any basis to conclude that the debate around identifying essential subsystems that these authors acknowledge has been resolved in favor of considering solely “safety” and “liveness,” which Dr. [REDACTED] asserts are the two principal properties of Resilience. (Report at 9.) Indeed, neither word appears anywhere in the blog post that defined the Nakamoto Coefficient (nor do the

²² Stacks, Balaji Srinivasan of 21: “*Quantifying Decentralization*” Blockstack Summit 2017, YOUTUBE (Aug. 11, 2017), <https://www.youtube.com/watch?v=4UXT5YVJwB4>. The YouTube video in question, *Quantifying Decentralization*, is related to a blog post on Earn.com by the same author. Srinivasan & Lee, *supra* note 16. Later in his report, Dr. [REDACTED] defines Resilience as the ability of a system “to withstand Byzantine behavior of components of the system.” (Report at 9.) He then states that Resilience “may apply to different properties of the system, namely safety and liveness,” which he defines as the properties of a system that bad things do not happen (safety) and good things do eventually happen (liveness). (*Id.*) Dr. [REDACTED] again offers no citation for this notion. For the reasons explained later in this report, none of this supplies a reliable metric for measuring blockchain systems’ decentralization.

²³ Srinivasan & Lee, *supra* note 16.

²⁴ *Id.*

words “double-spend resistance” or “censorship,” which Dr. [REDACTED] uses as examples of safety and liveness properties).

23. Rather, the authors of that post calculate the Nakamoto Coefficient by drawing on two concepts from economic theory – the Lorenz curve and the Gini coefficient – which itself was a leap by the (non-peer-reviewed) post’s authors.²⁵ The Lorenz curve and the Gini coefficient were originally designed to measure non-uniformity within a population.²⁶ Originally defined as a measure of the distribution of income across a population, the Gini coefficient is often used as a gauge of economic inequality, measuring income distribution or, less commonly, wealth distribution among a population.²⁷ The application of the Gini coefficient to analyze inequality in internet communities such as blockchains is flawed because it conflates two different problems: lack of resources and concentration of power.²⁸ These aspects should be considered separately since resource allocation is a network-dependent feature and power concentration is a feature of allocation of tokens. Absent a basis to conclude that allocation of tokens corresponds to authority, power, or control over a blockchain’s functioning, there is no basis to conclude that

²⁵ *Id.*

²⁶ UNITED STATES CENSUS BUREAU, *Gini Index*, <https://www.census.gov/topics/income-poverty/income-inequality/about/metrics/gini-index.html> (last revised Oct. 8, 2021) (explaining that the Gini coefficient “summarizes the dispersion of income across the entire income distribution,” “based on the difference between the Lorenz curve (the observed cumulative income distribution) and the notion of a perfectly equal income distribution”).

²⁷ *Id.*; see generally Oded Stark, *Status Aspirations, Wealth Inequality, and Economic Growth*, 10 REV. DEV. ECON. 171 (2006) (utilizing a Gini coefficient of wealth inequality in suggesting how such inequality corresponds to economic growth).

²⁸ Compare Srinivasan & Lee, *supra* note 16 (describing the Nakamoto coefficient as a measure of the number of entities needed to control a subsystem, inspired by the Gini coefficient and Lorenz curve), with Frank A. Farris, *The Gini Index and Measures of Inequality*, 117 AM. MATHEMATICAL MONTHLY 851 (2010) (describing the Gini index as a “single number that measures how equitably a resource is distributed in a population”).

token allocation is relevant to decentralization. (I further address this point below, when considering Dr. [REDACTED] definition of Governance.)

24. In addition, the Nakamoto Coefficient (like the Lorenz curve and Gini coefficient on which it is based; *see* Chart 2) is designed to measure the distribution of scarce resources (originally, money) within a defined population.²⁹ Accordingly, it is only a valid analytical tool to the extent it is analyzing a scarce resource (in economic theory, money) whose distribution has some relationship to the distribution of power within the system (for example, buying power).

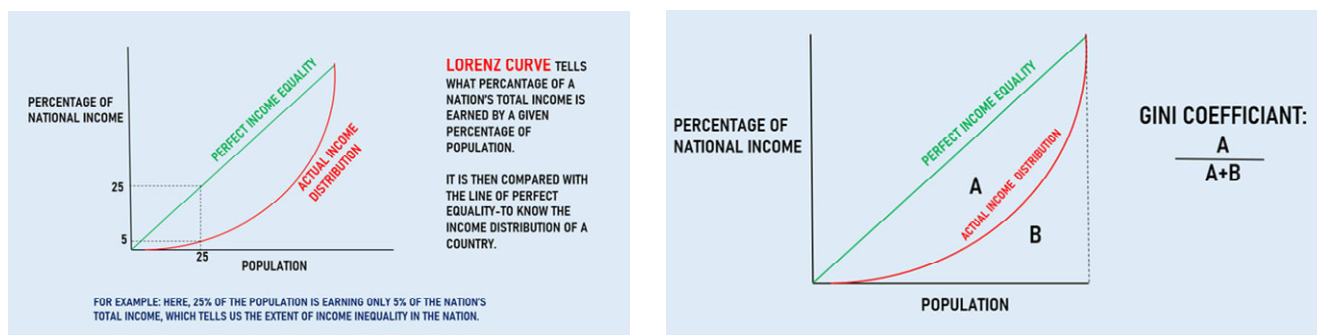


Chart 2. Illustration of Lorenz Curve and Gini Coefficient.³⁰

25. Even if the concept of the Nakamoto Coefficient that was proposed by this non-peer reviewed blog post were reliable, Dr. [REDACTED] application of the Nakamoto Coefficient to the XRP Ledger rests on an undefended logical leap. In particular, he overlooks the fact that the XRP Ledger uses a completely different consensus mechanism – one that *does not* use scarce resources to allocate authority. Rather, it permits each participant to independently choose which other participants to trust, as each validator has complete control over the contents of its Unique Node List, which a validator may change at any time without needing the permission of any other party. As a consequence, I do not believe that the Nakamoto Coefficient can be

²⁹ Srinivsan & Lee, *supra* note 16.

³⁰ Arsh, *What are the Main Merits of the Lorenz Curve?*, QUORA (2021), <https://www.quora.com/What-are-the-main-merits-of-the-Lorenz-curve>.

sensibly applied to evaluate the XRP Ledger's Resilience. At a minimum, Dr. [REDACTED] has failed to defend his application of that metric.

26. In the context of Bitcoin and Ethereum, the scarce resource Dr. [REDACTED] measures is mining power, which is relevant because of the authority given to successful miners in proof-of-work blockchain systems who may propose new blocks and the ability of a miner or miners that control the majority of the hash rate to undermine the validity of the system (in what is referred to as a "51% attack").³¹ I therefore agree that Dr. [REDACTED] decision to apply the Nakamoto Coefficient to Bitcoin and Ethereum to determine the distribution of mining power across the network is reasonable. But I do not agree that Dr. [REDACTED] offers a complete analysis of the Nakamoto Coefficient's application. The nature of the Nakamoto Coefficient is that it can only offer a point-in-time result: in other words, just as the Gini coefficient of the United States changed from 1920 to 1950 to 1990 to 2020, the Nakamoto Coefficient of Bitcoin and Ethereum is not static.³² It is public knowledge that mining-power concentrations have changed over time for Bitcoin and Ethereum.³³ And Dr. [REDACTED] report recognizes that he is calculating the Nakamoto Coefficient of Bitcoin and Ethereum by measuring the concentrations of mining power "at the time of writing this report." (Report at 15.) That is insufficient to reach any conclusions about the blockchains themselves, and could only (and at most) permit an analysis of

³¹ See Digital Currency Initiative, *51% Attacks*, MIT MEDIA LAB, <https://dci.mit.edu/51-attacks> (last visited Nov. 11, 2021).

³² See, e.g., Juliana Horowitz et al., *Trends in Income and Wealth Inequality*, PEW RSCH. (Jan. 9, 2020), <https://www.pewresearch.org/social-trends/2020/01/09/trends-in-income-and-wealth-inequality>.

³³ See e.g., Cambridge Centre for Alternative Finance, *Bitcoin Mining Map*, U. CAMBRIDGE, https://ccaf.io/cbeci/mining_map (last visited Nov. 11, 2021); ETHERSCAN, *Ethereum Network Hash Rate Chart*, <https://etherscan.io/chart/hashrate> (last visited Nov. 11, 2021).

the relative ownership of scarce resources by the participants in each blockchain's network at a given point in time.

27. An objective analysis of the Nakamoto Coefficients of Bitcoin and Ethereum based on Dr. [REDACTED] own definition – the minimum number of parties that need to be corrupted to subvert key properties of the systems (Report at 5 n.1) – would necessarily conclude that the Nakamoto Coefficients of both systems are no greater than 1 as to the two features of Resilience that Dr. [REDACTED] identifies: **safety** (that “‘bad things’ do not happen (Report at 9)) and **liveness** (that “‘good things’ do eventually happen” (*id.*)).

28. As to safety, an example of which Dr. [REDACTED] gives as double-spend resistance, both Bitcoin and Ethereum are vulnerable, as Dr. [REDACTED] recognizes, to a “51% attack.” (Report at 15, 18.) If one entity controls 51% of the hash power of the network, they are able to compromise the safety of the entire network.³⁴

29. As to liveness, an example of which Dr. [REDACTED] gives as censorship resistance (Report at 9), both Bitcoin and Ethereum grant successful miners complete discretion to censor or reject transactions.³⁵ Accordingly, a single miner (even without 51% of the hash rate) has the ability to void a proposed transaction for any reason without any oversight.³⁶ For the user who proposed

³⁴ This degree of control over the Bitcoin hash rate has occurred, albeit briefly, in the past. See Alex Hern, *Bitcoin Currency Could have been Destroyed by '51%' Attack*, THE GUARDIAN (June 16, 2014), <https://www.theguardian.com/technology/2014/jun/16/bitcoin-currency-destroyed-51-attack-ghash-io>.

³⁵ Andreas M. Antonopoulos, *MASTERING BITCOIN* 275 (2d ed. 2017); Johnnatan Messias et al., *On Blockchain Commit Times: An Analysis of How Miners Choose Bitcoin Transactions*, in PROC. OF THE SECOND INT’L KDD WORKSHOP ON SMART DATA FOR BLOCKCHAIN AND DISTRIBUTED LEDGER, 3–4 (Aug. 2020), <https://people.mpi-sws.org/~johnme/pdf/messias-sdbd-20.pdf>.

³⁶ See Hern, *supra* note 3426.

the voided transaction, there is no in-network recourse other than resubmitting the transaction, which does not satisfy Dr. [REDACTED] definition of liveness.³⁷

30. **Inclusiveness.** Dr. [REDACTED] defines inclusiveness (solely by citation to his own, unpublished manuscript, which refers to the concept as “openness”) as “the ability of the system to welcome new participants in a way which provides them with equal opportunities compared to existing participants.” (Report at 9.) Dr. [REDACTED] then defines the concept of “equal opportunities” (again solely by citation to his own, unpublished manuscript) as a system that “(a) allows any participant Alice to have an equal role in the system as any other (new or existing) participant Bob, provided Alice makes the same investment in system resources as Bob, and (b) the system does not prevent Alice from making such an investment.” (Report at 9.)

31. Again, I find Dr. [REDACTED] methodology to be flawed. Dr. [REDACTED] report does not substantiate the relationship between “Inclusiveness” and decentralization. The report does not offer any citation to authoritative literature that describes Inclusiveness (or the sub-defined concept of equal opportunities) as necessary to determining whether a system is decentralized.

32. Even assuming that “Inclusiveness” is an appropriate criterion for evaluating decentralization, Dr. [REDACTED] report again offers no metrics that would permit one to reach conclusions about the significance of greater or lesser degrees of Inclusiveness in particular layers of distinct blockchain models.³⁸ Accordingly, even if Dr. [REDACTED] could substantiate his

³⁷ This censorship authority has been deployed in practice. See Collin Harper, *Marathon Miners Have Begun Censoring Bitcoin Transactions*, COINDESK (May 7, 2021), <https://www.coindesk.com/tech/2021/05/07/marathon-miners-have-started-censoring-bitcoin-transactions-heres-what-that-means/>.

³⁸ Dr. [REDACTED] report asserts that Inclusiveness may relate to whether a particular blockchain is *permissioned* or *permissionless*, but offers no analysis or citation to conclude – as he asserts – that “permissionless systems are to be considered more decentralized than permissioned systems.” (Report at 9.) Indeed, the simple example of the U.S. dollar refutes the premise: the dollar is a permissionless currency to access and

assertions, the failure to supply meaningful comparison metrics or benchmarks is an independent reason that his conclusions are impossible to trust or validate objectively.

33. Dr. [REDACTED] criterion of “equal opportunities” appears to be based only on [REDACTED] [REDACTED].³⁹ For Dr. [REDACTED] to assert that Bitcoin and Ethereum provide “equal opportunities” to participants, but the XRP Ledger does not, is particularly problematic. The literature has, for at least the past few years, been critical of Bitcoin and proof-of-work blockchains because the significant costs of mining and the manner in which the in-protocol incentives favor those with massive computing power, such that in practice “only a few nodes are contributing blocks for the Blockchain.”⁴⁰ Dr. [REDACTED] does not address this literature, which explains that it is insufficient to consider abstract equality of opportunity when structural barriers

spend, but is issued and controlled by a centralized authority (the U.S. government). INVESTOPEDIA, *See Who Prints Money in the United States?*, <https://www.investopedia.com/ask/answers/082515/who-decides-when-print-money-us.asp> (last updated May 29, 2021).

Similarly, as noted above, blockchains contain multiple functional layers. It is possible for a blockchain to be permissioned as to certain layers and permissionless as to others (for example, one blockchain might have a permissioned code base but permissionless transaction proposal and validation; another might have permissionless governance through a decentralized autonomous organization (DAO) model but have permissioned transactions).

39

[REDACTED]

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Gochhayat et al., *supra* note 20, at 178381; *see also id.* at 178374 (“Despite envisioned decentralization in Bitcoin, the high cost of mining has led to considerable centralization of consensus in practice”); Sai et al., *supra* note 4, at 29 (“A high concentration of consensus power can induce an arm’s race to attain the most efficient hardware. Our survey reports that this race often results in specialized proprietary hardware. The practical implication of this type of hardware concentration is an indirect limitation to participation as only efficient, and often proprietary hardware, can result in a profitable operation.”); Gencer et al., *supra* note 9, at 9–11 (noting “[w]ith the current mining difficulty of Bitcoin and Ethereum, using commodity hardware to generate blocks is not feasible which centralizes the mining process somewhat,” and finding that in the ten week study period four Bitcoin miners had more than 53% of the average mining power and three Ethereum miners had 61% of average mining power).

prevent new entrants from meaningfully contributing to the system.⁴¹ By contrast, operating a fully functioning validation server on the XRP Ledger requires minimal computing power.⁴² As Dr. [REDACTED] report fails to recognize, any person or entity may operate an XRP Ledger validation server and participate in the consensus process without the permission or approval of any other entity – exactly the type of equal opportunity his report defines as key to Inclusiveness. (Report at 9.)

34. **In-Protocol Incentives.** Dr. [REDACTED] defines Incentives as “whether the system has rewards for protocol participants, paid out to protocol participants within the protocol itself.” (Report at 10.) To support his definition, and the relevance of Incentives to decentralization, Dr. [REDACTED] relies on the Sai and Troncoso papers.⁴³ However, neither paper supports Dr. [REDACTED] conclusions.

35. Sai et al. discuss the “incentive layer” of blockchains by observing that whether Bitcoin (and, by extension, Ethereum) actually offers economic incentives to its participants is contingent on factors external to the system. Specifically, if “the exchange rate” of Bitcoin to fiat currency “falls below a given threshold of profitability” it no longer provides an economic incentive and participants may withdraw from mining.⁴⁴ Put another way, if the cost of mining (measured by the cost of obtaining and operating the computing equipment) over any given

⁴¹ Sai et al., *supra* note 4, at 22 (“[T]he specialized equipment requirement severely contains . . . participation.”); Igor Makarov & Antoinette Schoar, *Blockchain Analysis of the Bitcoin Market*, 23 (Oct. 13, 2021), <https://ssrn.com/abstract=3942181> (“[T]he set of large miners is relatively stable, and it is small miners which enter and leave the mining business in response to price shocks.”).

⁴² *System Requirements: Minimum Specifications*, XRPL.ORG, <https://xrpl.org/system-requirements.html> (“A rippled server should run comfortably on commodity hardware”).

⁴³ See Report at 10 (citing Sai et al., *supra* note 4; Troncoso et al., *supra* note 2).

⁴⁴ Sai et al., *supra* note 4, at 19.

period is greater than the mining rewards received, the network does not effectively offer economic incentives.⁴⁵

36. Dr. [REDACTED] asserts that the Troncoso paper “argue[s] that the development of adequate incentives is necessary to build a successful decentralized system.” (Report at 10.) However, the conclusions of Troncoso et al. do not support Dr. [REDACTED] assertion. To the contrary, the Troncoso paper concludes that Incentives (1) need not be economic, and (2) may in fact undermine decentralized systems if not constructed carefully: “Designers of decentralized systems must carefully engineer such incentives, to ensure that natural (non adversarial) selfishness does not lead to dysfunction. *Monetary incentives, reputation, and reciprocity can be the basis of such incentives – but off the shelf such mechanisms are often central points of failure.*”⁴⁶ Dr. [REDACTED] ignores this essential aspect of the Troncoso paper’s analysis when he asserts that Incentives must be “in-protocol” to be significant. (Report at 10.⁴⁷) Instead, Dr. [REDACTED] report narrowly focuses on rewards earned through the energy and cost-intensive mining process (Report at 10, 16), and he ignores the XRP Ledger’s inherent structural and design benefits, including the ability to quickly, efficiently, and cheaply transfer value, which I detailed in my opening report. (Adriaens Report at 22, 25.) Each of these features of the XRP

⁴⁵ According to public reports, the exchange rate of Bitcoin has fallen to levels that rendered mining unprofitable in the past. See Evelyn Cheng, *Bad News for Bitcoin Miners: It’s No Longer Profitable to Create the Cryptocurrency*, by Some Estimates, CNBC (Mar. 15, 2018), <https://www.cnbc.com/2018/03/15/bad-news-for-bitcoin-miners-as-its-no-longer-profitable-to-create-the-cryptocurrency.html>.

⁴⁶ Troncoso et al., *supra* note 2, at 313 (emphasis added).

⁴⁷ A related problem with Dr. [REDACTED] argument is that he does not explain why it is sufficient that Bitcoin and Ethereum provide “in-protocol incentives” solely to miners, when he defines this aspect of his analysis as relating to “whether the system has rewards for protocol participants.” (Report at 10.) Miners are far from the only participants in the Bitcoin and Ethereum ecosystems; for other participants – like those who submit transactions and must pay a fee to miners – there are either no incentives or economic disincentives.

Ledger offer incentives – for example, to payment processors who want to ensure their transactions clear more quickly and cheaply than on the Bitcoin or Ethereum blockchains and therefore have an incentive to ensure the XRP Ledger continues to exist.

37. Moreover, the Troncoso paper observes that “[s]ome decentralized system[s] consist solely of nodes that are users and there is no additional infrastructure. They rely solely on users to collectively contribute resources (bandwidth, storage) in order to provide a service.”⁴⁸

Troncoso labels such a system decentralized, even though there are no Incentives provided.⁴⁹

38. Dr. [REDACTED] also offers no methodology or metrics to quantify the significance or adequacy of incentives in order to reliably compare the incentives offered by distinct blockchain architectures. This renders it impossible to validate his results. Nor does Dr. [REDACTED] account for issues considered by the literature, like the fact that the “in-protocol incentives” offered by Bitcoin and Ethereum are only economic incentives if external factors align correctly.⁵⁰

39. Although Dr. [REDACTED] concludes that the XRP Ledger does not provide incentives because it has no equivalent to mining rewards, Dr. [REDACTED] never considers other forms of incentives identified by Troncoso – like reputation and reciprocity.⁵¹ Indeed, reputation and reciprocity can form significant incentives in the context of distributed systems, as communities that see value in an innovative technological solution may be inclined to support them regardless of whether the solution offers “in-protocol” incentives.⁵² As I set out in my original Report and

⁴⁸ Troncoso et al., *supra* note 2, at 310.

⁴⁹ *Id.* Troncoso refers to these systems as “decentralized” and lists Freenet and Cachet as examples, neither of which offer incentives. *See e.g.*, FREENET, <https://freenetproject.org/index.html>.

⁵⁰ *See supra* at ¶ 35.

⁵¹ Troncoso et al., *supra* note 2, at 313.

⁵² *See, e.g., Incentives to Develop Free Software*, THE LINUX INFORMATION PROJECT, http://www.linfo.org/open_source_development_incentives.html (listing ten reasons why

discuss further *infra* in Part III, the XRP Ledger offers many such innovative technological advances that would provide non-economic yet meaningful incentives.

40. **Governance.** Dr. [REDACTED] final criterion for evaluating decentralization is Governance, which he defines in two distinct ways in different places in his report. First, in his summary and Table 1, he identifies two aspects of Governance: public face, and tokens allocated at genesis. (Report at 5.) Second, in Section 3.1, he defines Governance as “the level of power, if any, of human stakeholders to influence and change key rules in the system, e.g. through software updates.” (Report at 10–11.) He then notes three “parameters for evaluating decentralization of governance power” that have been “proposed or discussed in the literature” – namely: (1) improvement control (the number of developers contributing to the codebase), (2) existence of a public face (a personality or institution that is a representative of the system), and (3) owner control (measured by examining the total tokens accumulated by the stakeholders in the early adoption period). (Report at 11.) As with the other criteria Dr. [REDACTED] analyzes, the Governance criterion is not reliable both because it does not have an agreed-upon definition (as Dr. [REDACTED] admits in noting that the parameters he identifies have merely been “proposed or discussed” (Report at 11)), and because there is no agreed-upon metric for evaluating quantitatively any of the parameters he identifies in a manner that would permit comparisons across blockchains.

developers contribute to open-source projects, like the Linux operating system and the Internet itself, including the desire to use the system they are developing or maintaining, prestige, and profit from downstream businesses that contributors operate); Josh Lerner & Jean Tirole, *The Simple Economics of Open Source*, NAT’L BUREAU ECON. RSCH. (2000) https://www.nber.org/system/files/working_papers/w7600/w7600.pdf (concluding that future career advancement, peer recognition, and related incentives were powerful drivers behind the development of key software projects in the 1990s).

41. *Improvement Control.* Although not identified in Dr. [REDACTED] summary Table 1, he defines Improvement Control as relevant to Governance. (Report at 11.) According to Dr. [REDACTED] (Report at 16, 18), Bitcoin has “relatively few ‘core’ developers” and Ethereum is “largely similar” to Bitcoin in terms of improvement proposals – though the literature he cites indicates that, at least for Ethereum, one person – Vitalik Buterin – is the source of the “vast majority” of the code base.⁵³
42. Also, Dr. [REDACTED] asserts that “the overwhelming majority of code commits and lines of code” in rippled “comes from the developers who are or have been affiliated with or funded by Ripple Labs, Inc.” (Report at 23.) Unlike the Azouvi paper Dr. [REDACTED] cites,⁵⁴ however, the Report offers no quantitative analysis to support those assertions, so it is not possible to determine, for example, whom he considers to be the “core” developers of Bitcoin or Ethereum, or a developer “affiliated with or funded by Ripple Labs, Inc.” (Report at 23.) Dr. [REDACTED] analysis in this regard is therefore not replicable.⁵⁵
43. However, taking Dr. [REDACTED] assertions as true for the sake of argument, Dr. [REDACTED] offers no metrics to quantitatively measure Improvement Control such that it could be compared

⁵³ See, e.g., Sai et al., *supra* note 44, at 3 (“According to the empirical analysis of Azouvi et al. (2018), the authors report that the vast majority of the improvement proposal in Ethereum are authored by a single user, Vitalik Buterin, the founder of Ethereum.”).

⁵⁴ See Report at 11 (citing Azouvi et al., *supra* note 9).

⁵⁵ To support the proposition that Improvement Control is relevant to his decentralization aspects, Dr. [REDACTED] cites to a paper by de Filippi and Loveluck (Report at 11) that reports that five individuals who held “administration rights for the development of the Bitcoin project became known as the *core developers*.” Primavera de Filippi & Benjamin Loveluck, *The Invisible Politics of Bitcoin: Governance Crisis of a Decentralized Infrastructure*, 5 INTERNET POL’Y REV. 1, 9 (2016), <https://policyreview.info/pdf/policyreview-2016-3-427.pdf>. This fact further undermines Dr. [REDACTED] use of the term to refer to the top contributors to a particular blockchain project since the Bitcoin “core developers” were selected by Gavin Andresen and defined by the fact that they controlled the Bitcoin code, as discussed *infra* note 56.

across different blockchain systems (which is perhaps why Dr. [REDACTED] does not include this facet of Governance in his summary Table 1). Dr. [REDACTED] report lacks any reliable methodology to measure Improvement Control, making it impossible to use this parameter to evaluate Governance or any other aspect of decentralization.

44. *Public Face.* Dr. [REDACTED] asserts that Bitcoin has no “public face,” while Ethereum and the XRP Ledger do. (Report at 16, 18, and 23.) Dr. [REDACTED] conclusion in this regard as to Bitcoin is highly temporally contingent. As has been widely reported, early in Bitcoin’s development, a single individual – Gavin Andresen – was the principal developer of the Bitcoin software code, and worked with a small team of core developers to make the necessary improvements to Bitcoin that allowed it to flourish.⁵⁶ Similarly, as Dr. [REDACTED] acknowledges, Vitalik Buterin is responsible for the original design and development of Ethereum and remains its public face. (Report at 18.)

45. As with the other parameters he identifies, Dr. [REDACTED] offers no reliable metric to evaluate the Public Face of a particular blockchain, and no explanation of its relevance to the concept of decentralization as he (which is to say, Troncoso) defined it. The mere existence of a recognizable Public Face associated with a blockchain project has no apparent connection to whether “multiple authorities (parties) control different system components and no authority is

⁵⁶ Tom Simonite, *The Man Who Really Built Bitcoin*, MIT TECH. REV. (Aug. 15, 2014), <https://www.technologyreview.com/2014/08/15/12784/the-man-who-really-built-bitcoin/> (“When Andresen took over from Satoshi Nakamoto in 2010 he laid out the way the project would operate, drawing on his experience managing teams building software products and what he knew of major open source projects such as Linux. A group of five core developers emerged, with Andresen as the most senior. Only they had the power to change the code behind Bitcoin and merge in proposals from other volunteers. That gave them unique power over the currency’s basic operation and economic parameters. While the price of Bitcoin soared over the years, Andresen and the other core developers toiled to improve the software that made it all possible. They fixed security bugs that had permitted digital heists, made the software less prone to crashes, and spruced up the interface to make it easier to use.”).

fully trusted by all,” (Report at 5) (citing Troncoso et al., at 308), because it is entirely possible for those defined features to be met even where a single individual is responsible for the creation of the project. For example, Satoshi Nakamoto – the pseudonymous creator of Bitcoin – was clearly a significant contributor to the Bitcoin project, having developed its initial source code, but the actual governance and functioning of the blockchain is not impaired by his anonymity and lack of ongoing (known) support for the project.⁵⁷

46. *Token Allocation at Genesis.* Finally, Dr. [REDACTED] asserts that the “total tokens accumulated by the stakeholders in the early adoption period” of a blockchain is a relevant parameter of Governance. (Report at 11.) As an initial matter, Dr. [REDACTED] offers no explanation for why control of a blockchain’s tokens (which are inherently solely units of account recorded on the blockchain) is relevant to whether the blockchain itself is decentralized. Except in a proof of stake blockchain (which none of Bitcoin, Ethereum, or the XRP Ledger are at present), ownership of tokens provides no mechanism to control the operations of the ledger, nor any obligation on others in the system to trust the token holder, and accordingly does not have relevance to the features of a decentralized system as Dr. [REDACTED] defines it. Nor does Dr. [REDACTED] offer any quantifiable metrics that would allow for a meaningful comparison of one blockchain project to another, even were one to accept the utility of this parameter.

47. Dr. [REDACTED] description of the Token Allocation at Genesis for Bitcoin, Ethereum, and XRP are also flawed as a factual matter.

48. As to Bitcoin, Dr. [REDACTED] asserts that 0% of the tokens were allocated at genesis and that “Bitcoin did not have a hidden owner accumulation phase.” (Report at 17.) Dr. [REDACTED] leaves

⁵⁷ Jamie Redman, *Ten Years Ago Satoshi Nakamoto Logged Off*, BITCOIN.COM (Dec. 13, 2020), <https://news.bitcoin.com/ten-years-ago-satoshi-nakamoto-logged-off-the-final-message-from-bitcoins-inventor>.

to a footnote, however, an acknowledgement of the widespread reports that wallets controlled by Bitcoin’s inventor, Satoshi Nakamoto, contain approximately 1.1 million BTC that were mined in the early days of the protocol.⁵⁸ Dr. [REDACTED] also acknowledges that those BTC “were never transacted on the network,” (Report at 17 n. 12), meaning that Nakamoto presumably still controls a sizeable percentage of BTC – 1.1 million out of the 21 million that can ever be created, which would be worth over \$70 billion today.⁵⁹

49. As to Ethereum, Dr. [REDACTED] initially asserts in Table 1 that 61.5% of the current supply of ETH tokens were allocated at genesis, with about 10% “owner controlled.” (Report at 5.) Dr. [REDACTED] later acknowledges that 72 million ETH were pre-allocated in the genesis block (Report at 18–19), which would be about 61% of the approximately 118 million ETH in circulation today.⁶⁰ However, Dr. [REDACTED] calculation of the amount of originally mined ETH that was “owner controlled” fails to account for the fact that all ETH in the genesis block was effectively controlled by the ETH development team,⁶¹ which sold a significant quantity of the pre-mined ETH to fund the development of the system (which Dr. [REDACTED] refers to as “the ICO” or Initial

⁵⁸ See Sergio Demian Lerner, *The Well Deserved Fortune of Satoshi Nakamoto, Bitcoin Creator, Visionary and Genius*, BITSLOG, <https://bitslog.com/2013/04/17/the-well-deserved-fortune-of-satoshi-nakamoto/>.

⁵⁹ Based on an observed exchange rate of approximately 1 BTC = USD \$65,000. See CRYPTOCOMPARE, *Bitcoin (BTC) – USD*, <https://www.cryptocompare.com/coins/btc/overview/> (as observed Nov. 11, 2021).

⁶⁰ ETHERSCAN, *Ether Total Supply and Market Capitalization Chart*, <https://etherscan.io/stat/supply> (as observed Nov. 11, 2021) (reporting the total ether token supply as 117,783,769.76 ETH).

⁶¹ CONSENSYS, *A Short History of Ethereum* (May 13, 2019), <https://consensys.net/blog/blockchain-explained/a-short-history-of-ethereum>; Luit Hollander, *History of Ethereum Hard Forks*, MYCRYPTO (May 4, 2020), <https://medium.com/mycrypto/the-history-of-ethereum-hard-forks-6a6dae76d56f> (describing how the Ethereum development team included the 8,893 pre-sale transactions in the Ethereum genesis block and manually set the gas limit for the first few days of the Ethereum blockchain’s existence).

Coin Offering of ETH).⁶² Accordingly, a more accurate description of the Token Allocation of ETH is that the allocation of all 72 million was controlled by the owners at the beginning of the ICO, and the owners sold all but 10% to fund the development of the blockchain.⁶³

III. Additional Responses to Dr. [REDACTED] Report.

50. Dr. [REDACTED] at various places in his report, seizes upon the default Unique Node List (“dUNL”) present in the rippled software that underlies the XRP Ledger as grounds to conclude that the XRP Ledger as of October 2021 “is centralized” and that the dUNL is “a root cause of inequality in the system.” (Report at 22.) Dr. [REDACTED] states that the dUNL contains a list of “[p]articipants required for the proper operation of” the XRP Ledger. (Report at 6.) However, no participant in the XRP Ledger’s validation process is required to use the dUNL to participate in validation.⁶⁴ Indeed, as Dr. [REDACTED] observes, the code of the XRP Ledger itself identifies two alternative UNLs—neither published by Ripple—that are available for validators to use. (Report at 20.) That one UNL is the “default” within the rippled code does not establish that use of the dUNL is *required*.⁶⁵ Moreover, Dr. [REDACTED] willingness to conclude that the “issue of a centralized dUNL publisher, alone, is in my opinion sufficient to render the XRP Ledger centralized” (Report at 6), demonstrates the insufficiency of his analysis in light of the literature

⁶² Vitalik Buterin, *Launching the Ether Sale*, ETHEREUM FOUNDATION BLOG (July 22, 2014), <https://blog.ethereum.org/2014/07/22/launching-the-ether-sale>.

⁶³ Camila Russo, *Sale of the Century: The Inside Story of Ethereum’s 2014 Premine*, COINDESK (July 11, 2020), <https://www.coindesk.com/markets/2020/07/11/sale-of-the-century-the-inside-story-of-etheriums-2014-premine>.

⁶⁴ See *FAQ: What are Unique Node Lists (UNLs)?*, XRPL.ORG, <https://xrpl.org/faq.html> (“Each server operator can choose their own UNL.”).

⁶⁵ See *FAQ: Which UNL Should I Select?*, XRPL.ORG, <https://xrpl.org/faq.html> (“Currently, three publishers (Ripple, the XRP Ledger Foundation, and [REDACTED] are known to publish recommended default lists of high quality validators, based on past performance, proven identities, and responsible IT policies. However, **every network participant can choose which validators it chooses as reliable and need not follow one of the three publishers noted above.**” (emphasis added)).

in the field. I am not aware of any peer-reviewed paper, and Dr. [REDACTED] cites none, that suggests that it is sufficient to examine one aspect of one layer of a blockchain and reach a conclusion as to whether the blockchain itself is centralized. To the contrary, the literature (including, but not limited to, Sai et al.) makes clear that a more thorough analysis is necessary before it is appropriate to draw any global conclusions regarding centralization, and further recognizes that not all layers of a blockchain must be fully decentralized for the blockchain to be considered decentralized on the whole.⁶⁶

51. Dr. [REDACTED] also draws extensively from a 2018 paper by Chase and MacBrough (which was not peer-reviewed) to argue – without any independent analysis by Dr. [REDACTED] himself to substantiate the paper’s conclusions – that a high amount of overlap is required between different validators’ UNLs for the XRP Ledger to “provide” safety and liveness and for the “correct operation” of the XRP Ledger.⁶⁷ (Report at 21–22 and Appendix B.) Dr. [REDACTED] report, in turn, seizes on this overlap to opine that the XRP Ledger is centralized. (Report at 22.) I offer a few responses.

52. As an initial matter, Dr. [REDACTED] reliance on the Chase and MacBrough paper is misplaced because his report and the Chase and MacBrough paper analyze different versions of the rippled code. The research by Chase and MacBrough was performed as of February 21,

⁶⁶ Sai et al., *supra* note 4, at 29–30; *see also*; Steven Ehrlich, *Do Crypto and Blockchain Need To Be Decentralized To Succeed In 2019?*, FORBES (Dec. 17, 2018), <https://www.forbes.com/sites/stevenehrlich/2018/12/17/do-crypto-and-blockchain-need-to-be-decentralized-to-succeed-in-2019/?sh=55d667034442>.

⁶⁷ Notably, Chase and MacBrough make clear that their analysis only addresses the question of what might be necessary to “guarantee correctness” – not what is necessary for the XRP Ledger to function or operate. Brad Chase & Ethan MacBrough, *Analysis of the XRP Ledger Consensus Protocol 2* (Feb. 21, 2018), <https://arxiv.org/abs/1802.07242>. As Dr. [REDACTED] report admits, neither Bitcoin nor Ethereum guarantee correctness under any conditions, as they are always vulnerable to a 51% attack. (Report at 15, 18.)

2018, apparently based upon a 2018 version of the rippled code.⁶⁸ In contrast, Dr. [REDACTED] says he looked at the “current” version of the rippled code in effect as of the date of his report – October 4, 2021. (Report at 7.) It would therefore be unsound for Dr. [REDACTED] to base his analysis or conclusions of the “current” rippled code upon a study that looked at a version of the software that is more than three years out of date. In that regard, the history of changes to the rippled code (which is open source and public) indicates that significant changes to the code have occurred between 2018 and the present.⁶⁹ Dr. [REDACTED] offers no basis to establish that the Chase and MacBrough analysis, nor his own conclusions based on Chase and MacBrough, are still valid more than three years after that paper was released and after multiple updates to the rippled software that modified the consensus mechanism on which Dr. [REDACTED] grounds his opinions.

53. Dr. [REDACTED] also does not consider that federated consensus models inherently require human agreement – the selection of a list of trusted validators – as a basic element, yet no peer-reviewed or other literature suggests or states that federated consensus blockchains are always centralized or cannot be decentralized. This is a limitation of Dr. [REDACTED] “Governance”

⁶⁸ According to Github, which contains the history of the open-source rippled code, version 0.90.0 of rippled was released on February 20, 2018. Assuming that Chase and MacBrough did not complete their article in a single day, it is likely that they were referring to an even earlier version of the rippled code, such as version 0.81.0 (released February 2, 2018) or version 0.80.2 (released December 15, 2017). *See Releases - rippled*, <https://github.com/ripple/rippled/releases>.

⁶⁹ Rippled version 0.90.0 contains “several features and enhancements that improve the reliability, scalability and security of the XRP Ledger.” *Rippled Version 0.90.0*, GITHUB, <https://github.com/ripple/rippled/releases/tag/0.90.0>. Rippled version 1.6.0 “introduces several new features including changes to the XRP Ledger’s consensus mechanism to make it even more robust in adverse conditions,” including changes that “can improve the liveness of the network during periods of network instability.” *Rippled (XRP Ledger server) Version 1.6.0*, GITHUB, <https://github.com/ripple/rippled/releases/tag/1.6.0>. Both of these versions of rippled were released between the version considered by Chase and MacBrough and the version considered by Dr. [REDACTED]

analysis that means he is unable to conduct a comparison between the XRP Ledger and proof-of-work systems (*e.g.* Bitcoin and Ethereum).

54. Dr. [REDACTED] report concludes by purporting to analyze “[w]hat risks to the XRP Ledger would or might materialize if Ripple ‘walked away’ or ‘disappeared.’” (Report at 25.) As an initial matter, Dr. [REDACTED] cites no authority – and I am aware of none – to establish a methodology for such an analysis in the blockchain context. Dr. [REDACTED] analysis is purely speculative, grounded in unsupported assumptions about the behavior of multiple parties within the XRP Ledger ecosystem, and cannot form the basis for a reliable or repeatable conclusion. For example, Dr. [REDACTED] asserts that universities who have received funding from Ripple in the past may cease to operate validators if Ripple’s funding disappeared. (Report at 26.) Dr. [REDACTED] offers no support for this assumption, and given the exceedingly low cost of operating a validator,⁷⁰ there is ample basis to believe Dr. [REDACTED] assumptions could prove incorrect.

55. Dr. [REDACTED] assumptions about what might happen if Ripple disappears are subjective and based on the assumption that the current state of the XRP Ledger predominantly or entirely contains validator nodes that use Ripple’s dUNL. This assumption is visible in assertions like “[i]n the case where more than 20% of validators in the dUNL disappear, the network would not be operational. The current dUNL (as of October 4, 2021) contains 41 validators Hence, the network would cease to be operational if nine validators disappeared.” (Report at 26.) Dr. [REDACTED] never establishes as a matter of fact, however, that the current operational XRP Ledger validators actually use the current dUNL, such that 20% of current dUNL validators disappearing could impact the operation of the network. As Dr. [REDACTED] acknowledges, two other UNLs that are not published by Ripple exist and, indeed, are referenced in the rippled code base. (Report at

⁷⁰ See *supra* note 42.

23.) Moreover, rippled does not require any validator to use any dUNL, or include any validator in particular in its own UNL.⁷¹ Dr. [REDACTED] never explains why XRP Ledger nodes could or would not just switch to another already-published UNL.

56. Dr. [REDACTED] assumptions about the consequences of Ripple's disappearance also ignore that the XRP Ledger offers significant additional advantages to its users, such as increased speed and decreased transaction cost, with less negative environmental impact. (Adriaens Report at 22, 24–25.) These advantages – validating transactions in seconds, compared to approximately 10 minutes for Bitcoin – provide a significant value proposition for the XRP Ledger and an incentive for those who are interested in facilitating or enabling rapid decentralized settlement of transactions. (Adriaens Report at 22.)

57. While Dr. [REDACTED] report focuses narrowly on “in-protocol incentives” offered by Bitcoin and Ethereum (Report at 10 and 16), he ignores the significant competitive advantages that the XRP Ledger offers and the corresponding incentives for those interested in the success of such an ecosystem. (Adriaens Report at 25.) It is therefore unsurprising that participants in the XRP Ledger ecosystem – from exchanges like Bittrue to developers like XRPL Labs – operate validators without the need for in-protocol incentives.⁷² Dr. [REDACTED] report offers no basis to conclude that these validator operators (whom I offer as mere examples of the over 120 validators currently active on the XRP Ledger system)⁷³ would cease operating their validators if Ripple were to disappear, and accordingly no basis to believe the XRP Ledger itself would disappear without Ripple.

⁷¹ See *supra* note 64.

⁷² See *Validator Registry*, XRPSCAN, <https://xrpscan.com/validators> (as observed Nov. 11, 2021).

⁷³ *Id.*

I declare under penalty of perjury that the foregoing is true and correct.

Executed on November 12, 2021

A handwritten signature in black ink, appearing to be 'PA', written over a horizontal line.

Peter Adriaens

Exhibit 14

**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK**

SECURITIES AND EXCHANGE COMMISSION,
Plaintiff,

v.

RIPPLE LABS INC., BRADLEY GARLINGHOUSE, and
CHRISTIAN A. LARSEN,
Defendants.

20-cv-10832 (AT)

EXPERT REPORT OF BRADLEY BORDEN

October 4, 2021

I. Background and Qualifications

1. I am a Professor of Law at Brooklyn Law School and the principal of Bradley T. Borden PLLC. For more than 20 years, I have studied, taught, researched, written about, and advised clients with respect to the federal income tax classification of property and the federal income tax consequences of property transactions. I counsel property owners regarding the tax consequences of property transactions as they decide whether to buy or sell property and advise them regarding reporting the tax consequences of such transactions. My scholarship also considers how the tax consequences of transactions may affect property owners' business decisions. My academic and practical work focuses on the classification of property and the tax consequences of property transactions.

2. I am the author or co-author of the following books on federal income tax: SECTION 1031 EXCHANGES FOR REAL ESTATE INVESTORS AND PROFESSIONALS (Vandeplas Publishing 2021); FEDERAL INCOME TAXATION: CASES AND MATERIALS (8th ed., Foundation Press 2020) (with Martin J. McMahon, Jr., Daniel L. Simmons & Bret Wells); LLCs AND PARTNERSHIPS: LAW, FINANCE, AND TAX PLANNING (Wolters Kluwer 2019); FEDERAL TAXATION OF CORPORATIONS AND CORPORATE TRANSACTIONS (Aspen Publishers 2018) (with Steven Dean); TAXATION AND BUSINESS PLANNING FOR REAL ESTATE TRANSACTIONS (2d ed., Carolina Academic Press 2017); TAXATION AND BUSINESS PLANNING FOR PARTNERSHIPS AND LLCs (Aspen Publishers 2017); and TAX-FREE LIKE-KIND EXCHANGES (2d ed., Civic Research Institute 2015). I am also the author or co-author of more than 125 articles published in leading professional and academic journals. Attached as Exhibit A is my CV, including cases in which I have previously testified as an expert during the previous four years and a complete list of my publications over the last ten years.

3. My publications have been cited by the United States Court of Appeals for the Fifth¹ and Ninth Circuits,² the United States Court of Federal Claims,³ and state courts and commissions.⁴ I am also one of the most frequently downloaded tax authors on the Social Science Research Network.⁵

4. I have extensive experience in the tax bar. I am the past chair of the Sales, Exchanges & Basis Committee of the American Bar Association Section of Taxation, which focuses on the federal income tax treatment of property transactions. I am also currently or formerly a member of other professional organizations, including the American College of Tax Counsel, the New York State Bar Association, the New York City Bar Association, the Texas Bar Association, and the Tax Forum. I am also a Fellow of the American Bar Foundation.

5. I am frequently invited by members of the tax bar to speak at conferences of professional tax advisors, and I have spoken at some of the most prestigious tax conferences. I also have an active tax advisory practice. My clients include large publicly-traded companies, real estate fund managers, large real estate developers, investors, and single-property owners. I am licensed to practice law in New York and Texas, and I am a certified public accountant.

¹ *Southgate Master Fund, L.L.C. v. United States*, 659 F.3d 466, 483, n.56 (5th Cir. 2011) (citing Bradley T. Borden, *The Federal Definition of Tax Partnership*, 43 HOUS. L. REV. 925, 928–29 (2006)).

² *Teruya Brothers, Ltd. v. Commissioner*, 580 F.3d 1038, 1047, n. 12 (9th Cir. 2009) (citing Kelly Alton, Bradley T. Borden & Alan S. Lederman, *Related-Party Like-Kind Exchanges*, 115 TAX NOTES 467 (Apr. 20, 2007)).

³ *Fisher v. United States*, 82 Fed. Cl. 780, 786 (2008) (citing Bradley T. Borden, *Reverse Like-Kind Exchanges: A Principled Approach*, 20 Va. Tax Rev. 659 (2001)).

⁴ *Wells Fargo Bank, N.A. v. Short*, 180 Wash. App. 1012 (2014) (citing Bradley T. Borden, David J. Reiss & W. KeAupuni Akina, *Show Me the Note!*, 19 J. BANK LENDER LIAB. 1 (2013)); *Dickerson v. Regions Bank*, No. M2012-01415-COA-R3CV, 2014 WL 1118076 (Tenn. Ct. App. Mar. 19, 2014) (same); *Central Dodge Title, LLC v. Wisconsin Department of Revenue*, 2009 WL 4883048 (Wis. Tax. App. Comm. 2009) (citing Bradley T. Borden, *Reverse Like-Kind Exchanges: A Principled Approach*, 20 VA. TAX REV. 659 (2001)).

⁵ See, e.g., Paul Caron, *SSRN Tax Professor Rankings*, TAXPROF BLOG (Sep. 29, 2021), https://taxprof.typepad.com/taxprof_blog/tax_prof_rankings (ranking me 21 for most all-time downloads and 19 for recent downloads).

6. I have been retained as an expert in litigation in various state and federal courts in the United States and in a foreign court on various matters. At issue in many cases in which I have been retained as an expert is the federal income tax classification of property or the application of federal income tax law's property-transaction rules. I have given expert testimony in depositions on multiple occasions.

7. In connection with this matter, I was retained by Kellogg Hansen Todd Figel & Frederick PLLC, on behalf of Ripple Labs Inc. ("Ripple"), to provide an expert opinion on matters of U.S. tax law. I am being reimbursed at the hourly rate of \$1,290. Attached as Exhibit B is a list of all sources I have relied upon and considered in providing this opinion.

II. Questions Presented and Opinions

A. Questions Presented

8. I was asked to offer an expert opinion on the following issues in connection with the above-captioned matter:

- (a) Has authoritative guidance been issued regarding the federal income tax classification of virtual currency such as XRP?
- (b) Does that or any other guidance classify virtual currency such as XRP as a security for federal income tax purposes?
- (c) From the perspective of federal income tax law (and focusing on the period prior to December 22, 2020, when the Complaint was filed in this matter), would a reasonable buyer or seller expect virtual currency such as XRP to be classified as a security for federal income tax purposes and qualify for application of federal income tax rules specific to securities?

B. Summary of Opinions

9. My opinions with respect to questions presented are as follows:

- (a) The answer to question (a) is yes. The Internal Revenue Service (“IRS”) issued guidance in 2014 classifying virtual currency such as XRP as property (the “IRS 2014 Guidance”). That guidance, which continues to represent the IRS’s public position on virtual currency such as XRP, confirms that federal income tax law treats virtual currency as property that is subject to federal income tax law’s general property-transaction rules (the “general property-transaction rules”).
- (b) The answer to question (b) is no. Existing IRS guidance does not classify virtual currency such as XRP as a security for federal income tax purposes. To the best of my knowledge, the IRS has not classified virtual currency as a security for federal income tax purposes in any regulation, rule, public proceeding, or any other guidance. I am also unaware of any federal income tax statute, administrative ruling, or judicial decision that classifies virtual currency as a security for federal income tax purposes or concludes the federal income tax definition of a security includes virtual currency.
- (c) The answer to question (c) is no. A reasonable buyer or seller of virtual currency such as XRP would not expect it to be classified as a security for federal income tax purposes or qualify for federal income tax treatment specific to securities. Based on the IRS 2014 Guidance, reasonable buyers and sellers would expect the general property transaction rules to apply to

virtual currency such as XRP. Reasonable buyers and sellers would not expect any securities-specific exceptions to the general property-transaction rules to apply to virtual currency such as XRP. For example, a reasonable seller of such virtual currency would not expect the wash-sale rule, which applies to transactions in securities, to apply to such virtual currency because such virtual currency does not come within the wash-sale definition of securities and therefore is not classified as securities under the wash-sale rule. Furthermore, the reasonable buyer or seller of virtual currency such as XRP would not expect such virtual currency to come within the federal income tax definitions of securities, which include stock, bonds, and options to buy or sell such property. Thus, reasonable buyers and sellers of virtual currency such as XRP would not expect such virtual currency to qualify as a security for federal income tax purposes or expect the securities-specific exceptions to apply to such virtual currency.

III. Case Background

10. The Securities and Exchange Commission (“SEC”) brought an action against Ripple, Bradley Garlinghouse, and Christian A. Larsen (together, the “Defendants”) on December 22, 2020, claiming that the Defendants’ offers and sales of XRP constituted investment contracts, and that those offers and sales were unlawful because they were not registered with the SEC.⁶ The Defendants assert that their sales of XRP did not involve the offer or sale of an investment contract under U.S. securities laws, and therefore no registration was required.

⁶ ECF No. 4 (Complaint filed in SEC v. Ripple Labs Inc., 20 Civ. 10832 (S.D.N.Y. Dec. 22, 2020)); *see also* ECF No. 46 (Amended Complaint filed on Feb. 18, 2021).

IV. Characteristics of XRP

11. From my review of materials in this case, including facts that the SEC has admitted, I understand that XRP has the following features and characteristics: it can be bought and sold on global exchanges;⁷ holders of XRP are not entitled to receive dividends,⁸ or to exercise any governance rights in respect of a separate legal entity;⁹ and ownership of XRP does not convey any redemption rights or rights to return of capital.¹⁰ Moreover, the holder of XRP is not entitled to fiduciary duties from Ripple or its management,¹¹ has no rights to liquidating distributions from Ripple,¹² and cannot exercise management or voting rights in Ripple.¹³ XRP is not recognized as an interest in any legal person,¹⁴ cannot own property, and cannot transact business in its own name. Finally, XRP does not grant any right to acquire or sell other property.¹⁵ My understanding, therefore, is that XRP does not confer on the holder any governance, voting, or other rights with respect to Ripple or any other entity.

12. In 2015, the U.S. Department of Treasury's Financial Crimes Enforcement Network ("FinCEN") and the United States Attorney's Office for the Northern District of California expressly recognized that XRP is a "virtual currency" under applicable guidance issued by FinCEN.¹⁶

⁷ Pl.'s Answers and Obj.'s to Defs.' First Set of Req. for Admis. *Sec. Exch. Comm'n. v. Ripple Labs, Inc.*, 20 Civ. 10832 (S.D.N.Y.) Nos. 50, 51, 52. I have received the Plaintiff's Answers and Objections to Defendants' First, Second and Third Requests for Admission, which will hereinafter be referred to as "Plaintiff's RFA Answer."

⁸ Plaintiff's RFA Answer Nos. 57, 58, 59, 60, 62, 63; 133.

⁹ Plaintiff's RFA Answer No. 61.

¹⁰ Plaintiff's RFA Answer No. 64, 75.

¹¹ Plaintiff's RFA Answer No. 66.

¹² Plaintiff's RFA Answer Nos. 69, 70.

¹³ Plaintiff's RFA Answer Nos. 71, 72, 75, 76, 77, 78; 219.

¹⁴ Plaintiff's RFA Answer Nos. 19, 57, 58, 59, 60, 61, 62, 63, 66, 67, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78; 133; 219.

¹⁵ Plaintiff's RFA Answer Nos. 57, 64, 72, 75, 133.

¹⁶ "Ripple and U.S. Department of Justice Settlement Agreement" (May 2015), <https://www.justice.gov/usao-ndca/file/765721/download> (hereafter, "the 2015 Settlement Agreement").

13. The characteristics of typical assets that come within the federal income tax definition of securities—namely, corporate stock, debt instruments, interests in tax partnerships, and options to acquire and sell such property—are significantly different from the characteristics of virtual currency such as XRP.

14. **Corporate Stock**. Stock, the quintessential example of a security, represents ownership in an entity that is taxed separately from the owners of such entity. That separate entity can hold property and transact business, report taxable income, and is a separate taxpayer that is liable for its own federal income tax. Stock typically provides its owner with the voting rights and rights to distributions or a return of capital on liquidation of the corporation.¹⁷ Owners of stock only have an indirect ownership in the assets and operations of the corporation. Stock derives value from several variables, including the value of property and operations of the corporation.

15. **Debt Instruments**. A debt instrument grants the holder of the instrument the right to repayment of principal and (if applicable) interest.¹⁸ Debt instruments derive value from several variables, including the creditworthiness of the borrower, collateral securing the instrument, and the borrower's payment history.

16. **Options to Acquire or Sell Property**. Options to acquire or sell property are interests that grant the holder the right to acquire or sell property subject to the option.¹⁹ Options derive value from several variables, including the value of the underlying property the option holder is entitled to acquire or sell.

¹⁷ I.R.C. §§ 301, 302, 331, 332.

¹⁸ I.R.C. § 1275(a)(1); *Gilbert v. Comm'r*, 248 F.2d 399, 402 (2d Cir. 1957) (“The classic debt is an unqualified obligation to pay a sum certain at a reasonably close fixed maturity date along with a fixed percentage in interest payable regardless of the debtor's income or lack thereof”).

¹⁹ Rev. Rul. 78-182, 1978-1 C.B. 265.

17. **Interests in Tax Partnerships.** Interests in partnerships and entities taxed as partnerships (collectively, “tax partnerships”) may grant the owners of such interests a share in the management of the tax partnership, grant the owners rights to distributions, and subject the owners to allocations of the tax partnership’s income and losses.²⁰ Owners of interests in tax partnerships are deemed to have an indirect ownership in the tax partnership’s business. Ownership interests in a tax partnership derive value from several variables, including the value of the property and operations of the tax partnership.

V. Analysis

A. The IRS 2014 Guidance Treats Virtual Currency such as XRP as Property that Is Not a Security.

18. In 2014, the IRS, citing FinCEN guidance, announced that “[f]or federal tax purposes, virtual currency is treated as property.”²¹ According to that IRS 2014 Guidance, “[v]irtual currency is a digital representation of value that functions as a medium of exchange, a unit of account, and/or a store of value.”²² The IRS presented Bitcoin as an example of such virtual currency because it “can be digitally traded between users and can be purchased with or exchanged into U.S. dollars, Euros, and other real or virtual currencies.”²³ XRP has similar characteristics and is subject to the IRS 2014 Guidance. In answer to the question of how virtual currency such as XRP is treated for tax purposes, the IRS responded that it is treated as property, and the IRS applies the general property-transaction rules to virtual currency such as

²⁰ I.R.C. § 701, et seq.

²¹ IRS Notice 2014-21, 2014-16 I.R.B. 938 (Apr. 14, 2014) at § 2 (citing FinCEN, Application of FinCEN’s Regulations to Persons Administering, Exchanging, or Using Virtual Currencies, FIN-2013-G001 (March 18, 2013)). The 2015 Settlement Agreement, which stated that XRP is a “virtual currency,” cited to the same 2013 FinCEN guidance about virtual currencies that the IRS relied on in the IRS 2014 Guidance.

²² *Id.* at § 2 (distinguishing virtual currency from “‘real’” currency—i.e., the coin and paper money of the United States or any other country that is designated as legal tender, circulates, and is customarily used and accepted as a medium of exchange in the country of issuance”).

²³ *Id.* at § 2.

XRP.²⁴ The IRS also answered that virtual currency is not treated as a currency that could result in foreign currency gain or loss.²⁵ Based upon the characteristics of XRP enumerated above, reasonable buyers and sellers of XRP would expect the IRS 2014 Guidance to apply to it.

19. The IRS 2014 Guidance is considered authoritative as to the classification and tax treatment of virtual currency such as XRP and has remained authoritative since it was issued in 2014 up to the present.²⁶

20. Taxpayers consider the following authorities in evaluating the federal income tax classification and treatment of property: the Code, case law, Treasury regulations, IRS published guidance, legislative history, and private IRS rulings. I am unaware of anything in any of those sources that contradicts or diminishes the authority in the IRS 2014 Guidance as to the federal income tax classification and treatment of virtual currency. I am also unaware of any such source concluding that the federal income tax definition of a security includes virtual currencies.

21. Therefore, the only authoritative guidance (the IRS 2014 Guidance) relating to the federal income tax classification and treatment of virtual currency such as XRP classifies such virtual currency as property that is not a security.²⁷

²⁴ *Id.* at § 4, Q-1, A-1.

²⁵ *Id.* at § 4, Q-2, A-2.

²⁶ The IRS has released additional guidance on specific aspects of the taxation of cryptocurrency since 2014, but the subsequent guidance did not contradict or override the relevant aspects of the IRS 2014 Guidance. *See. e.g.*, Rev. Rul. 2019-24, 2019-44 I.R.B. 1004.

²⁷ There are, of course, other types of property that are subject to special tax rules (e.g., commodities and foreign currency). While the IRS 2014 Guidance indicated that virtual currency was not a “foreign currency,” it is possible that it may fit into some other, non-security-specific set of special tax rules, such as those applicable to commodities.

B. Based on the IRS 2014 Guidance, Reasonable Buyers and Sellers of Virtual Currency such as XRP Would Expect the General Property-Transaction Rules to Apply to Such Virtual Currency.

22. In my experience, and as a general matter, reasonable buyers and sellers of property take the tax treatment of transactions into account when making commercial decisions and when reporting the tax consequences of transactions. Often, the expected tax consequences of a purchase or sale may inform or dictate the decisions of reasonable buyers and sellers—i.e., whether, when, and how to buy or sell property. The IRS 2014 Guidance, including the IRS’s related publication, “Frequently Asked Questions on Virtual Currency Transactions,” signals that reasonable buyers and sellers of virtual currency seek guidance regarding the federal income tax classification and tax consequences of transactions of such virtual currency. Furthermore, reasonable buyers and sellers of virtual currency such as XRP rely upon the IRS 2014 Guidance, in the absence of other guidance to the contrary, when making decisions related to transactions of such virtual currency and when they report the tax consequences of such transactions.

23. The IRS 2014 Guidance states that virtual currency such as XRP is property subject to the general property-transaction rules. Further IRS guidance has reinforced this conclusion by clarifying how the general property-transaction rules apply to certain events unique to cryptocurrency (which the IRS considers to be a subset of virtual currencies) such as airdrops or hard forks.²⁸ In fact, the general property-transaction rules apply to all types of property (real estate, trucks, cows, commodities, virtual currency, foreign currency, securities, and many others) unless a special, narrowly tailored exception overrides the application of the general property-transaction rules. The following briefly summarizes those general rules.

²⁸ Rev. Rul. 2019-24, 2019-44 I.R.B. 1004.

24. **Acquisition**. A person who acquires property for services or by windfall has gross income upon the receipt of such property.²⁹ A person who acquires property with cash has no gross income on receipt of the property.³⁰ A person who acquires property in exchange for other property has gross income under the rules governing dealings in property.³¹

25. **Basis and Holding**. The buyer of property for cash takes a basis in the property equal to the amount of cash paid for the property.³² The recipient of property who recognizes income upon receipt of the property (such as a person who receives property in exchange for services) takes a basis in the property equal to the amount of gross income recognized upon the receipt of the property plus any amount paid for the property.³³ The person acquiring property in an exchange generally takes a basis in the property equal to the acquired property's fair market value.³⁴ The basis of property, regardless of how it is acquired, might be adjusted under various provisions of the Code (e.g., depreciation or amortization deductions).³⁵

26. **Disposition**. Upon disposition of property, the person transferring the property realizes gain or loss based upon the amount realized and the adjusted basis of the transferred property.³⁶ As a general matter, the transferor must recognize (i.e., report on a tax return) any

²⁹ See, e.g., *Commissioner v. Glenshaw Glass Co.*, 348 U.S. 426 (1955); *Cesarini v. United States*, 428 F.2d 812 (6th Cir. 1970); Treas. Reg. § 1.61-2(d) (1960), Treas. Reg. § 1.61-14 (1960).

³⁰ I.R.C. § 1001(a); Treas. Reg. § 1.61-6(a) (1960) (limiting the application of the gain and loss realization rules to sales and exchanges of property).

³¹ I.R.C. §§ 61(a)(3), 1001(a), (b); Treas. Reg. § 1.61-6(d)(2)(i) (1960).

³² I.R.C. § 1012(a) (“The basis of property shall be the cost of such property[.]”).

³³ See, e.g., *Id.*; Treas. Reg. § 1.61-2(d) (1960).

³⁴ See, e.g., *Philadelphia Park Amusement Co. v. United States*, 130 Ct. Cl. 166, 171–172 (1954).

³⁵ I.R.C. §§ 1011, 1016.

³⁶ I.R.C. § 1001(a).

gain or loss realized on the transfer of property.³⁷ A person who transfers property in exchange for services recognizes gain based upon the value of the services received.³⁸

27. Based upon the IRS 2014 Guidance and the foregoing general property-transaction rules, a person buying, holding, or selling virtual currency such as XRP would expect the following tax consequences: (i) when the person acquires the virtual currency through a cash purchase, the person does not have current income and takes a basis in the virtual currency equal to the amount paid for the virtual currency;³⁹ (ii) when the person acquires the virtual currency in a compensatory transaction or by windfall, the person has gross income⁴⁰ and takes a basis in the virtual currency equal to any amount included in gross income upon receipt of the virtual currency plus any amount paid for the virtual currency;⁴¹ and (iii) when the person transfers the virtual currency for cash, other property, or services, the person would recognize gain or loss on the transfer.

C. Reasonable Buyers and Sellers of Virtual Currency such as XRP Have No Reason to Expect that Securities-Specific Exceptions Apply to such Virtual Currency.

28. The Code includes multiple securities-specific exceptions to the general property-transaction rules (“securities-specific exceptions”). Those securities-specific exceptions often provide for non-recognition of gain or loss on the transfer or receipt of securities in qualifying transactions. The securities-specific exceptions only apply to property that qualifies as a security by coming within the appropriate federal income tax definition of securities. Because federal income tax law does not have a single definition of securities that applies throughout the Code, particular securities-specific exceptions often include their own particular definition

³⁷ I.R.C. § 1001(c).

³⁸ *International Freighting Corporation, Inc. v. Commissioner*, 135 F.2d 310 (2d Cir. 1943).

³⁹ I.R.C. § 1001(a) (explaining that a gain is triggered on a sale); Treas. Reg. § 1.61-2(d) (1960).

⁴⁰ IRS 2014 Guidance § 4, Q-3, A-3.

⁴¹ IRS 2014 Guidance § 4, Q-4, A-4.

of securities. Those particular definitions can be found in the relevant Code section, IRS guidance, case law, or a combination of those authorities.

29. As a general matter, the federal income tax definitions of securities includes stock, evidences of indebtedness, and options to purchase and sell such assets,⁴² but some federal income tax definitions of security are broader than the general definition.⁴³ Even if a digital asset could be designed with characteristics that fit into a federal income tax definition of a security, reasonable buyers and sellers would understand that virtual currencies with XRP's characteristics enumerated above do not come within the general federal income tax definition of securities.

30. As set forth in the federal income tax regulations, “[t]he exceptions from the general rule requiring recognition of all gains and losses, like other exceptions from a rule of taxation of general and uniform application, are strictly construed and do not extend beyond the words or the underlying assumptions and purposes of the exception.”⁴⁴ Under this “strict-

⁴² See, e.g., I.R.C. § 165(g)(2) (defining security for purposes of the worthless-security rules as “(A) a share of stock in a corporation; (B) a right to subscribe for, or to receive, a share of stock in a corporation; or (C) a bond, debenture, note, or certificate, or other evidence of indebtedness, issued by a corporation or by a government or political subdivision thereof, with interest coupons or in registered form”); I.R.C. § 1236(c) (defining security for purposes of determining the character of gains and losses recognized by a dealer in securities as “any share of stock in any corporation, certificate of stock or interest in any corporation, note, bond, debenture, or evidence of indebtedness, or any evidence of an interest in or right to subscribe to or purchase any of the foregoing”); I.R.C. § 1058(a) (incorporating the section 1236(c) definition for purposes of denying gain or loss on certain transfers of securities that do not sufficiently shift the economics of ownership).

⁴³ See, e.g., I.R.C. § 475(c)(2)(A–E) (stating the term “security” includes notional principal contracts and other derivatives as well as stock, partnership interests and debt; the 475 definition includes: (A) share of stock in a corporation; (B) partnership or beneficial ownership interest in a widely held or publicly traded partnership or trust; (C) note, bond, debenture, or other evidence of indebtedness; (D) interest rate, currency, or equity notional principal contract; and (E) evidence of an interest in, or a derivative financial instrument in, any security described in subparagraph (A), (B), (C), or (D), or any currency, including any option, forward contract, short position, and any similar financial instrument in such a security or currency))

⁴⁴ Treas. Reg. § 1.1002-1(b) (continuing, “[n]onrecognition is accorded by the Code only if the exchange is one which satisfies both (1) the specific description in the Code of an excepted exchange, and (2) the underlying purpose for which such exchange is excepted from the general rule. The exchange must be germane to, and a necessary incident of, the investment or enterprise in hand. The relationship of the exchange to the venture or enterprise is always material, and the surrounding facts and circumstances must be shown. As elsewhere, the taxpayer claiming the benefit of the exception must show himself within the exception.”). The IRS identifies several exceptions to the general property-transaction recognition rules and the reason for such exceptions: “Exceptions to the general rule are

construction rule,” a securities-specific exception depends upon a strict construction of the exception, including definitions that apply to the exception. A securities-specific exception only applies to property that comes within the exception’s definition of securities. Thus, reasonable buyers and sellers of virtual currency such as XRP would not expect a securities-specific exception to apply to their virtual currency unless, applying a strict reading of the exception’s definition of securities, such virtual currency comes within that definition. The following analysis shows that the securities-specific exceptions do not apply to virtual currency such as XRP under a fair reading, and especially not under a strict reading, of the federal income tax definitions of securities.

31. As an initial matter, the IRS 2014 Guidance affirms that virtual currency such as XRP is property subject to the general property-transaction rules and nowhere suggests that virtual currency is a security that could qualify for any securities-specific exception. The IRS’s affirmative application of the general-property transaction rules to virtual currency such as XRP provides certainty that such virtual currency is not a security for federal income tax purposes—even before applying the strict-construction rule.

32. The IRS also has not, to the best of my knowledge, determined in any ruling, regulation, guidance, or public proceeding that any virtual currency such as XRP comes within the federal income tax definition of securities or qualifies for a securities-specific exception. I am also unaware of any case law that holds virtual currency such as XRP is a security under federal income tax law. Finally, Congress has not enacted any legislation

made, for example, by sections 351(a), 354, 361(a), 371(a)(1), 371(b)(1), 721, 1031, 1035 and 1036. These sections describe certain specific exchanges of property in which at the time of the exchange particular differences exist between the property parted with and the property acquired, but such differences are more formal than substantial. As to these, the Code provides that such differences shall not be deemed controlling, and that gain or loss shall not be recognized at the time of the exchange. The underlying assumption of these exceptions is that the new property is substantially a continuation of the old investment still unliquidated; and, in the case of reorganizations, that the new enterprise, the new corporate structure, and the new property are substantially continuations of the old still unliquidated.” Treas. Reg. § 1.1002-1(c).

adding virtual currency such as XRP to any statutory federal income tax definition of security. Moreover, XRP's undisputed features lack characteristics of a security for federal income tax purposes: it pays no dividends, provides no governance rights in respect to any entity, does not represent a debt or equity interest in any entity, and is not a derivative instrument such as an option or forward with respect to such debt or equity.

33. Thus, reasonable buyers and sellers of virtual currency such as XRP would not expect such currency to come within a federal income tax definition of securities. Here are several examples of the securities-specific federal income tax rules that do not apply to virtual currencies:

1. The Wash-Sale Rule

34. The wash-sale rule is a securities-specific exception that does not apply to virtual currency. The rule disallows loss deductions on the sale or other disposition of stock or securities if the seller reacquires substantially identical stock or securities within 30 days of disposition.⁴⁵ For example, if an investor sells one share of Company A stock for a \$5,000 tax loss and one week later purchases one share of Company A stock, the wash-sale rule disallows the deduction of that \$5,000 loss.

35. The definition of securities used in the wash-sale rule has been the subject of judicial decisions,⁴⁶ and under the IRS interpretations the wash-sale definition of securities does not include commodity futures contracts or foreign currencies.⁴⁷ I am unaware of any

⁴⁵ I.R.C. § 1091(a).

⁴⁶ See, e.g., *Trenton Oil Co. v. Commissioner*, 147 F.2d 33, 37 (6th Cir. 1945); *Corn Products Refining Co. v. Commissioner*, 16 T.C. 395 (1951), *aff'ing on other grounds* 348 U.S. 911 (1955); *Horne v. Commissioner*, 5 T.C. 250 (1945).

⁴⁷ See Rev. Rul. 74-218, 1974-1 C.B. 202 (relying upon the definition in section 1236(c), to rule that foreign currency is not a security for purposes of the wash-sale rule because “[c]urrency in its usual and ordinary acceptation means gold, silver, other metals or paper used as a circulating medium of exchange, and does not embrace bonds, evidences of debt, or other personal property or real estate”); IRS Publication 550, Investment Income and Expenses (2020) (“The wash sale rules apply to losses from sales or trades of contracts and options to

cases or rulings interpreting the wash-sale definition of securities to include virtual currency such as XRP. In fact, under the strict-construction rule, an act of Congress would be required to include virtual currency such as XRP within the wash-sale definition of securities.

36. To illustrate that Congress knows how to legislate the statutory expansion of federal income tax rules when it wants to, Congress has expanded the wash-sale definition of securities to include property that is otherwise excluded by a court's construction of the wash-sale definition. For instance, in response to a Tax Court decision holding that the wash-sale definition of stock or securities does not include options,⁴⁸ Congress amended the statute to provide that "the term 'stock or securities' shall . . . include contracts or options to acquire or sell stock or securities."⁴⁹ Therefore, Congress amended the statute to expand the definition's scope to include asset classes that the Tax Court previously excluded from the definition.

37. Members of Congress have signaled their understanding that the current wash-sale definition of securities does not include virtual currency such as XRP and that legislative action would be required to expand the wash-sale rule to apply to such virtual currency. In that regard, Congressman Richard Neal, Chairman of the House Ways and Means Committee (the committee with the principal responsibility for tax legislation in the House of Representatives) proposed legislation that would make "specified assets" subject to the wash-

acquire or sell stock or securities. They do not apply to losses from sales or trades of commodity futures contracts and foreign currencies.").

⁴⁸ *Gantner v. Commissioner*, 91 T.C. 713 (1988) (holding that the section 1091 definition of securities does not include options). The court applied basic tenets of statutory interpretation to rule that section 1091 did not apply to options to acquire stock. Section 1091(a) then (and now) disallows loss on the sale of shares of stock or securities if the taxpayer "has acquired . . . , or has entered into a contract or option so to acquire, substantially identical stock or securities." *Id.* at 721. The Tax Court reasoned that if it read options into the definition of stock and securities it would render "or has entered into a contract or option so to acquire" superfluous and "violate the cardinal rule of statutory construct that 'effect shall be given to every clause and part of a statute.'" *Id.*

⁴⁹ I.R.C. § 1091(a), Pub. L. 106-554, § 1(a)(7), 102 Stat. 3682 (1988).

sale rule.⁵⁰ “Specified assets” is defined in the proposal to include four types of property: (1) any security as defined in the meaning of Section 475,⁵¹ (2) any foreign currency, (3) any commodity,⁵² and (4) “*any digital representation of value which is recorded on a cryptographically secured distributed ledger or any similar technology as specified by the Secretary.*”⁵³ This proposed legislation, separately listing a category for virtual currency as a “specified asset”—i.e., one that is separate from a security or foreign currency—reflects an understanding by the ranking tax member of the House of Representatives that virtual currency does not come within the wash-sale definition of securities.

38. Note further that Chairman Neal’s proposed legislation would classify foreign currency within the proposed new definition of “specified assets.” That proposal addresses a class of assets that the IRS had earlier excluded from the wash-sale definition of securities. This enumeration reflects awareness among members of Congress of the need for legislative action to extend the wash-sale rule beyond its current reach, either by expanding its definition of securities or, as in the Neal proposed legislation, to expand its scope to apply to other types of non-security assets such as foreign currency and virtual currency or other digital assets.

39. This analysis illustrates that a reasonable buyer or seller of virtual currency such as XRP would have no grounds to apply the wash-sale exception to such virtual currency. Based upon that knowledge, reasonable buyers and sellers could conclude that they can recognize losses incurred on the sale of virtual currency such as XRP within 30 days of acquiring the same quantity of such virtual currency. Understanding that the wash-sale rule

⁵⁰ Amendment in the Nature of a Substitute to the Committee Print Offered by Mr. Neal of Massachusetts, Proposed Amendment to S. Con. Res. 14, 117th Cong. (2021), available at https://waysandmeans.house.gov/sites/democrats.waysandmeans.house.gov/files/documents/NEAL_032_xml.pdf, at 634:19–635:11; see also H.R. 5376 (2021) (same language proposed in budget reconciliation), available at <https://www.congress.gov/bill/117th-congress/house-bill/5376/text>, at 2219:19–2220:11.

⁵¹ *Id.*

⁵² *Id.* at § 138153(d)(1)(h)(3) (incorporating the definition of commodity in section 475(e)(2)).

⁵³ *Id.* at § 138153(d)(1) (emphasis added).

does not apply to virtual currency such as XRP could affect the decisions of reasonable buyers and sellers of such virtual currency.

40. Another bill now pending in Congress—the proposed Infrastructure Investment and Jobs Act—would add “digital asset[s]” to the definition of “specified security” for the purpose of the broker reporting rules in Section 6045 of the Code.⁵⁴ This is yet another example of members of Congress recognizing that the federal income tax definition of securities for very specific purposes does not currently include virtual currency. Section 6045 is outside Subtitle A (Income Taxes) of the Code and would not apply to the federal income tax classification of virtual currency such as XRP and the tax consequences of transactions of such virtual currency. Nonetheless, the proposed legislation is yet another example of members of Congress recognizing that federal income tax definitions of securities do not include virtual currency without affirmative action to expand the definitions.

2. Other Examples

41. The Code includes other security-specific exceptions to the general property-transaction rules, including rules applicable only to “stock,” that manifestly have no application to virtual currency, and nothing in IRS guidance or other federal income tax law would cause reasonable buyers or sellers of virtual currency such as XRP to believe otherwise.

42. **Corporate-Formation Rules**. The corporate-formation rules apply only to stock—the quintessential security—which is so fundamentally different from virtual currency such as XRP to leave no doubt that provisions restricted to stock do not apply to such virtual currency. In brief, the corporate-formation rules provide an exception to the general property-transaction rules for qualifying transfers of property to a corporation in exchange for stock in

⁵⁴ H.R. 3684, 117th Cong. § 80603 (2021).

the corporation. In particular, the corporate-formation rules provide that, with such transactions, no gain or loss is recognized on the transfer of property in exchange for the issuance of stock.⁵⁵ These rules cannot apply to virtual currency such as XRP that lack the features of stock.

43. **Corporate-Reorganization Rules**. The corporate-reorganization rules are a securities-specific exception that do not apply to virtual currency such as XRP. Under this exception, no gain loss is recognized when ParentCo distributes SubCo stock or securities (i.e., SubCo debt) to ParentCo shareholders in a qualifying reorganization.⁵⁶

44. The federal income tax law’s definition of securities for purposes of the corporate-reorganization rules generally includes certain debt instruments of SubCo with a sufficiently long maturity representing a continuation of the taxpayer’s interest in the reorganized entity,⁵⁷ as well as the option to acquire SubCo stock.⁵⁸

45. Virtual currency such as XRP clearly falls outside the definition of securities for purposes of these corporate-reorganization rules, and the rules’ application to such virtual currency would make no sense. Virtual currency such as XRP is not an interest in an entity, provides no right to repayment, and has no maturity date or other indicia of being the type of instrument that represents a continuing interest in a corporation. Lacking the features of qualifying debt instruments virtual currency such as XRP does not qualify as securities for

⁵⁵ I.R.C. § 351(a).

⁵⁶ I.R.C. § 355(a)(1).

⁵⁷ *See, e.g.*, Rev. Rul 2004-78, 2004-2 CB 108 (setting forth the general rule that a debt instrument with a term of less than five years is generally not a security for this purpose; the ruling sets forth an exception where debt instruments received in the reorganization represent “a continuation of the security holder’s investment in the Target Corporation”).

⁵⁸ Treas. Reg. § 1.354-1(e) (1998) (providing “[e]xcept as provided in section 1.356-6, for purposes of section 354, the term securities includes rights issued by a party to the reorganization to acquire its stock”).

purposes of those rules.⁵⁹ Thus, reasonable buyers and sellers of virtual currency such as XRP would not expect the securities-specific corporate reorganization rules to apply.

46. **Tax partnerships.** Some definitions of securities include interests in tax partnerships.⁶⁰ Exceptions to the general property-transaction rules also apply to transactions of interests in tax partnerships. Under those exceptions, no gain or loss is generally recognized when property owners contribute property to tax partnerships or when tax partnerships distribute property to partners.⁶¹ Because virtual currency such as XRP does not share the characteristics of interest in a tax partnership, and based on existing IRS guidance, reasonable buyers and sellers of such virtual currency would not apply those partnership rules to transactions of virtual currency such as XRP.

47. **Options.** The general definition of security includes options to buy or sell stock or debt instruments. The IRS provides guidance governing transactions with options that applies an open-transaction doctrine until the option is sold, expires, or is exercised.⁶² These “option-specific rules” are exceptions to the general property-transaction rules, so they must be strictly construed, but even without such scrutiny, virtual currency such as XRP clearly does not qualify for the option-specific rules. Virtual currency such as XRP is stand-alone property with no right to buy or sell other property, so reasonable buyers and sellers of virtual currency such as XRP would conclude that such virtual currency is not an option and would not expect the option-specific rules to apply to such virtual currency.

⁵⁹ I.R.C. § 356(a)(1).

⁶⁰ I.R.C. § 163 (describing tax treatment for interests in partnerships as based on the partnership’s income, gain, deduction, loss, and distribution of excess income).

⁶¹ I.R.C. § 721(a), 731(a)(1). These exceptions apply generally to all property, but the general nonrecognition rule may not apply to some distributions of marketable securities by a partnership. I.R.C. § 731(c).

⁶² See, e.g., Rev. Rul. 78-182, 1978-1 C.B. 265 (discussing the tax treatment of options traded on the Chicago Board Options Exchange, Incorporated).

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on October 4, 2021

A handwritten signature in black ink, appearing to read "Brad Borden", is written over a horizontal line.

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- Member, Bloomberg BNA PASS-THROUGH ENTITIES Advisory Board, 2017–Present
- Member, FLORIDA TAX REVIEW Board of Advisors, 2016–Present
- Columnist, JOURNAL OF PASSTHROUGH ENTITIES, 2015–2019
- Member, TAX MANAGEMENT REAL ESTATE Advisory Board, 2011–2016

PUBLICATIONS (PAST TEN YEARS)

ARTICLES IN LAW REVIEWS

- *Contribution and Distribution Flexibility and Tax Pass-Through Entities*, 23 FLA. TAX. REV. 349 (2019) (with Brett Freudenberg)
- *Effective Tax Rates and Entity Selection Following the 2017 Tax Act*, 71 NAT'L TAX J. 613 (2018)
- *Interest Dilution as a Contribution-Default Remedy in LLCs and Partnerships*, 6 NOTTINGHAM INSOLVENCY & BUS. L. J. 180 (2018) (with Douglas L. Longhofer)
- *Quantitative Prediction Model in Tax Law's Substantial Authority*, 71 TAX LAW. 543 (2018) (with Sang Hee Lee)
- *Boundaries of the Prediction Model in Tax Law's Substantial Authority* 71 TAX LAW. 33 (2017) (with Sang Hee Lee)
- *Reforming REIT Taxation (or Not)*, 53 HOUS. L. REV. 1 (2015)
- *Rethinking the Tax-Revenue Effect of REIT Taxation*, 17 FLA. TAX REV. 527 (2015)
- *A Case for Simpler Gain Bifurcation for Real Estate Developers*, 16 FLA. TAX REV. 279 (2014) (with Nathan R. Brown & E. John Wagner, II)
- *Probability, Professionalism, and Protecting Taxpayers*, 68 TAX LAW. 83 (2014) (with

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Dennis J. Ventry, Jr.)

- *REMIC Tax Enforcement as Financial-Market Regulator*, 16 U. PA. J. BUS. L. 663 (2014) (with David J. Reiss)
- *Using the Client-File Method to Teach Transactional Law*, 17 CHAPMAN L. REV. 101 (2013)
- *A Model for Measuring the Expected Value of Assuming a Tax-Partnership Liability*, 7 BROOK. J. CORP., FIN. & COMM. L. 361 (2013) (with Joseph Binder, Ethan Blinder & Louis Incatasciato)
- *Quantitative Model for Measuring Line-Drawing Inequity*, 98 IOWA L. REV. 971 (2013)
- *The Law School Firm*, 63 S.C. L. REV. 1 (2011) (with Robert J. Rhee)

BOOKS

- SECTION 1031 FOR REAL ESTATE INVESTORS AND PROFESSIONALS, (Vandeplas Publishing, 2021)
- FEDERAL INCOME TAXATION: CASES AND MATERIALS (8th ed., Foundation Press 2020) (with Martin J. McMahon, Jr., Daniel L. Simmons & Bret Wells)
- LLCs AND PARTNERSHIPS: LAW, FINANCE, AND TAX PLANNING (Wolters Kluwer 2019)
- FEDERAL INCOME TAXATION: CASES AND MATERIALS (7th ed., Foundation Press 2017) (with Martin J. McMahon, Jr., Daniel L. Simmons & Dennis J. Ventry, Jr.)
- INCOME TAX CONCEPTS FOR BUSINESS AND TRANSACTIONAL LAWYERS (Aspen Publishers, in progress) (with Steven Dean)
- TAXATION OF BUSINESS ENTITIES (Aspen Publishers, in progress) (with Steven Dean)
- FEDERAL TAXATION OF CORPORATIONS AND CORPORATE TRANSACTIONS (Aspen Publishers 2018) (with Steven Dean)
- TAXATION AND BUSINESS PLANNING OF PARTNERSHIPS AND LLCs (2d ed., Aspen Publishers 2017)
 - a. 2020–2021 Client File: DD Pizzeria LLC (Operating Tax Partnership) (Wolters Kluwer 2020)
 - b. 2017–2018 Client File: DD Pizzeria LLC (Operating Tax Partnership) (Wolters Kluwer 2018)
- TAX-FREE LIKE-KIND EXCHANGES (2d ed., Civic Research Institute 2015)
- LIMITED LIABILITY ENTITIES: STATE BY STATE GUIDE TO LLCs, LPs AND LLPs (Wolters Kluwer Law & Business 2012) (with Robert J. Rhee)

BOOK CHAPTERS AND SIMILAR PUBLICATIONS

- *Effective Tax Rates for Typical High-Income Taxpayers*, TAX SERIES SPECIAL UPDATE: TAX PRACTICE AFTER THE TAX CUTS AND JOBS ACT (Louis S. Freeman, ed.) (Practicing Law Institute 2018)
- *Real Estate Transactions by Tax-Exempt Entities*, TAX MANAGEMENT 591-3rd/480-2nd (2015)
- *Tax Aspects of Partnerships, LLCs and Alternative Forms of Business Organizations*, in RESEARCH HANDBOOK ON PARTNERSHIPS, LLCs AND ALTERNATIVE FORMS OF BUSINESS ORGANIZATIONS (Robert W. Hillman & Mark J. Lowenstein eds.) (Edward Elgar Publishing 2015)
- *Chapter 9: Economic Justification for Flow-Through Tax Complexity*, in CONTROVERSIES IN TAX: A MATTER OF PERSPECTIVE (Anthony C. Infanti ed.) (Ashgate Publishing 2015)

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- *Taxation of Real Estate Developers*, TAX MANAGEMENT PORTFOLIO, (in progress)
- Title 6, *Partnership Operations & Terminations*, TAX ADVISORS PLANNING SERIES (RIA 2014)
- Chapter 2970, *The At-Risk Rules*, TAX MANAGEMENT'S TAX PRACTICE SERIES (Tax Management 2012)

ARTICLES IN OTHER PUBLICATIONS

- *A Financial Analysis of Disguised Sales of Partnership Interests*, 172 TAX NOTES 381 (July 19, 2021) (with Martin E. Connor, Jr., Douglas L. Longhofer & Nastassia Shcherbatsevich)
- *Rethinking Book-Tax Disparities and Partnership Distributions*, 170 TAX NOTES FED. 711 (Feb. 1, 2021) (with Douglas L. Longhofer)
- *Hot Like-Kind Exchange Issues*, 78-11 NEW YORK UNIVERSITY ANNUAL INSTITUTE ON FEDERAL TAXATION (2020)
- *Twenty Things Real Estate Attorneys Can Do to Not Mess Up a Section 1031 Exchange*, 36 PRAC. REAL EST. LAW. 30 (Sep. 2020)
- *Twenty Things Real Estate Attorneys Can Do to Not Mess Up a Section 1031 Exchange*, (Part 2: Items 11-20) 36 PRAC. TAX LAW 3 (Sep. 2020)
- *Twenty Things Real Estate Attorneys Can Do to Not Mess Up a Section 1031 Exchange (Part 1 Items 1-10)*, 34 PRAC. TAX LAW 15 (May 2020)
- *Universal Deadline Extensions Draw Attention to Section 1031 Periods*, 167 TAX NOTES FED. 603 (Apr. 27, 2020)
- *Wrapped Nonrecognition: Code Sec. 1031 Exchanges Within Qualified Opportunity Funds*, 22 J. PASSTHROUGH ENT. 37 (Sept.-Oct. 2019)
- *Section 1031 Exchanges and the 20 Percent Business Deduction under IRC Section 199A*, 33 PROB. & PROP. 58 (Sep./Oct. 2019)
- *Partnership-Related Relatedness: Measuring Partners' Capital Interests and Profits Interests*, 22 J. PASSTHROUGH ENT. 15 (May-June 2019), reprinted in 33 PRAC. TAX LAW. 3 (Sept. 2019)
- *Investing § 1231 Gain in Qualified Opportunity Funds*, 35 TAX MGT. REAL EST. J. No. 7 (July 3, 2019)
- *Code Sec. 1031, the Code Sec. 199A and Bonus Depreciation Regulations, and Ozone Drop-Swap Cash-Outs*, 22 J. PASSTHROUGH ENT. 13 (Jan.-Feb. 2019)
- *Basic and Non-Basic Tax Tips for Leasing Lawyers*, 35 PRAC. REAL EST. LAW. 48 (Jan. 2019)
- *Ten Reasons to Prefer Tax Partnerships Over S-Corporations*, 22 N.Y. BUS. L. J. 47 (Winter 2018)
- *Interest Dilution and Damages as Contribution-Default Remedies in Failing LLCs and Partnerships*, BUS. L. TODAY (Nov. 6, 2018) (with Thomas E. Rutledge)
- *The New Code Section 1031—It's All About Real Property Now*, 46 N.Y. REAL PROP. L. J. 19 (Fall 2018)
- *S-Corporation Cash-Out Break-Ups and Code Sec. 1031 Exchanges*, 21 J. PASSTHROUGH ENT. 21 (Sep.-Oct. 2018)
- *Real Estate Gain Deferral and Exclusion Through Investments in Qualified Opportunity Funds*, 18 DAILY TAX REP. 8 (Sep. 18, 2018) (with Alan S. Lederman)

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- *Rolling Real Estate Gain into a Qualified Opportunity Fund: Comparison with § 1031*, 34 TAX MGT. REAL EST. J. 155 (Sep. 5, 2018) (with Alan S. Lederman)
- *How the New Tax Act Creates Complexity and Inequity for Small Businesses*, 23 BROOK. L. NOTES 40 (Spring 2018)
- *Code Sec. 1031 After the 2017 Tax Act*, 21 J. PASSTHROUGH ENT. 17 (May-June 2018), republished in 34 PRAC. REAL EST. LAW. 35 (July 2018); 33 PRAC. TAX LAW. 49 (Fall 2018)
- *Effect of IRS Nonacquiescence on Tax Planning and Reporting*, 21 J. PASSTHROUGH ENT. 19 (Jan.-Feb. 2018)
- *Like-Kind Exchanges of Timber Rights*, 20 J. PASSTHROUGH ENT. 27 (Sep.-Oct. 2017)
- *Malulani and the Entrenchment of Mechanical Analysis of Related-Party Exchange Rules*, 20 J. PASSTHROUGH ENT. 15 (May-June 2017)
- *It's a Bird, It's a Plane, No, It's a Board-Managed LLC*, 26 BUS. L. TODAY, No. 7 (Mar. 2017) (with A. Christine Hurt & Thomas E. Rutledge)
- *Bartell and the Expansion of Facilitated Exchanges*, 20 J. PASSTHROUGH ENT. 13 (Jan.-Feb. 2017)
- *Expected-Cost Analysis as a Tool for Optimizing Tax Planning and Reporting*, 44 REAL EST. TAX'N 21 (4th Quarter 2016) (with Ken H. Maeng)
- *Equity Structure of Non-Corporate Entities* 31 REAL EST. FIN. J. 35 (Summer/Fall 2016)
- *Code Sec. 1031 Drop-Swap Cash-Outs and Unrecaptured Section 1250 Gain*, 19 J. PASSTHROUGH ENT. 27 (Sep.-Oct. 2016)
- *Navigating the Confluence of Code Secs. 1031 and 1250*, 19 J. Passthrough Ent. 25 (May-June 2016)
- *Proposed Anti-Fee-Waiver Regulations: A Blueprint for Waiving Fees?*, 57 TAX MGT. MEMO 87 (Mar 7, 2016) (with Douglas L. Longhofer and Lena E. Smith)
- *Section 1031 Drop-and-Swaps Thirty Years After Magnuson*, 19 J. PASSTHROUGH ENT. 11 (Jan.-Feb. 2016)
- *Maximizing Capital Gains in Real Estate Transactions*, 74-8 NEW YORK UNIVERSITY ANNUAL INSTITUTE ON FEDERAL TAXATION (2016) (with James M. Lowy)
- *XIRR Guessing Games and Distribution Waterfalls*, BUS. L. TODAY, No. 435 (Jan. 2016)
- *Section 1031 Drop-and-Swaps Thirty Years After Bolker*, 18 J. PASSTHROUGH ENT. 21 (Sep.-Oct. 2015)
- *North Central and the Expansion of Code Sec. 1031(f) Related-Party Exchange Rules*, 18 J. PASSTHROUGH ENT. 19 (May-June 2015)
- *To Repeal or Retain Section 1031: A Tempest in a \$6 Billion Teapot*, 34 A.B.A. SEC. TAX'N NEWS Q. 1 (Spring 2015) (with Joseph B. Darby III, Charlene D. Luke & Roberta F. Mann)
- *Section 1031 Exchanges: Death of a Related-Party Exchange—Did “Butler” Do it?*, 75 DAILY TAX REP. J-1 (Apr. 20, 2015) (with Alan S. Lederman)
- *Counterintuitive Tax-Revenue Effect of REIT Spinoffs*, 146 TAX NOTES 381 (Jan. 19, 2015)
- *Math Behind Financial Aspects of Partnership Distribution Waterfalls*, 145 TAX NOTES 305 (Oct. 20, 2014)
- *Accounting for Pre-Transfer Development in Bramblett Transactions*, 41 REAL EST. TAX'N 162 (3rd Quarter, 2014) (with Matthew E. Rappaport)

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- *Navigating State Law and Tax Issues Raised by Partnership and LLC Reorganizations*, 16 BUS. ENT. 4 (July/Aug. 2014)
- *Notable Partnership Tax Articles of 2013*, 143 TAX NOTES 1513 (June 30, 2014)
- *Are Related-Party Acquisitions in Anticipation of Exchange Technically and Theoretically Valid?*, 120 J. TAX'N 52 (Feb. 2014) (with Kelly E. Alton & Alan S. Lederman)
- *Section 179(f) Deductions and Recapture of Costs of Qualified Real Property*, 120 J. TAX'N 4 (Jan. 2014) (with Cali Lieberman)
- *Avoiding Adverse Tax Consequences in Partnership and LLC Reorganizations*, 23 BUS. L. TODAY (Dec. 2013) (with Brian J. O'Connor & Steven R. Schneider)
- *Dirty REMICs, Revisited*, 27 PROB. & PROP. 8 (Nov./Dec. 2013) (with David Reiss)
- *IRS Blesses Tax-Free Exchange of Negative-Equity Property*, BLS PRACTICUM (Sep. 12, 2013)
- *Goliath Versus Goliath in High-Stakes MBS Litigation*, 19 SEC. LIT. & REG. 3 (Sep. 4, 2013) (with David Reiss)
- *Show Me the Note!*, 19 BANK & LENDER LIABILITY 3 (June 3, 2013) (with KeAupuni Akina & David Reiss)
- *Notable Partnership Tax Articles of 2012*, 139 TAX NOTES 639 (May 6, 2013)
- *Dirt Lawyers and Dirty REMICs*, 27 PROB. & PROP. 12 (May/June 2013) (with David Reiss)
- *Cleaning Up the Financial Crisis of 2008: Prosecutorial Discretion or Prosecutorial Abdication?*, 92 CRIM. L. REP. 765 (Mar. 20, 2013), 100 BANKING REP. 579 (Mar. 26, 2013), 18 BLS LAW NOTES 32 (Spring 2013) (with David J. Reiss)
- *Once a Failed REMIC, Never a REMIC*, 30 CAYMAN FIN. REV. 65 (1st Quarter 2013) (with David Reiss)
- *Preserving the Conservation Contribution Deduction*, 30 J. TAX'N INV. 23 (Winter 2013) (with Andrew M. Wayment)
- *Beneficial Ownership and the REMIC Classification Rules*, 28 TAX MGMT. REAL EST. J. 274 (Nov. 7, 2012) (with David J. Reiss)
- *Sales of Church Real Property to Parishioners*, 24 TAX'N EXEMPTS 3 (July/Aug. 2012) (with Katherine E. David)
- *The Overlap of Tax and Financial Aspects of Real Estate Ventures*, 39 J. REAL EST. TAX'N 67 (1st Quarter 2012)
- *Tax-Free Exchanges of Art and Other Collectibles*, 29 J. TAX'N INV. 3 (Spring 2012)
- *From Allocations to Series LLCs: 2011's Partnership Tax Articles*, 134 TAX NOTES 1433 (Mar. 12, 2012)

PUBLIC SCHOLARSHIP

- *Who Cares About Taxing REIT Spinoffs?*, THE HUFFINGTON POST (Dec. 17, 2015)
- *REITs—Benign, Benevolent Structures*, THE HUFFINGTON POST (June 24, 2015)
- *The Art (and Law) of Tax-Free Exchanges of Art and Collectibles*, THE HUFFINGTON POST (June 10, 2015)
- *Third-Party Litigation Financing and the Impending Resurgence of the Legal Profession*, THE HUFFINGTON POST (May 4, 2013)
- *An Uneasy Justification for Prosecutorial Abdication in the Subprime Industry*, THE

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HUFFINGTON POST (Nov. 7, 2012) (with David Reiss)

- *Did the IRS Cause the Financial Crisis?*, THE HUFFINGTON POST (Oct. 18, 2012)
- *Wall Street Rules Applied to REMIC Classification*, THOMSON REUTERS NEWS & INSIGHTS (Sep. 13, 2012) (with David Reiss)
- *The Symbiosis of a Fly Fisherman and Creek Fish*, THE HUFFINGTON POST (Feb. 6, 2012)
- *Romneys' Tax Returns Underscore Gross Inequity and Extent of Class Warfare*, THE HUFFINGTON POST (Jan. 25, 2012)

PRESENTATIONS (PAST TEN YEARS)

SELECTED ACADEMIC PRESENTATIONS

- *The Prediction Model in Tax Law's Substantial Authority*, Faculty Workshop, University of Florida Frederic G. Levin College of Law, Gainesville, Florida, February 2017
- *Capital Structure of Noncorporate Business Entities*, J. Reuben Clark Law Society Faculty Group Conference, New York, New York, January 2016
- *Probability, Professionalism, and Protecting Taxpayers*, Standards of Practice and their Implications in Law and Accounting Firms, Northwestern University Pritzker School of Law, Chicago, Illinois, October 2015 (with Dennis J. Ventry, Jr.)
- *REIT Stuff*, Graduate Tax Program Colloquium, University of Florida Frederic G. Levin College of Law, Gainesville, Florida, October 2014
- *REMIC Tax Enforcement as Financial-Market Regulator*, Faculty Colloquium, University of Washington School of Law, Seattle, Washington, January 2014
- *Using the Client-File Method to Teach Transactional Law*, The Future of Law, Business, and Legal Education: How to Prepare Students to Meet Corporate Needs, Chapman Law Review Symposium, Orange, California, February 2013
- *The Law School Firm: A Legal Teaching Model for the 21st Century*, Education Law and Policy Society, Columbia Law School, New York, New York, October 2012

SELECTED OTHER PRESENTATIONS

- *Business, Tax and Ethical Fundamentals Every Transactional Lawyer Needs to Know: Finding Your Way Out of the Transactional Maze*, New York County Lawyers Association Continuing Legal Education Institute, Webinar, June 2020 (with Lewis Tesser)
- *Contribution-Default Remedies of LLCs and Partnerships*, American Bar Association, Business Law Section, LLC Institute, Tampa, Florida, November 2019 (with Michael D. Soejoto)
- *Annual Review of Ethical Issues for QIs and Advisors in Like-Kind Exchanges*, Jeremiah Long Memorial National Conference on Like-Kind Exchanges Under Section 1031 I.R.C., Scottsdale, Arizona, October 2019 (with Mary Foster, David Shechtman, Derrick Tharpe)
- *Installment Sale Adjuncts/Substitutes to Exchanges*, Jeremiah Long Memorial National Conference on Like-Kind Exchanges Under Section 1031 I.R.C., Scottsdale, Arizona, October 2019 (with Anne Andrews, Alan Lederman)
- *TICs and DSTs as Replacement Property*, Jeremiah Long Memorial National Conference on Like-Kind Exchanges Under Section 1031 I.R.C., Scottsdale, Arizona, October 2019 (with Dick Lipton, Darryl Steinhouse)

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- *Annual Review of State Law Issues Affecting Exchanges*, Jeremiah Long Memorial National Conference on Like-Kind Exchanges Under Section 1031 I.R.C., Scottsdale, Arizona, October 2019 (with Ciro Immordino, Mary Foster, Joyce Welch)
- *Hot Like-Kind Exchange Issues*, New York University 78th Annual Institute on Federal Taxation, New York, New York, October 2019 (with Robert D. Schachat)
- *A Financial Analysis of Disguised Sales of Partnership Interests*, Tax Forum, New York, New York, October 2019
- *Related Party Exchanges—Risks and Opportunities*, Federation of Exchange Accommodators 2019 Annual Conference, New Orleans, Louisiana, September 2019
- *Maximizing Capital Gains in Real Estate Transactions*, New York University Federal Restate and Partnerships Tax Conference, Washington, D.C., June 2019 (with James M. Lowy)
- *Basic and Non-Basic Tax Issues for Leasing Lawyers*, Commercial Real Estate Leases 2019, New York State Bar Association, Real Property Law Section, New York, New York, February 2019
- *Don't Get Caught in the Transactional Maze: Income Tax Fundamentals and Their Ethical Implications for the Transactional Lawyer*, New York County Lawyers Association Continuing Legal Education Institute, New York, New York, February 2019 (with Lewis Tesser)
- *Effect of Property Tax Policy and Real Estate Transactions*, NYC Advisory Commission on Property Tax Reform, New York, New York, January 2019 (no published materials)
- *Breaking Up is Hard To Do: Handling Partnership Split-Ups on Sale of Property*, Jeremiah Long Memorial Conference on Like-Kind Exchanges Under Section 1031 I.R.C., Austin, Texas, November 2018 (with Steve Breistone, Adam Handler, Lou Weller)
- *Current Thinking on What is Real Property*, Jeremiah Long Memorial Conference on Like-Kind Exchanges under Section 1031 I.R.C., Austin, Texas, November 2018 (with Mary Foster, Dick Lipton, Bob Schachat)
- *Tax Issues in Commercial Leasing*, New York State Bar Association, Commercial Real Estate Leasing, Real Property Law Section, New York, New York, October 2018
- *Maximizing Capital Gains in Real Estate Transactions*, Creative Tax Planning for Real Estate and Partnership Transactions 2018, The American Law Institute Continuing Legal Education, Chicago, Illinois, September 2018 (with James M. Lowy, Andrea Macintosh Whiteway)
- *Real Estate and Partnerships Under the Tax Cuts and Jobs Act*, Creative Tax Planning for Real Estate and Partnership Transactions 2018, The American Law Institute Continuing Legal Education, Chicago, Illinois, September 2018 (with Jerald D. August, Richard E. Levine, David Polster, Blake D. Rubin, Bahar A. Schippel, Steven R. Schneider, Stefan F. Tucker, Andrea Macintosh Whiteway)
- *S-Corp and Partnership Taxation, and Potential Implications of the New Tax Code*, New York State Bar Association, Business Law Section Spring Meeting, Business Organizations Law Committee, New York, New York, May 2018 (with Russell Kranzler and Matthew Moisan)
- *Choice-of-Entity Decisions Under the New Tax Act*, National Tax Association 48th Annual Spring Symposium, Washington, D.C., May 2018
- *Implications of IRS Nonacquiescences*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Washington, D.C., May 2018 (with Diana

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- L. Erbsen, Mary B. Foster, R. Matthew Kelley, Howard J. Levine, Steven J. Toomey)

▪ *Structuring Waterfall Provisions in LLC and Partnership Agreements*, Strafford Continuing Education, Tax Law 2018: New Challenges & Opportunities, New York, New York, May 2018 (with Anthony Minervini)
- *My Principal Purpose in Acquiring Related Party Property Didn't Include Tax Avoidance*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Washington, D.C., May 2017 (with Christina M. Glendening, Matthew E. Rappaport & Heather Ripley)
- *Section 1038 as an Alternative to Mixing Bowl Transactions*, Bloomberg BNA Tax Advisory Board Meeting, New York, New York, December 2016 (with Mark E. Wilensky & Glenn Johnson)
- *Structuring the Management of an LLC "Board,"* American Bar Association, Business Law Section, LLC Institute, Arlington, Virginia, October 2016 (with Christine Hurt & Thomas E. Rutledge)
- *Are Sale-Leasebacks on the Menu?*, American Bar Association, Section of Taxation and Section of Real Property, Trust & Estate Law, Trust & Estate Division, Boston, Massachusetts, October 2016 (with Stephen M. Breitstone, Aaron S. Gaynor & Glenn Johnson)
- *Ensuring an Internal Rate of Return (IRR) Distribution Waterfall Flows Correctly*, University of Texas School of Law 25th Annual LLCs, LPs and Partnerships Conference, Austin, Texas, July 2016
- *Developments in Income Taxation of Real Estate, Capital Gains Taxation and Section 1031 Exchanges*, Hofstra University Maurice A. Dean School of Law and Meltzer, Lippe, Goldstein & Breitstone, LLP, Private Wealth and Taxation Institute, Hempstead, New York, May 2016 (with Glenn M. Johnson & Mark E. Wilensky)
- *Dealing with Unrecaptured Section 1250 Gain in Drop-Swap Cash-Outs*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Washington, D.C., May 2016 (with Katherine E. David & Mark E. Wilensky)
- *Can the Tenant Provide Tax-Free Financing of the Landlord's Construction Costs?*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Los Angeles, California, January 2016 (with Aaron S. Gaynor, Glenn M. Johnson & E. John Wagner, II)
- *Proposed Anti-Fee Waiver Regulations: A Blueprint for Waiving Fees?*, Bloomberg BNA Tax Management Advisory Board Meeting, New York, New York, December 2015 (with Douglas L. Longhofer & Lena E. Smith)
- *The State of Section 1031 Drop-and-Swaps Thirty Years After Bolker and Magnuson*, The University of Texas School of Law 63rd Annual Taxation Conference, Austin, Texas, December 2015
- *Maximizing Capital Gains in Real Estate Transactions*, New York University 74th Annual Institute on Federal Taxation, San Francisco, California, November 2015 (with James M. Lowy)
- *Did You Really Mean What You Wrote in that IRR Distribution Waterfall?* American Bar Association, Business Law Section, LLC Institute, Arlington, Virginia, November 2015 (with John Grumbacher, Thomas Kaufman & Steven Schneider)
- *Maximizing Capital Gains in Real Estate Transactions*, New York University 74th Annual Institute on Federal Taxation, New York, New York, October 2015 (with James M. Lowy)

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- Panelist, *Non-Entity Real Estate Structures*, American Bar Association, Business Law Section, LLCs, Partnerships and Unincorporated Entities Committee, 2013 LLC Institute, Arlington, Virginia, October 2014 (with Daniel F. Cullen)
- Moderator, *Duties of an Attorney in a Basic Section 1031 Exchange*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Denver, Colorado, September 2014 (with Suzanne Goldstein Baker, Howard J. Levine & Beat U. Steiner)
- Panelist, *Tax Planning Workshop: Drop & Swap and Section 704(c)(2) Strategies*, ABA Tax Section CLE Webinar and Teleconference, December 2013 (with Mark E. Wilensky, Stephen M. Breitstone, Lou Weller, Donna M. Crisalli, Clifford M. Warren)
- Panelist, *Partnership and LLC Reorganizations*, American Bar Association, Business Law Section, LLC Institute, Arlington, Virginia, October 2013 (with Brian J. O'Connor and Steven R. Schneider)
- Moderator, *TICs and DST Transactions: They're Back!*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Washington, D.C., May 2014 (with Daniel F. Cullen & Darryl Steinhouse)
- *Individual and Partnership Tax Developments*, Tulane Tax Institute, New Orleans, Louisiana, October 2013
- Panelist, *The Very Rare Find: A Section 1031 Collectible Exchange with Definite Answers*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, San Francisco, California, September 2013 (with Alan Lederman, Suzanne Goldstein Baker, Timothy Shortess, Donna M. Crisalli)
- *Dirt Lawyers, Dirty REMICs*, American Bar Association Real Property, Trust & Estate Law Section's Legal Education and Uniform Law Group, Professors' Corner Teleconference, February 13, 2013 (with David J. Reiss)
- Panelist, *Tax Issues Involving Flawed Securitizations*, American Bar Association Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Orlando, Florida, January 2013 (with Alan S. Lederman & John W. Rogers, III)
- *REMICs*, Idaho State Tax Institute, Pocatello, Idaho, November 2012
- *Is It Treated as a Sale? Something Else?—Part III: Issues Surrounding Tax Ownership of U.S. Residential Mortgage Debt*, American Bar Association Section of Taxation and Section of Real Property, Trust & Estate Law, Trust and Estate Division, Sales, Exchanges & Basis Committee Meeting, Boston, Massachusetts, September 2012 (with Alan S. Lederman)
- *Professional Ethics in the Transactional Setting*, Pocket MBA: Summer 2012, San Francisco, California, June 2012

EXPERT TESTIMONY (PAST FOUR YEARS)

BERNSTEIN V. NNN REALTY INVESTORS, LLC, NO. 30-2011-00449598, Superior Court of the State of California, County of Orange,

Expert retained in 2020 by defendant's counsel in an action for claimed breach of contract, breach of implied covenant of good faith and fair dealing, negligent misrepresentation, market manipulation, securities fraud, control person liability, setting aside fraudulent transfers—constructive fraud, setting aside fraudulent transfers—actual fraud, and common-law fraud.

MATERIALS CONSIDERED

In addition to materials directly cited in the text of my Report, which are incorporated by reference as materials I considered, I considered the following materials in forming my opinions:

SEC v. RIPPLE CASE MATERIALS

Defs.'s Letter Mot. Regarding Pl.'s Resp. to Defs' Interrogs., dated Sept. 15, 2021, ECF No. 352

ECF No. 4 (Complaint filed in Sec. Exch. Comm'n v. Ripple Labs Inc., 20 Civ. 10832 (S.D.N.Y. Dec. 22, 2020))

ECF No. 46 (Amended Complaint filed in Sec. Exch. Comm'n v. Ripple Labs Inc., 20 Civ. 10832 (S.D.N.Y. Dec. 22, 2020))

Pl.'s Answers and Obj.'s to Defs.' First Set of Req. for Admis. Sec. Exch. Comm'n. v. Ripple Labs, Inc., 20 Civ. 10832

Pl.'s Answers and Obj.'s to Defs.' Second Set of Req. for Admis. Sec. Exch. Comm'n. v. Ripple Labs, Inc., 20 Civ. 10832

Pl.'s Answers and Obj.'s to Defs.' Third Set of Req. for Admis. Sec. Exch. Comm'n. v. Ripple Labs, Inc., 20 Civ. 10832

TAX AUTHORITIES, REGULATIONS, AND GUIDANCE

Internal Revenue Code of 1986, as amended, §§ 61, 163, 165, 301, 354, 351, 355, 356, 475, 701, 721, 731, 761, 1001, 1011, 1012, 1016, 1275, 1058, 1091, 1236

Internal Revenue Code of 1986, § 1091(a), Pub. L. 106-554, § 1(a)(7), 102 Stat. 3682 (1988)

IRS Gen. Couns. Memo. (GCM) 39551 (August 26, 1986)

IRS Gen. Couns. Memo. (GCM) 38369 (May 9, 1980)

IRS, FREQUENTLY ASKED QUESTIONS ON VIRTUAL CURRENCY TRANSACTIONS, <https://www.irs.gov/individuals/international-taxpayers/frequently-asked-questions-on-virtual-currency-transactions> (updated Oct. 9, 2019; Dec. 6, 2019; Sept. 22, 2020; Oct. 8, 2020; Mar. 2, 2021; June 4, 2021)

IRS Publication 550, Investment Income and Expenses (2020)

IRS Notice 2014-21, 2014-16 I.R.B. 938 (Apr. 14, 2014)

Rev. Rul. 71-568; 1971-2 C.B. 312

Rev. Rul. 74-128, 1974-1 C.B. 202

Rev. Rul. 78-11, 1978-1 C.B. 254

Rev. Rul. 78-182; 1978-1 C.B. 265

Rev. Rul. 81-204, 1981-2 C.B. 157

Rev. Rul. 2004-78, 2004-2 CB 108

Rev. Rul. 2019-24 2019-44 I.R.B. 1004

Treas. Reg. §§ 1.61-2; 1.61-6; 1.61-14; 1.354-1; 1.1001-1; 1.1002-1; 1.354-1

OTHER REGULATORY AUTHORITIES

FinCEN, Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies, FIN-2013-G001 (March 18, 2013)

FinCEN, "Statement of Facts and Violations," In re Ripple Labs Inc. (May 5, 2015) , https://www.fincen.gov/sites/default/files/shared/Ripple_Facts.pdf

"Ripple and U.S. Department of Justice Settlement Agreement" (May 2015), <https://www.justice.gov/usao-ndca/file/765721/download>

Press Release, Financial Crimes Enforcement Network, "FinCEN Fines Ripple Labs Inc. in First Civil Enforcement Action Against a Virtual Currency Exchanger" (May 5, 2015)

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