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Transcript of Stuart G. Stubblebine, Ph.D.

Date: May 15, 2024

Case: Meta Platforms, Inc., et al. -v- VL Collective IP LLC (PTAB)

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Meta 1031
Meta v. VL Collective
IPR2023-00923

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1 (1 to 4)

1	1 UNITED STATES PATENT AND TRADEMARK OFFICE 2 BEFORE THE PATENT TRIAL AND APPEAL BOARD 3 - - - - - X 4 META PLATFORMS, INC., : 5 INSTAGRAM, INC., : 6 WHATSAPP LLC, META : 7 PLATFORMS : 8 TECHNOLOGIES, LLC, : IPR2023-00923 9 and GIPHY, INC. : Patent 7,266,682 B2 10 Petitioner, : 11 v. : 12 VL COLLECTIVE IP LLC, : 13 Patent Owner. : 14 - - - - - X 15 Deposition of STUART G. STUBBLEBINE, PH.D. 16 New York, New York 17 Wednesday, May 15, 2024 18 8:01 A.M. 19 Job No.: 534493 20 Pages: 1 - 239 21 Reported By: Anita M. Trombetta, RMR, CRR 22	3	1 A P P E A R A N C E S 2 ON BEHALF OF THE PETITIONER: 3 ETHAN PERBOHNER, ESQUIRE 4 JONATHAN DREW BRIT, ESQUIRE 5 KIRKLAND & ELLIS LLP 6 601 Lexington Avenue 7 New York, NY 10022-4611 8 212.446.4800 9 10 ON BEHALF OF THE PATENT OWNER: 11 PHILIP EKLEM, ESQUIRE 12 REICHMAN JORGENSEN LEHMAN & FELDBERG 13 400 Madison Avenue, Suite 14D 14 New York, NY 10017 15 212.381.1965 16 17 ALSO PRESENT: 18 Henry Houh, Ph.D. (via teleconference) 19 20 21 22
2	1 Deposition of STUART G. STUBBLEBINE, PH.D., 2 held at the offices of: 3 4 5 Reichman Jorgensen Lehman & Feldberg 6 400 Madison Avenue, Suite 14D 7 New York, NY 10017 8 (212) 381-1965 9 10 11 Pursuant to notice, before Anita M. Trombetta, 12 RMR, CRR, Notary Public in and for the State of 13 New York. 14 15 16 17 18 19 20 21 22	4	1 -----I N D E X----- 2 WITNESS - STUART G. STUBBLEBINE, PH.D. 3 EXAMINATION BY Page 4 ATTORNEY PERBOHNER 5 5 ATTORNEY EKLEM 236 6 -----E X H I B I T S----- 7 Exhibit Description Page 8 Exhibit 1 Declaration of Stuart 9 9 G. Stubblebine, Ph.D. 10 in Support of Patent 11 Owner's Response 12 Stubblebine 35 13 Curriculum Vitae 14 Document Entitled, 45 15 Secure Transport 16 Protocols for 17 High-Speed Networks 18 Document Entitled, 102 19 User Datagram 20 Protocol 21 '682 Patent 149 22 Document Entitled, 187 Very large conferences on the Internet: The Internet Multimedia Conferencing Architecture and the MBONE Exhibit 7 Document Entitled, 193 Transmission Control Protocol Darpa Internet Program Protocol Exhibit 8 Specification 200 Document Entitled, "PacketCable 1.4 Architecture Framework, Technical Report

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5 1 PROCEEDINGS 2 STUART G. STUBBLEBINE, P.H.D., 3 called as a witness, having been duly 4 sworn by a Notary Public, was examined and 5 testified as follows: 6 ATTORNEY PERBOHNER: This is Ethan 7 Perbohner, at Kirkland & Ellis, on behalf of 8 petitioners. 9 And with me is my colleague, Jonathan 10 Brit. 11 And also attending this deposition 12 remotely is Dr. Henry Houh. 13 ATTORNEY EKLEM: This is Philip Eklem, 14 with Reichman Jorgensen Lehman & Feldberg LLP, on 15 behalf of the patent owner, VL Collective IP LLC, 16 and the witness. 17 EXAMINATION BY 18 ATTORNEY PERBOHNER: 19 Q Dr. Stubblebine, please state your full 20 name and spell it. 21 A Stuart Gerald Stubblebine. It's 22 S-T-U-A-R-T, G-E-R-A-L-D, and then	7 1 could refer to it as that? 2 A Yes. And, yes. 3 Q Have you read the '682 patent in its 4 entirety? 5 A Yes. 6 Q When did you last read it? 7 A In entirety? Probably before I submitted 8 my report. Since then, I've looked at pieces here 9 and there. 10 Q I'd like to go over some housekeeping 11 items with you. 12 I'm going to be asking you some questions 13 today. Your counsel may object to those 14 questions. But unless your counsel instructs you 15 not to answer, you must answer those questions. 16 Do you understand that? 17 A I understand what you said. 18 Q During the deposition today, if you don't 19 understand my question, please let me know. 20 Otherwise, I will assume that you understand it. 21 Okay? 22 A Okay.
6 1 S-T-U-B-B-L-E-B-I-N-E. 2 Q Where are you located right now? 3 A I'm a resident of Florida. I am right 4 here, right now, in this room. 5 Q And where is "this room"? 6 A New York City. 7 Q At the -- at any particular office? 8 A Yes. It's the lawyer's office. 9 Q What is your home address? 10 A I am a little bit in transition right now. 11 I'm kind of winding down my work. So I'm 12 traveling a bit. 13 Q Are you a U.S. citizen? 14 A Yes. 15 Q And who is your current employer? 16 A I have a company called Ssnology -- 17 S-S-N-O-L-O-G-Y, and that's my only employment. 18 Q Do you understand this deposition is part 19 of an inter partes review proceeding related to 20 U.S. Patent 7226682? 21 A Yes. 22 Q And have you read the '682 patent, if we	8 1 Q Do you understand you are under oath 2 today? 3 A Yes. 4 Q And do you understand you have to give 5 truthful, complete, and accurate testimony? 6 A Yes. 7 Q And you will do that today, correct? 8 A Yes, providing I don't get cut off and am 9 unable to complete my response, yes, I will 10 attempt to. 11 Q We'll try to break every hour or so. If 12 you ever need to take a break earlier than that, 13 just let me know. 14 Is that okay? 15 A Yes. 16 Q The only thing I'll ask is that we do not 17 take a break while there is a question pending. 18 Is that okay? 19 A Yes. 20 Q Is there any reason, medical or otherwise, 21 today that is preventing you from giving truthful, 22 complete, and accurate testimony?

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9 1 A No. 2 (S.S. Exhibit 1, Declaration of Stuart G. 3 Stubblebine, Ph.D. in Support of Patent Owner's 4 Response, marked for identification.) 5 Q I'm handing you a document titled, 6 "Declaration of Stuart G. Stubblebine, Ph.D. in 7 Support of Patent Owner's Response," which is 8 Exhibit 2004 in this IPR. 9 This will be marked as Exhibit 1 in this 10 deposition, but today, during this deposition, is 11 it okay if we refer to it as your declaration? 12 A Yes. 13 Q Do you recognize this exhibit? 14 A (Document review.) 15 Yes. This is the declaration that I gave 16 earlier. There may have been other appendices 17 like my vitae, but I don't recall. Was my vitae 18 attached to this? 19 Q Can you please turn to the second to last 20 page of your declaration. 21 Is that your signature above your name 22 there?	11 1 Q Are there any corrections or additions to 2 your declaration that you would like to make 3 today? 4 A Not that I'm aware of. Something may come 5 up during our discussion, but not that I'm aware 6 of. 7 Q If it does, could you please let me know 8 during that time? 9 A Well, you'll hear what I said. So, I 10 mean, I won't formally say, "This is a new 11 opinion." I'll just kind of answer your questions 12 and, you know, if it's -- so I think -- I think 13 the answer to that is no. 14 Q Can you describe for me the process you 15 took to write your declaration. 16 A Sure. 17 I had initial call with the lawyers, and 18 they said they would provide some documents. 19 And -- and so I started looking at the various 20 documents in the case, the references, 21 particularly. 22 I looked at the file history. And so I
10 1 A Yes. 2 Q Is this declaration a complete expression 3 of your opinions in this proceeding? 4 ATTORNEY EKLEM: Objection to form. 5 A When you say "expression," can you -- that 6 sounds like a legal term. Can you please tell me, 7 in laymen's term, what you're talking about? 8 Q Are all of your opinions contained in this 9 declaration? 10 A All that I can think of. There may be 11 more, you know, during the -- this -- during this, 12 you know. 13 Q Can you elaborate on other opinions that 14 may not be in there as of now? 15 A No. I'm not aware of any other opinion 16 that's needing to be in there. 17 Q Since the issuance of your declaration, 18 have you changed any of your opinions or developed 19 any new of them, opinions? 20 ATTORNEY EKLEM: Objection to form. 21 A I have -- I stand by the opinions in my 22 report. I have not changed them.	12 1 read the patent first. I looked at the file 2 history. Then I looked at other documents in the 3 case. So I kind of gradually went through the 4 documents, analyzed the -- the claims, and then 5 looked at the claims with respect to the context 6 of the patent and also the claims in the context 7 of the prosecution history. 8 Then, I don't recall exactly, but 9 somewhere around that time, I started looking at 10 the different areas associated with the other 11 report, the other declaration, Dr. Houh's 12 declaration. So I did that piecemeal, just kind 13 of starting with one set, spending some time on 14 that, providing feedback about my technical 15 opinions related to -- or technical early thoughts 16 related to the technology and what was said and 17 etc. 18 So, basically, the first technical 19 discussion of what was going on was me 20 communicating with the lawyers -- the lawyers on 21 the side of the case -- with my initial 22 impressions of the technology of what was going

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13 1 on. 2 ATTORNEY EKLEM: Caution the witness not 3 divulge any communications -- substantive 4 communications that you had with any attorneys. 5 THE WITNESS: Okay. 6 Q Did you write the first draft of your 7 declaration? 8 A Yes. I wrote the -- multiple first 9 drafts, yes. 10 Q And to what extent did counsel assist in 11 drafting the declaration? 12 ATTORNEY EKLEM: Caution -- caution the 13 witness not to divulge the substance of any 14 communications with lawyers. 15 A Okay. Can you repeat the question, 16 please? 17 Q To what extent did counsel assist in 18 drafting your declaration? 19 A I would say, the very beginning, all the 20 initial work was entirely me drafting, and then at 21 one point, I asked for a framework that I could 22 put it into or get help putting it into a	15 1 with? 2 ATTORNEY EKLEM: Objection to form. 3 I'm also going to caution the witness, to 4 the extent that the question is asking for the 5 interactions with attorneys, not to divulge the 6 substance of any communications that you had with 7 attorneys. 8 A I think all of that -- all the 9 nontechnical topics were related to communications 10 with attorneys. 11 ATTORNEY PERBOHNER: The witness had 12 mentioned he had help with nontechnical substance 13 of his declaration. So these are simply questions 14 geared towards that. 15 ATTORNEY EKLEM: So if you're asking him 16 for things that are not the substance of 17 communications with attorneys, you can ask your 18 questions. He can give you whatever answer he 19 can. 20 Q So I'll just reframe the question or ask 21 it again. 22 Did you have any help drafting
14 1 framework and reviewing the legal process to make 2 sure that -- the legal background section that was 3 in the report. 4 So adding the legal description, the 5 formatting. There may be other nontechnical 6 topics that were -- that I had help on. 7 Q And what would you consider a framework to 8 be? 9 A Just simply a template. 10 Q And what would that template be? 11 A Like the -- like just simply the -- 12 actually, I came up with the technical background. 13 I wanted this and wanted pieces in that. I think 14 adding material considered, just like the outline 15 here, scope, summary of -- 16 (Reporter clarification.) 17 A So when I'm referring to a framework, I'm 18 referring to just simply providing an outline. 19 And when I refer to an outline, it would be 20 portions of the table of contents. And that table 21 of contents changed over time. 22 Q What nontechnical topics did you have help	16 1 nontechnical topics in your declaration? 2 A What do you mean "drafting"? I just want 3 to make sure we're clear on this. 4 Q Counsel taking a pen, telling you what to 5 write down, etc. 6 A And me telling counsel what to write down? 7 Q Counsel telling you what to write down. 8 ATTORNEY EKLEM: And caution the witness 9 not to divulge the substance of any communications 10 that you had with lawyers in this case. 11 A Well, if the counsel told me to write 12 something down, then that sounds like that would 13 be subject to an issue here. 14 Q Did you find any -- let me rephrase. 15 Were the documents you cited provided to 16 you? 17 ATTORNEY EKLEM: Objection to form. 18 A We could go through one document after 19 another and we can discuss them. 20 Q In general, were the documents provided to 21 you? 22 A I -- I don't -- you said cited. I don't

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17 1 want to make a broad statement without looking at 2 each one and giving you an answer. 3 Q Did you find any other documents you 4 referenced yourself? 5 A I don't recall without looking at my 6 report. 7 Q Were you compensated to prepare your 8 declaration? 9 ATTORNEY EKLEM: Objection to form. 10 A Yes. 11 Q Could you turn to Paragraph 1 of your 12 declaration, on Page 7. 13 A Okay. I'm there. 14 Q Do you see the last sentence of the first 15 paragraph? 16 A Yes. 17 Q What is your normal hourly rate? 18 A It's \$1,025. 19 Q And what does "normal" mean to you? 20 A It's the rate that I charge all my clients 21 at that particular time. 22 Q Can you give me an example of a rate that	19 1 The Internet multimedia conferencing architecture 2 and MBONE." 3 A And the question is what, again? Was I 4 provided with -- with the exhibit? 5 Q Correct. 6 A Yes. 7 Q "Secure transport protocols for high speed 8 networks"? 9 A Yes. 10 Q Were you provided with the PacketCable 1.0 11 architecture framework? 12 A Yes. 13 Q Were you provided with RTP transport 14 protocol for realtime application? 15 A Yes. 16 Q Were you provided with Andrew S. Tanenbaum 17 "Computer Networks"? 18 A Yes, but I don't recall specifically when, 19 but I -- I don't have a really clear answer on 20 that one. But, yes, I believe so. I am familiar 21 with this reference from many years. 22 Q Were you provided with Carrier Sense
18 1 is not normal? 2 ATTORNEY EKLEM: Objection to form. 3 A I don't have -- I think the only not 4 normal would be, it was many years ago, where the 5 rate changed, and so I did have clients with 6 different rates. But since last five or ten 7 years, I've had the same rate for every client. 8 Q Can you turn to the last page of your 9 declaration. 10 Could we walk through each of these 11 references that you have as materials considered, 12 and you let me know whether these were provided to 13 you by counsel. 14 A Okay. 15 Q The first one, U.S. Patent Number 7266682? 16 A Yes. 17 Q The file history of U.S. Patent Number 18 7266682? 19 A Yes. These -- yes. I requested that. 20 Q The declaration of Dr. Henry Houh? 21 A Yes. 22 Q "Very large conferences on the Internet:	20 1 Multiple Access With Collision Detection? 2 A Yes. 3 Q Were you provided with patent owner's 4 preliminary response? 5 A Yes. 6 Q Were you provided with Transmission 7 Control Protocol RFC 793? 8 A You know, when you say "provided," I don't 9 know if I'd looked at the initial version that was 10 provided to me or whether I looked this version up 11 initially. But I did -- was provided with 12 RFC 793. 13 Q Were you provided with user data grant 14 protocol RFC 768? 15 A The same comment on that one. The same 16 response on that one. 17 Q And were you provided with MMH: Software 18 Message Authentication? 19 A I was ultimately provided -- I don't 20 recall whether I found it first or -- so I don't 21 recall. 22 Q Are you being compensated for your

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21 1 testimony you're providing today? 2 ATTORNEY EKLEM: Objection to form. 3 A I'm being compensated for all work being 4 performed in this case, as I am with other 5 clients. 6 Q Does that have the same hourly rate as we 7 discussed earlier? 8 A Yes. 9 Q Are there others you worked with to 10 prepare your declaration? 11 ATTORNEY EKLEM: Objection to form. 12 A When you say "prepare," what are you 13 referring to? 14 Q Help draft. 15 A The opinions in my report are solely my 16 opinions. In terms of putting my opinions into 17 the report, I had help with Phil. I don't know 18 whether Jaime was involved or not. I don't 19 recall. I don't believe so, but I don't recall 20 whether he was involved. 21 Q Would you ever bounce ideas off counsel? 22 ATTORNEY EKLEM: Objection to form.	23 1 A I don't know. 2 Q Is it between \$100- and \$200,000? 3 A I suspect so, but I don't know for 4 certain. 5 Q How many hours have you billed towards 6 this IPR proceeding thus far? 7 A Well, you could do the math based on the 8 estimated number of hours I've spent. 9 Q I'm asking you today, can you give me that 10 estimate? 11 A Okay. Can you ask me the complete 12 question, please? 13 Q How many hours have you billed towards 14 this IPR proceeding thus far? 15 A I don't know. 16 Q Can you give me an estimate? 17 A No. It's kind of a can-do, what we were 18 just talking about. 19 Q Could you do that math for me? 20 A No. I don't have access to -- I don't 21 have those records. 22 Q If I refer to patent owners as
22 1 And caution the witness not to disclose 2 the substance of any conversations you had with 3 counsel. 4 A I would say all -- as far as I'm aware, 5 all technical ideas originated with me, and I 6 would explain the technology and -- so that's -- 7 would be the general nature of interaction. 8 Q Did you have assistance from any students 9 or others who worked at Ssnology? 10 A No. 11 Q How much have you billed, in dollars, 12 towards this IPR proceeding thus far? 13 A I don't know. 14 Q Could you give me a rough estimate? 15 A It would be tough to speculate. 16 Q Is it more than \$10,000? 17 A Yes. 18 Q Is it more than \$50,000? 19 A Yes. 20 Q Is it more than \$100,000? 21 A I believe so. 22 Q Is it more than \$200,000?	24 1 VL Collective IP and VideoLabs Inc., as VideoLabs 2 during this deposition, will you understand that? 3 A Yes. 4 Q When did VideoLabs or someone on behalf of 5 VideoLabs first reach out to you in correlation 6 with this patent? 7 A I don't recall. 8 Q Could you give me an estimated year? 9 A It was -- it was this year. I believe it 10 was this year. 11 Q And do you remember which month? 12 A It was early in the year, but I don't 13 recall when. 14 Q Is it fair to say January or February? 15 A I -- yes, it was -- let me see in my 16 report. 17 Quite likely. 18 Q Who reached out to you? 19 A I got an email. I don't remember who sent 20 it. It was likely Phil, but I don't recall who 21 sent it. 22 Q And prior to Phil reaching out to you,

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25 1 were you aware of the '682 patent? 2 A No. 3 Q Were you aware of VideoLabs? 4 A No. 5 Q Did you have any relationship with any 6 VideoLabs employees prior to them reaching out to 7 you for this patent? 8 ATTORNEY EKLEM: Objection to form. 9 A I think the way that you phrased that, 10 it's a little bit confusing. Can you give me the 11 question again, please? 12 Q Did you have any relationship with any of 13 the employees at VideoLabs prior to them reaching 14 out to you? 15 ATTORNEY EKLEM: Same objection. 16 A I think you assume that VideoLabs reached 17 out to me. What I -- what I had said was, one of 18 the lawyers reached out to me. 19 Q Okay. So I think we're conflating 20 counsel's firm and VideoLabs here. 21 A Okay. 22 Q So let me be clear for specifically the	27 1 heard of, but not Meta Platforms Technologies LLC. 2 Q And were you aware of Jiffy Inc.? 3 A Jiffy, I have not. Jiffy Inc. 4 Q Have you heard of Facebook, generally, 5 before your first communication? 6 A If I heard of what? 7 Q Have you heard of Facebook, generally? 8 A Yes. 9 Q Do you have a personal Facebook page? 10 A Does that matter? Does that matter in 11 this -- I thought that we were going to be talking 12 about my report and not necessarily personal 13 issues related to me. So if that's not necessary, 14 I'd prefer not to answer. 15 Q Well, I'll ask you again. 16 Do you have a personal Facebook page? 17 ATTORNEY EKLEM: Objection to scope. 18 Asked and answered. 19 A Yeah, I feel like I've answered that. I 20 feel uncomfortable in answering personal 21 questions. 22 Q Do you have an opinion on Facebook?
26 1 two entities VideoLabs. 2 Did you have any relationship with any of 3 the employees at VideoLabs, not at Reichman 4 Jorgensen? 5 A I don't know who is an employee at 6 VideoLabs. I don't believe I've had any 7 interaction with them. 8 Q Prior to you being reached out for the 9 '682 patent, were aware of Meta Platforms? 10 A Yes. I'm aware of Meta, but not Meta 11 Platforms. 12 Q Were you aware of Instagram Inc.? 13 A No. I'm aware of Instagram, but not 14 Instagram Inc. The same answer. It could have 15 been another company that has Instagram. So I 16 don't... 17 Q Were you aware of WhatsApp LLC? 18 A Same answer. I've heard of WhatsApp, but 19 not WhatsApp LLC. 20 Q Were you aware of Meta Platforms 21 Technologies? 22 A Same answer. But in this case, Meta I've	28 1 ATTORNEY EKLEM: Objection to scope. 2 A Opinion about what? 3 Q Opinions, generally, on the product 4 Facebook. 5 A No. 6 ATTORNEY EKLEM: Objection to form and 7 scope. 8 A I'm sorry. Can you repeat the question? 9 And I think I was over-talking the attorney. 10 Q Do you have any opinions, generally, on 11 the product Facebook? 12 ATTORNEY EKLEM: Objection to form and 13 scope. 14 A That's not something I was asked to opine 15 on, and I haven't formed an opinion on it. 16 Q Do you have a professional Facebook page? 17 ATTORNEY EKLEM: Objection to form and 18 scope. 19 A That's not something I've opined on or I 20 gave an opinion on or it's not in my report. 21 Q Have you done work like this in the past, 22 as being an expert witness?

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29 1 ATTORNEY EKLEM: Objection to form. 2 A Have I been an expert witness before, is 3 the question? 4 Q Correct. 5 A On my vitae, you can see various cases 6 I've been involved in. Yes. 7 Q Did you charge the same rate in those 8 other matters? 9 A My rate changes over time. It increases 10 with inflation. 11 Q Do you have any prior experience with 12 VideoLabs? 13 A None that I'm aware of. 14 Q Do you have any prior experience with any 15 of the founders of VideoLabs, including Joe 16 Chernesky? 17 ATTORNEY EKLEM: Objection to form. 18 A I've never -- I don't recall ever hearing 19 that name before. 20 Q Do you have any prior experience with Bill 21 Goldman of VideoLabs? 22 ATTORNEY EKLEM: Objection to form.	31 1 A Not that I recall. 2 Q Have you had any prior experience with 3 Reichman Jorgensen Wayne and Feldberg? 4 A Can you clarify that? 5 Q Have you ever been retained by Reichman 6 Jorgensen before? 7 A No. 8 Q Have you ever had any interactions with 9 Reichman Jorgensen before? 10 A No. Not that I recall. 11 Q Did you do anything to prepare for your 12 deposition today? 13 A Yes. 14 Q What did you do? 15 A I started last week reviewing my 16 declaration and reviewing the exhibits that I 17 opined on. 18 Q Did you -- 19 A I'm not sure if I reviewed all of the 20 exhibits, but I reviewed some of the exhibits that 21 I opined on. 22 Q Do you remember which exhibits?
30 1 A Did you ask whether I've ever heard of 2 this person? 3 Q Any prior experience with them. 4 A When you say "prior experience," in 5 dealing with this person? Is that what you're 6 referring to? 7 Q Correct. Have you ever interacted with 8 Bill Goldman? 9 A Not that I recall. 10 Q Do you know who Bill Goldman is? 11 A No. 12 Q Do you have any prior experience with Ira 13 Bloomberg? 14 ATTORNEY EKLEM: Objection to form. 15 A When you say "experience," what do you 16 mean? 17 Q Any interactions. 18 A Not that I know of. 19 Q Do you know who Ira Bloomberg is? 20 A No. 21 Q And I'll go back. 22 Do you know who Joe Chernesky is?	32 1 A The patent. The Hanley reference. The 2 Basturk reference. PacketCable reference. RTP. 3 I believe just those. 4 Q Did you do -- did you meet with anyone to 5 prepare for your declaration today? 6 ATTORNEY EKLEM: I'm going to caution the 7 witness not to divulge any -- the substance of any 8 communication you had with any attorneys. 9 A Yes. This week, I met with Phil and 10 Jaime. 11 Q How long did you meet with them for? 12 A I think, yesterday, it was until 2:00 or 13 so, somewhere around there, in the morning until 14 2:00. I don't recall on Monday. 15 Q Was there anyone else, other than counsel, 16 present at that meeting? 17 A No. 18 Q Did you talk to anyone else, other than 19 counsel, at that meeting? 20 A No. 21 Q Other than counsel, have you discussed the 22 substance of your declaration with anyone else,

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33 1 for example, VideoLabs personnel or other experts? 2 A No. 3 Q Did you review any documents that are not 4 already exhibits or pleadings in this proceeding? 5 ATTORNEY EKLEM: I'm going to caution the 6 witness not to divulge the substance of any 7 communications you had with counsel. 8 You can answer that question "yes" or 9 "no." 10 A Can you repeat the question, please? 11 Q In preparation for your declaration, did 12 you review any documents that are not already 13 exhibits or pleadings in this proceeding? 14 A I don't believe so. I don't recall -- I 15 don't recall any. 16 Q After your declaration was submitted in 17 this proceeding, did counsel provide you with any 18 other information that you are relying on for your 19 opinions? 20 ATTORNEY EKLEM: I'm going to caution the 21 witness not to divulge the substance of any 22 communications you had with counsel.	35 1 Q Did you review the patent owner's 2 preliminary response filed in this proceeding? 3 A Yes. 4 Q Did your review include any declarations 5 submitted by Dr. Houh? 6 A Yes. The third element in my materials 7 considered was his declaration, and that was a 8 primary focus of what my report was addressing. 9 I say "report," but sometimes I'll say 10 "report" instead of "declaration," if we're okay 11 with that. 12 Q Sure. 13 Do you know who Dr. Houh is? 14 A I don't recall ever meeting him. 15 Q Have you ever been opposed to Dr. Houh in 16 any case previously? 17 A Not that I recall. 18 (S.S. Exhibit 2, Stubblebine Curriculum 19 Vitae, marked for identification.) 20 Q I'm handing you a document titled, "Stuart 21 Stubblebine CV," which is Exhibit 2005 in this 22 IPR. This will be marked as Exhibit 2 in this
34 1 A My opinion is my declaration, so -- and I 2 cited the materials I considered. 3 Q Are you aware your declaration was 4 submitted alongside patent owner's response to the 5 Patent Trial and Appeal Board? 6 A When you say "alongside," do you mean -- 7 I'm not sure what you mean by that. 8 Q Submitted with. 9 A I think I knew that they were submitting 10 something, but I didn't know it was submitted 11 with. 12 Q Did you review the petitioners' IPR filed 13 in this proceeding? 14 A I looked at the patent owner's preliminary 15 response, if that's what you're referring to. 16 Q This would be the first -- this would just 17 be -- you can consider it -- call it the petition, 18 the petition of the '682. 19 A I don't recall. 20 Q Do you remember seeing the '682 petition? 21 ATTORNEY EKLEM: Objection to form. 22 A No.	36 1 deposition. 2 Do you recognize this document? 3 A This is my vitae. I notice now at the 4 top, it says, "Stubblebine Consulting Inc." It 5 should be "Ssnology LLC." 6 Q Okay. Can you describe your educational 7 experience? 8 ATTORNEY EKLEM: Objection to form. 9 A On Page 15 of this exhibit, I list the 10 degrees I've had and other education that I've 11 had. 12 Q Do you have a bachelor's degree? 13 A Yes. In 1983, I have a bachelor's of 14 science with -- from Vanderbilt University, with a 15 double major in computer science and mathematics. 16 Q Do you have a master's degree? 17 A Yes. I've got a master's in electrical 18 engineering from the computer -- with a -- 19 basically, the focus there was computer 20 engineering and networking. 21 Q Do you have a Ph.D.? 22 A Yes. I have a Ph.D. from the University

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37 1 of Maryland in electrical engineering. My focus 2 was computer engineering. And my dissertation was 3 on message integrity and cryptographic protocols. 4 Q And where do you currently work? 5 A I'm the sole employee. So I work wherever 6 I am. 7 Q You mentioned before that the top of your 8 résumé should be noted as Ssnology; is that 9 correct? 10 A LLC, yes. 11 Q What is Ssnology LLC? 12 A I changed the name of my company because 13 of the -- because I'm winding down in the amount 14 of expert work I'm doing and -- I changed the name 15 of my company because it was easier to do 16 accounting and other filings using an LLC as 17 opposed to an Inc. And that's the only 18 significant change between the two. 19 Q What kind of work does either Ssnology or 20 Stubblebine Consulting Inc., do? 21 A The only clients focus to technology 22 consulting.	39 1 of mine is -- is the correctness of design and 2 analysis according to the correctness of the 3 networking protocol, which is basically a security 4 protocol. 5 And so I would do that for various 6 companies, and I would ultimately often help them 7 redesign the protocol to make it secure. So that 8 was really the early aspects of my company. 9 Q Now let's move to Ssnology LLC. 10 Could you differentiate the difference 11 between Ssnology LLC and Stubblebine Consulting in 12 terms of work provided? 13 A I wanted to mention something I just 14 noticed. Maybe it's on another area here. 15 But I also had Stubblebine Research LLC. 16 That was, basically, roughly, in the early 2000s, 17 for maybe -- I don't know the number of years -- 18 maybe five or eight. I don't know. And that was 19 a separate -- do you want me to explain what that 20 was? 21 Q Yes, please. 22 A Okay. I think, when I edited this
38 1 Q What does technology consulting entail? 2 A Well, when you're talking about Ssnology, 3 are we also referring to Stubblebine Consulting 4 Inc.? 5 Q Let's start with Stubblebine Consulting 6 Inc. 7 A Okay. I think a description includes, on 8 the bottom of Page 1 of my vitae, where I did -- 9 have done independent consulting, specialized in 10 computer network security, evaluations, detail 11 design, formal analysis, applied research, 12 technical due diligence reviews, intellectual 13 property, and expert witness services. 14 So, for example, in the 2000 time frame, I 15 was primarily focusing on design and analysis of 16 security and networking protocols with the focus 17 on security and cryptography. 18 And mostly -- most of my projects at that 19 time were involved going into an organization 20 and -- normally, going into a security company and 21 analyzing the security of their protocols, whether 22 they were actually correct. That's an expertise	40 1 document, I somehow lost that aspect in -- in the 2 title. Because I added Ssnology, and I think I 3 may have dropped off Stubblebine Research LLC. 4 But, again, it may be in here. I just don't see 5 it. I wanted to make sure you're aware of my past 6 experience. 7 Q Understood. 8 A And then I think you -- can you repeat the 9 question? 10 Q The difference between Ssnology LLC and 11 Stubblebine Consulting. 12 A Okay. So ignore Stubblebine Research LLC. 13 Q Sure. 14 A Okay. It's the same consulting practice. 15 So I -- I did this as a -- to simplify my 16 accounting, for the most part, my filing. 17 Q Would you consider the underlying work to 18 be the same, though? 19 A Yes. All my consulting projects are 20 focused in a similar area. So all my income is 21 derived from consulting. But, again, my 22 consulting has changed over time, what I've been

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41 1 doing. 2 Q How has your consulting evolved over time? 3 A Initially, it was primarily focused in 4 what's described. But I notice I say here, also 5 applied research, and I think that brings into 6 what I was doing previously under Stubblebine 7 Research LLC, where I got NSF grants and NIS 8 grants – National Science Foundation grants and 9 NIS grants to do research. And so that's where 10 that applies. But that was a part of – I listed 11 it under consulting, but that was a part of the 12 Stubblebine Research Labs LLC, and I think it just 13 got missed. But, again, that was a while ago. I 14 think that just got missed on the front – on the 15 first line. 16 And how Stubblebine Consulting LLC versus 17 Ssnology has evolved is that I primarily do – 18 Ssnology was since 2023, and since that time, my 19 projects have been – my consulting projects have 20 been just simply expert witness service. 21 Q Could you turn to Page 7 of your CV, where 22 you have listed litigation support experience.	43 1 depositions in my vitae, we would arrive at the 2 number. 3 Q Is it more than ten? 4 A Yes. 5 Q More than 20? 6 A I believe so. 7 Q More than 30? 8 A I don't know. 9 ATTORNEY PERBOHNER: Is now okay for a 10 quick break? 11 ATTORNEY EKLEM: If you'd like. 12 (Recess.) 13 BY ATTORNEY PERBOHNER: 14 Q I'd like to quickly revisit where you 15 currently reside. 16 Where is your current home address? 17 A I don't understand why that's relevant. 18 Q Where would you consider to be your home 19 address, currently? 20 A I don't understand why that's relevant to 21 this case. 22 Q It's simply just background information
42 1 Have you been an expert witness before? 2 A Yes. 3 Q How many times? 4 A I list many in this – in my vitae. I 5 haven't counted them. 6 Q Could you give me a rough estimate? 7 A No, not really. 8 Q Have you ever been opposite to Meta or any 9 of the parties in this IPR? 10 ATTORNEY EKLEM: Objection to form. 11 A Can you repeat the question? 12 Q Have you ever been opposite to Meta or any 13 of the other parties in this IPR? 14 A I don't recall being opposite to the 15 parties that are listed as petitioners on my 16 declaration. 17 Q Have you ever been deposed before? 18 A Yes. 19 Q How many times? 20 A I list when I've been deposed, or I try to 21 keep it up to date, in my litigation experience. 22 So I think if you just simply count the – the	44 1 I'm trying to elicit. 2 A I don't see that as being relevant to my 3 opinions in the report. As I said, I'm a Florida 4 resident. Divulging my home address isn't 5 something necessary. I understand this proceeding 6 is public record, and I don't care to divulge 7 that. 8 Q Do you have a business address? 9 A No. I – it's wherever I am, I'm working. 10 I do have – actually, I do have a business 11 address. I have a registration for my business. 12 Q Where is that? 13 A It's in Florida. 14 Q Is it fair to say you currently reside in 15 Poland? 16 A I – again, where – I'm a resident of 17 Florida. I travel. 18 Q Is it fair to say that your expert 19 declaration discusses the prior art in this 20 petition for inter partes review? 21 ATTORNEY EKLEM: Objection to form. 22 A Can you repeat the question, please?

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45 1 Q Is it fair to say that your expert 2 declaration discusses the prior art in the 3 petition for inter partes review? 4 ATTORNEY EKLEM: Objection to form. 5 A I prefer to say references because I use 6 the references that were in Dr. Houh's report. 7 Q Was one of those references "Secure 8 Transport Protocols for High-Speed Networks," also 9 known as Basturk? 10 A That's exhibit – I reviewed Exhibit 1006, 11 that reference, which was in Dr. Houh's report. 12 (S.S. Exhibit 3, Document Entitled, Secure 13 Transport Protocols for High-Speed Networks, 14 marked for identification.) 15 Q So I'm handing you a document titled, 16 "Secure Transport Protocols for High-Speed 17 Networks," which is Exhibit 1006 in this IPR. 18 If it's okay with you, can we refer to 19 this exhibit as "Basturk" in our deposition today? 20 A Okay. 21 Q Are you familiar with Basturk? 22 A Yes.	47 1 transport level security. And the focus is 2 secured delivery. 3 And I have a definition for "secured 4 delivery," but they say, "Secured delivery, 5 roughly speaking, is a guarantee to the Sender A 6 that his message was received by B and not 7 intercepted and destroyed by the adversary." It 8 is "essentially an extension of the standard 9 transport level reliability feature to the more 10 adversarial settings we're discussing, which is 11 why it seems as the most natural way to view it as 12 the transport level security." 13 So their focus was – 14 Q And where are you reading from right now? 15 A I'm sorry. I'm reading from Meta 16 Exhibit 106 – 1006, Page 4, the second paragraph 17 from the top, where it says, "Transport level 18 security features and secured delivery." 19 Q Thank you. 20 A And so, to be specific with your question, 21 it's about designing a secured delivery protocol. 22 And they describe what the secured delivery
46 1 Q When is the first time you recall reading 2 Basturk? 3 A When I began this project, I believe, was 4 the first time I read this. 5 Q And this was in approximately January or 6 February? 7 A It was – I believe it was in early this 8 year. 9 Q When is the last time you reviewed 10 Basturk? 11 A Yesterday. 12 Q What is Basturk? 13 ATTORNEY EKLEM: Objection to form. 14 A That's a very broad question. 15 Q Generally, what is Basturk about? 16 ATTORNEY EKLEM: Objection to form. 17 A I could give you what they say it's about. 18 Is that what you're asking? 19 Q Sure. 20 A So I discuss this on Page 57 of my report. 21 And the focus is on solving a problem, of 22 transport level security, in particular, of secure	48 1 protocol is here. 2 Q Can you turn to Page 1 of Basturk. 3 A Are you going to be using the Meta? I 4 guess it's the same number, so just – but 5 throughout the – you're always going to be 6 referring to the actual page number or the – this 7 one, it's the same, but I'm just... 8 Q The Meta one. 9 Do you see at the bottom of Page 1 where 10 it states, "IBM TJ Watson Research Center"? 11 A Yes. 12 Q Are you familiar with the IBM TJ Watson 13 Research Center? 14 A Yes. 15 Q How are you familiar? 16 A I have known security researchers that 17 were at TJ Watson. 18 Q What kind of work does IBM TJ Watson 19 Research Center do? 20 ATTORNEY EKLEM: Objection to form and 21 scope. 22 A I want to also add that I consulted for

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49 1 IBM when I was in grad school. They paid for part 2 of my -- they were sponsoring my advisor and 3 myself related to my initial research, and I think 4 that's probably when I first heard of TJ Watson, 5 but I don't recall. But being more familiar with 6 the security research within IBM. 7 Q So is IBM TJ Watson Research Center 8 separate from where you consulted or worked for? 9 A Yes. I was at the federal systems 10 division, which was in Gaithersburg, Maryland, at 11 the time. 12 Q And just generally, what does IBM 13 TJ Watson Research Center do? 14 ATTORNEY EKLEM: Objection to form and 15 scope. 16 A That's not been the focus of my report. I 17 don't have an opinion on that. 18 Q Are you familiar with any of their 19 research? 20 A I think one of the issues here is that I'm 21 familiar with IBM research, but I don't always 22 keep track of which research center they're at.	51 1 really don't look at which location IBM they're 2 from. 3 A little bit with -- except for Zurich, 4 because I know more closely at least one of the 5 researchers in Zurich, back then, at the time. 6 Q Is it fair to say it's possible you've 7 read IBM TJ Watson Research Center papers before? 8 ATTORNEY EKLEM: Objection to form. 9 Scope. 10 A That's not something I've opined on in my 11 report. I don't... 12 Q Sitting here today, you can't -- you don't 13 know if you've read a paper from IBM TJ Watson 14 Research Center? 15 A Correct. 16 Q Have you read papers from the IBM Research 17 Center that you noted is in Zurich? 18 A Yes, I think, but I'm not -- I know it was 19 IBM Zurich, and I know there were researchers. 20 I'm not sure what they call the organization 21 there. 22 Q Basturk was utilized as a prior art
50 1 They have a center in Zurich. They have TJ 2 Watson. I think they've got -- so I don't -- for 3 that particular, I'm not really up to speed on it. 4 Q Is it fair to say that the IBM TJ Watson 5 Research Center publishes documents? 6 ATTORNEY EKLEM: Objection to form. 7 Scope. 8 A I don't know. 9 Q Have you read research papers from IBM 10 TJ Watson Research Center? 11 ATTORNEY EKLEM: Objection to form and 12 scope. 13 A That's not something I opined on in my 14 report. I don't know whether I have. 15 Q You can't recall if you've ever read an 16 IBM research paper specifically -- 17 A Research paper or -- 18 Q -- specifically for TJ Watson Research 19 Center? 20 A Again, I don't recall. I recall -- I 21 think, when I go to conferences and I see, you 22 know, someone give a presentation from IBM, I	52 1 reference in this petition, correct? 2 ATTORNEY EKLEM: Objection to form. 3 A I want to make sure -- I'm sorry. I want 4 to make sure I clarify the last question. 5 What I looked at is conference papers. 6 Those aren't necessarily the same thing as -- as, 7 you know, publication by IBM. So I'm looking at 8 conference papers is when I look at papers. 9 So when I made that reference to IBM 10 Zurich, I'm referring to publications and 11 conferences where those were authors, and whether 12 it was a publication of IBM, I don't know. 13 Q So I'll ask my last question again. 14 Basturk was utilized as a prior art 15 reference in this petition, correct? 16 ATTORNEY EKLEM: Objection to form. 17 A It's my understanding that it's an exhibit 18 that was a part of Dr. Houh's report, and I didn't 19 do any analysis to determine whether it's a prior 20 art reference. There is an exhibit I need to look 21 at. 22 Q Can you please turn to Page 2 -- Page 7 of

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53 1 your declaration, at Paragraph 2. 2 Do you see the third sentence that starts 3 with, "I have also been asked to provide 4 opinions"? 5 A Third sentence from the top? 6 Q Correct. In Paragraph 2. 7 A Oh, in Paragraph 2. I don't see "also," 8 but -- oh, there it is. The third sentence. "I 9 have also been." Yes. 10 Q And do you see in that same sentence where 11 it states, "Petitions alleged prior art 12 references"? 13 A Yes. 14 Q Is Basturk one of those prior art 15 references? 16 ATTORNEY EKLEM: Objection to form. 17 A What I know is that Basturk, the exhibit, 18 was attached to Dr. Houh's report, and that's what 19 I used to do my analysis. One of the references I 20 used. I used the other references that were 21 listed as material considered. 22 Q In reading Basturk, do you recall reading	55 1 A No. 2 Q It is not fair to say it's used in 3 multiple sections? 4 A No. I answered with respect to the pages 5 you gave me. I haven't looked in other places in 6 the report. I just simply looked at the pages you 7 gave me. 8 Q Would you consider Section 2.1 to be 9 different than Section 2.2? 10 A I would say 2.1 and 2.2 are subsections. 11 I would say there are all these issues -- all 12 these subsections are related -- are under the 13 Section 2, which is design of a secured transport 14 protocol, with respect to Pages 7 and 8, and then, 15 I believe, also on Page 12. That's subsection of 16 2.5. 17 Q Is it fair to say that Basturk is used in 18 multiple subsections of this -- of "on the fly" is 19 used in multiple subsections of Basturk? 20 A They're also on different lines, but it's 21 basically all a part of the design of secured 22 transport protocols. It's used just in those, on
54 1 the term "on the fly"? 2 A Yes. 3 Q Is it fair to say that the term "on the 4 fly" is used multiple times throughout Basturk? 5 ATTORNEY EKLEM: Objection to form. 6 A I haven't counted. I don't know. 7 Q Is it used multiple times? 8 A Do you want me to look in the -- 9 Q Yes. 10 And I can direct you to the Page Number 7, 11 8, and 12. 12 A (Document review.) 13 Okay. I looked at just the pages you 14 referenced. I think it was 8, 9, and 12? 15 Q 7, 8, and 12. 16 A Yeah, 7, 8, and 12. And on those, I see 17 three on Page 7 that are close to each other, one 18 on Page 8, and two on Page 12 is what I see so 19 far. 20 Q Is it fair to say the term "on the fly" is 21 used in multiple sections of Basturk? 22 ATTORNEY EKLEM: Objection to form.	56 1 the pages you showed me. 2 Q Is "on the fly" used in multiple 3 subsections: Yes or no? 4 A I believe I answered that question. 5 Q And that answer is? 6 A There -- I only am looking at the pages -- 7 numbers that you gave me, and with those page 8 numbers, they are found within one section, the 9 design of secured transport protocol, and under at 10 least two subsections. 11 Q So I'm just asking a yes-or-no question. 12 Are they used in -- is the term "on the 13 fly" used in separate subsections? 14 A I answered that. 15 Q Is that a "yes" or a "no"? 16 A They're in multiple subsections of a 17 single section called, "Design of Secured 18 Transport Protocol." So I just basically said, 19 yes, they are within the same section. 20 Q Prior to reading Basturk for the first 21 time, had you heard of the term "on the fly" 22 before?

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57 1 ATTORNEY EKLEM: Objection to form. 2 A I may have. I don't recall the context. 3 Q Does the term "on the fly" have any 4 connotation to you? 5 ATTORNEY EKLEM: Objection to form. 6 A What's the context you're referring to? 7 Q That you've heard previously, before 8 Basturk. 9 A Like I said, I don't recall particular 10 context -- 11 (Inaudible; reporter clarification.) 12 A I don't recall the context that I've heard 13 of "on the fly" in the past. 14 Q Prior to reading Basturk, did "on the fly 15 have any particular meaning to you? 16 ATTORNEY EKLEM: Objection to form. 17 A I haven't assigned a meaning to it prior 18 to reading Basturk, or even considered it. 19 Q In an everyday sense, what would "on the 20 fly" mean to you? 21 ATTORNEY EKLEM: Objection to form and 22 scope.	59 1 ATTORNEY EKLEM: Objection to form. 2 A That's not something I've opined on in my 3 report, and I don't have a technical definition or 4 meaning for it. 5 Q Have you ever seen the phrase "on the fly" 6 in other technical papers before? 7 ATTORNEY EKLEM: Objection to form and 8 scope. 9 A I haven't opined on that. And you're 10 talking, again, outside my report or the papers in 11 this case, that's not something I've opined on, 12 and I don't recall seeing it in a technical paper. 13 Q I'll ask one more time, just because 14 you're serving as a technical expert in this IPR 15 proceeding. 16 Have you ever seen the term "on the fly" 17 used before in any other technical reports? 18 ATTORNEY EKLEM: Objection to form and 19 scope. Asked and answered. 20 A I think, like I said, you're asking beyond 21 the paper -- the exhibits and my report and my 22 opinion. I don't recall ever seeing a technical
58 1 A So you're saying outside -- outside my 2 report and the references? 3 Q Correct. 4 ATTORNEY EKLEM: Sorry. Same objections. 5 A That's not something I've opined on, and I 6 haven't considered that. 7 Q If you had to create a definition of "on 8 the fly," generally, what would you give it? 9 ATTORNEY EKLEM: Objection to form and 10 scope. 11 A Are you considering outside my declaration 12 and the materials in this case? 13 Q Correct. 14 ATTORNEY EKLEM: Same objections. 15 A I don't -- I don't have one. 16 Q If someone used the term "on the fly," 17 would you know what they meant? 18 ATTORNEY EKLEM: Objection to form and 19 scope. 20 A No. I would have to look at the context. 21 Q Does the term "on the fly" have a 22 technical meaning to you?	60 1 paper with "on the fly," no. 2 Q Did any previous understanding the term 3 "on the fly" guide your opinions in your report? 4 ATTORNEY EKLEM: Objection to form and 5 scope. 6 A That's not something I opined on. I would 7 look at the context and -- look at the context of 8 Basturk, I would look to that to see what they 9 mean by "on the fly." 10 Q Did you use any other documents other than 11 Basturk to guide your meaning of "on the fly" in 12 your declaration? 13 ATTORNEY EKLEM: Objection to form. 14 A To guide the meaning. 15 My focus was to look at what was in 16 Basturk. I believe that Dr. Houh mentioned "on 17 the fly" as well. Those are the only two 18 references that I recall having "on the fly" in 19 it, and I looked at them. 20 Q In terms of Basturk, what does "on the 21 fly" mean to you? 22 A I discussed this in my report, including

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61 1 Pages 72 to 81. And in this context, I give 2 citations or quotes from Basturk. And I say, 3 "Basturk suggests performing the transport level 4 security computations, i.e., signature generation 5 and verification or encryption to encryption." 6 And in this case, he's talking about 7 symmetric key-based signature generation, which 8 uses a key that is a brand-new session key 9 particular to two parties to be communicated. 10 So that's what signature generation here 11 is. So it's not asymmetric signatures or 12 symmetric signatures between two parties in a 13 manner that's called "on the fly." When the 14 requirements for enabling on the fly computations, 15 signature computation that starts before the 16 retrieval of connection context. 17 And so, again, we're talking about 18 symmetric signature computation starts before the 19 retrieval of a connection context for messages 20 received by a receiver. 21 And I give a citation at Page 8. I give 22 multiple citations on Page -- Exhibit Page 8 and	63 1 computations to be carried out on the fly as data 2 being transmitted or received." 3 And it says, "This minimizes latency." 4 So he's referring to not only 5 transmitting, but also receiving, such as 6 receiving an ACK. "When applied to security 7 functions such as signature generation and 8 verification encryption, on-the-fly processing 9 several has implications." 10 He goes on to say he'd -- 11 "For example, we would like decryption and 12 receive packets to proceed independently of that 13 of any other packet and note that this allows 14 parallelization, as packets may be received out of 15 order." 16 And he goes on to say, "Computation of 17 cryptographic functions can be greatly sped up by 18 using hardware but does not require hardware to be 19 available." 20 And then he gets more down to the details 21 as to what he summarizes to be timely and 22 on-the-fly security computations, at Exhibit 1006,
62 1 Exhibit Page 6. 2 And he discuss -- discusses wanting to 3 increase processing about security that has the 4 potential to degrade performances is the initial 5 processing requirement required by security 6 functions, such as" -- and then goes on to say, 7 "It's most significant for long connections as it 8 applies to all state transitions." 9 So, essentially, he's saying that this 10 includes, for all communications, both -- you 11 know, each state transition implies doing 12 computation such as analogy messages and reliable 13 protocol. 14 And then he says there's some rules that 15 can be followed to limit the impact. 16 And he says -- and when I say "he," I mean 17 "they" or the paper. 18 The main one is, "All computations should 19 be performed in the most timely fashion possible. 20 It's important to ensure that nothing slows down 21 or delays this additional processing." 22 It says, "In all instances, we would like	64 1 at Page 8, and he says, "Both signature 2 computation" -- so, again, this is symmetric 3 signature computation -- "and 4 encryption-decryption." 5 So, for example, you'd have to decrypt the 6 pairwise key or encrypt it or decrypt. And 7 symmetric signature computation, you would also 8 have to decrypt the -- or encrypt the message 9 authentication code. Whereas, an asymmetric, you 10 would use asymmetric cryptography. 11 On the use of secret information, a key. 12 So he's referring to symmetric cryptography for 13 use of a secret key that's shared by two 14 communicating parties. 15 So it's basically saying, for every two 16 parties, you -- every party you communicate with, 17 you have a separate key, and you need to be able 18 to do -- use that key for signature computation or 19 verification and encryption-decryption. 20 Then it says, "Retrieval of this 21 information is therefore necessary for such 22 processing."

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65 1 So you basically -- what he's saying here 2 is, basically, you need to retrieve the key -- a 3 key that can be used in this process. And the key 4 depends upon the two particular parties you're 5 communicating with. 6 "While one key assumes its immediately 7 availability when transmitting data, it must 8 typically be retrieved upon receipt of the packet, 9 and in this context, retrieval step can 10 introduce" -- 11 Q If it's okay, we also have our expert 12 listening as well. So maybe just -- 13 A "Retrieval of this information, therefore, 14 is necessary for such processing. While one can 15 assume it's immediately available when data -- in 16 transmitting data, it typically must be retrieved 17 upon receipt of a packet, and this context 18 retrieval step can introduce latency." 19 So, for example, what he's basically 20 saying here is, when you have a shared key with 21 someone who sends you something, you need to be 22 able to -- to retrieve that key so you can use it	67 1 the context retrieval. And then he summarizes 2 this. 3 "To summarize, requirement for timely and 4 on-the-fly security computation translates into 5 three specific design rules. Signature 6 computation before the retrieval of a context -- 7 connection context." 8 And then the second -- so this is doing at 9 least some part of the signature without 10 retrieving, doing the context to figure out even 11 who you're convening with and using a particular 12 key, or not necessarily knowing which key is to be 13 used to do the entire signature computation. You 14 still need to retrieve the key to do it. 15 And Number 2, packets are independently 16 encrypted. 17 And Number 3, hardware utilization is 18 facilitated whenever possible. 19 And he gets more into the details by what 20 he means by this in Exhibit 1006, at 12, 13, and 21 15 through 16. 22 Q In your opinion, what does "on the fly"
66 1 in the process of signature verification and 2 decryption. And so that's what he's referring to 3 here is context retrieval is retrieving 4 information related, necessary to retrieve the 5 key. 6 So the context is, what key you need to 7 use, in this particular example, upon receipt of 8 the packet. And this context retrieval step can 9 introduce latency. 10 So, for example, if you need to go find 11 the key, you may have to do a database lookup, or 12 you may have to go somewhere to find where the key 13 is. And the key that's used in the process is 14 "therefore useful to design security functions in 15 a particular signature computation which allow 16 processing to start immediately upon arrival of 17 data without waiting for the associate context 18 retrieval to complete." 19 So -- and design the security function of 20 the actual cryptographic signature of course it's 21 important to consider, is what he says, to 22 basically start processing even before you receive	68 1 mean as used in Basturk? 2 ATTORNEY EKLEM: Objection to form. 3 A On Exhibit 1006, has multiple steps. So 4 on Exhibit 1006, 12, 13, and 15, it -- one aspect 5 of it is reducing the context latency by putting 6 the context information early in each packet; 7 namely, in a security segment in the packet's 8 header. 9 So just to be clear, what we're talking 10 about here is, if you need to retrieve a key to do 11 the signature computation or encryption or 12 decryption, you would put some identifying 13 information related to the key very early in the 14 communication. So that's one aspect. 15 And then the second component I discuss on 16 Paragraphs 86 of my report, on Page 78, is the 17 nature of the computations themselves. 18 So second component for achieving 19 on-the-fly processing is the nature of the 20 communications themselves; meaning, MAC 21 computations are kept simple and can start prior 22 to context retrieval.

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69 1 And when they're talking here, MAC 2 computations, they're talking about 3 symmetric-based message authentication codes are 4 kept simple. And when he's saying "simple," he's 5 referring to not using complex computations to 6 perform the MAC computation. 7 And an example of something you wouldn't 8 use would be an asymmetric signature. He's 9 referring to special MAC computations that are 10 simple. 11 And then an important aspect of this is to 12 be able to do the MAC computation prior to the 13 context retrieval is that it's got to be a very 14 special type of MAC that computing the function 15 includes a hash function, but it depends neither 16 on or nor on the cryptographic primitive chosen to 17 basically doing the -- to completing it. 18 So it has a hash function that doesn't -- 19 essentially, doesn't depend upon the key used in 20 the context retrieval. 21 So, again, you can start running this hash 22 function. It's something that has the right	71 1 Q Which form of latencies are you aware of 2 in Basturk? 3 A There is the latency with respect to 4 context retrieval. It takes some time to do 5 context retrieval. It may take some time in 6 context retrieval. 7 For example, if you're in -- I -- if 8 you're communicating with a party, like an ongoing 9 communication, there would be no need for any 10 significant latency with respect to context 11 retrieval because any implementation would cache 12 the key because this is an ongoing session. 13 And with ongoing session, you would know 14 that until the connection is closed, like a TCP 15 connection, or you're no longer -- there is an end 16 to a TCP connection, you would know that until 17 that occurs, you should probably keep the key. 18 Then you can limit the time. 19 So I don't believe it actually reduces 20 latency on an ongoing basis, for example, during 21 an interaction. That's with respect to context 22 retrieval latency.
70 1 security properties, and you can just simply it 2 use it without using a key, such as a key 3 retrieved from the context retrieval. 4 And then he says -- Basturk teaches 5 using the style -- or, basically, I say, "Teaches 6 a style of MAC computation that allows part of the 7 computation to be performed on the received 8 message, the poor retrieval of the session key or 9 other cryptographic information from the context 10 information -- from the context information is 11 complete." 12 So you don't need to know -- again, you 13 don't need to know the session key or another key 14 prior to performing the hash portion of the MAC 15 computation. 16 Q Does "on the fly" as you described it, 17 reduce latency? 18 ATTORNEY EKLEM: Objection to form. 19 A What's the context? 20 Q As used in Basturk. 21 A Which -- which form of latency are you 22 referring to?	72 1 I believe there's others, but I want to 2 continue looking to answer your question. 3 (Document review.) 4 So the other aspect that he has was 5 using -- which is well-known, using a message 6 authentication code that -- what's well-known is, 7 you want to minimize computation. So that's 8 something I think is well-known. 9 And the -- for example, you wouldn't want 10 to use asymmetric cryptography. You wouldn't want 11 to use asymmetric signatures here using public key 12 cryptography. So -- and he says it's enabled by 13 choosing a style of computation that permits 14 computation to be performed on received messages 15 before the context received and not placing the 16 signature in the trailer. 17 And that signature to computation depends 18 on the algorithm selected, not where the signature 19 value is placed in -- in the packet. 20 And so these are just my comments with 21 respect to Basturk and this aspect of on-the-fly 22 computation. I -- and further comments. I have

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73 1 further comments, but I want to stop here. 2 Q So in either context that you just 3 referred, is the goal of "on the fly" to reduce 4 latency? 5 A I think you have to be careful about 6 talking what type of latency. The latency they're 7 referring to is his definition of "on the fly," 8 and the context of Basturk is retrieving the 9 particular key to be used in the signature 10 computation and selecting message authentication 11 code or signature technique that's not 12 computationally complex. And enabling doing the 13 hashing function, meaning the message digest, for 14 example, taking a fingerprint, per se, of the 15 content to be signed or verified without requiring 16 a key. 17 It turns out that some cryptographic 18 signature functions inherently require the use of 19 a key, where many don't. They already have, you 20 hash and then encrypt or decrypt. But some 21 algorithms do require a key to perform the 22 authentication -- message authentication code.	75 1 what latency are you referring to? 2 Q Any of the latencies discussed in Basturk. 3 A I'd like to be clear which ones you're 4 referring to. There was at least the context 5 retrieval latency and possible latency for 6 using -- using the cryptographic function, like 7 asymmetric cryptography, which is computationally 8 intensive. 9 So are you referring to those latencies? 10 And so -- and when you say "reduce latency," 11 that's a comparison, a comparison against 12 something else. And so I need to have something 13 else to compare it with. 14 Q In comparison to when "on the fly" is not 15 used. 16 A I think it depends on the scenario. 17 And -- it depends on the scenario. 18 Q Can you describe some of those scenarios? 19 A Sure. 20 A common scenario is, you're -- for 21 example, now you're using -- you're using HTTPS. 22 You're -- you have a browser connection, and the
74 1 Q In the context of context retrieval, is 2 the goal of "on the fly" to reduce latency? 3 A I would be careful about your 4 characterization. "On the fly" -- his reference 5 to "on the fly" is doing all these things, each 6 one of these aspects. And -- so I think your 7 question was incompletely phrased. 8 Q To the best of your understanding. 9 A Can you repeat the question, please? 10 Q In the context of context retrieval, is 11 the goal of "on the fly" used to reduce latency? 12 A I have trouble understanding the question 13 the way you phrased it. 14 Q Again, just to the best of your 15 understanding. 16 A Again, I can't answer the question the way 17 you phrased it. I don't understand the question. 18 Q Does Basturk's use of "on the fly," and in 19 its context, does that reduce latency? 20 A Can you repeat that, please? 21 (Record read.) 22 A So in the context of Basturk. And then	76 1 connection stays alive. And it's -- what you do 2 is, anything doing encryption or decryption in 3 their signature is just simply caching keys. So 4 any communication with a cache key has no -- is 5 essentially -- essentially, no latency related to 6 context retrieval. 7 Q Could you think of ways that "on the fly," 8 as used in Basturk, reduces latency? 9 ATTORNEY EKLEM: Objection to scope and 10 form. 11 A Just to write it down -- you're looking 12 for -- can you clarify the question, please? 13 Q Just to the best of your understanding. 14 A Okay. And the question? 15 Q Could you think of ways that "on the fly," 16 as used in Basturk, reduces latency? 17 ATTORNEY EKLEM: Objection to scope and 18 form. 19 A Within Basturk... 20 I think it misses -- I think it -- I mean, 21 I see evidence in Basturk which shows that it 22 doesn't help with context latency -- context

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77 1 retrieval latency. 2 So, for example, in 2.4, they're using 3 session key exchange. So they're basically using 4 a protocol where entities have a shared key, and 5 they generate, basically -- they have long lived 6 keys, and then they generate session keys to use 7 for communications. 8 And this is an example where, after you've 9 gone through the process of session key exchange, 10 you have the key, and you know that someone wants 11 to communicate with you, and you're communicating 12 with someone because you participated in this 13 extensive protocol, going back and forth to 14 negotiate a key, which authenticate a key exchange 15 means. 16 It would be crazy not to have an 17 implementation where you wouldn't cache the key 18 after a key exchange. So I don't see -- if you're 19 going to go through the overhead of a key 20 exchange, I don't see any benefit with retrieval 21 latency in this example of any follow-on 22 communications.	79 1 If you're doing like almost -- I can't think of a 2 protocol where you don't put context information 3 already up in the front. 4 So, no, I don't see any particular 5 advantage of -- of this paper when it comes to 6 something we kind of already know and do. 7 Q You said earlier that Basturk uses 8 symmetric session key, right? 9 A I read that, yes. 10 Q Can Basturk implement asymmetric 11 cryptography? 12 ATTORNEY EKLEM: Objection to the form and 13 scope. 14 A That's -- that's not something I've opined 15 on. I don't see it in Basturk, and I highly doubt 16 it is. It's talking about efficient message 17 authentication codes, which were symmetric 18 cryptography. So there is no -- I don't see any 19 reference of -- of asymmetric cryptography. 20 And much of the issue is authenticated key 21 exchange using symmetric key cryptography and 22 pairwise key. So the whole paper is talking about
78 1 Q Do you see evidence in Basturk which shows 2 that on the fly does assist with context latency? 3 ATTORNEY EKLEM: Objection to form. And 4 scope. 5 A I'm sorry. You said where it does? 6 Q Yes. 7 A Where it does? 8 Q Where it does assist -- 9 A Assist? 10 Q -- assist with context retrieval latency. 11 A It's -- I think it's in here. Somewhere 12 it says, "Put the context information early in the 13 message." 14 But in most protocols, context information 15 is already early in the message. Rarely do you 16 put context information at the end of the message. 17 It's normally the header that has information. 18 So I don't see much value at all with that 19 little nugget of putting context information in 20 the front of the message. If you can -- we can go 21 through various protocols. If you have secure 22 email, who you're communicating with is up front.	80 1 symmetric protocols. So I don't -- possibly, 2 the -- yeah. 3 So I don't -- I don't see it as it relates 4 to -- here you've been using the term "message 5 authentication code." So I don't see it. 6 Q You mentioned "possibly" just now. 7 Could you elaborate on it? 8 A Possibly what? 9 Q You mentioned "possibly" and pointed to 10 something. Could you finish that thought? 11 ATTORNEY EKLEM: Objection to form. 12 A I stopped when I said "possibly." 13 What I just simply said was -- was message 14 authentication codes, that's clear that's 15 symmetric cryptography. I'm not aware of any 16 other place in the paper where it talks about 17 something other than message authentication codes 18 using symmetric cryptography. 19 You see lots of evidence they're talking 20 about symmetric cryptography in here. Pairwise 21 keys, session keys. 22 What pairwise keys means is that you're

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81 1 communicating with another entity. And every time 2 you send a message, you're using that key, in 3 part, to generate the message. 4 So if I sent the message to multiple 5 people and I had different pairwise keys, I would 6 have to create a signature for each recipient of 7 the message using the respective keys that are 8 shared between the entities that are being 9 communicated with. And you then need to make the 10 signature. 11 So that's the type of cryptography that's 12 being applied here. And the context. 13 ATTORNEY PERBOHNER: Is it okay if we 14 break for ten minutes? 15 ATTORNEY EKLEM: Sure. 16 (Recess.) 17 BY ATTORNEY PERBOHNER: 18 Q Did you discuss the substance of your 19 testimony with counsel during the break? 20 A No. 21 Q Does the term "on the fly" in Basturk 22 discuss about doing tasks in parallel?	83 1 we were always doing that, but as part of that, 2 you can also perform the hash computation of the 3 message authentication code while you're doing 4 the -- while you're doing the context retrieval. 5 But, again, I don't see the context 6 retrieval is even an issue in communications, as I 7 described before, because when you send the 8 very -- because you already have cached keys that 9 are used. 10 So I don't see a benefit for interactive 11 protocols, for example, to do anything when we're 12 already doing -- retrieving the key to -- to 13 perform a computation. 14 And even so, key retrieval, even if -- 15 first of all, it's almost always cached. You know 16 when you're going to use a key. It's always 17 cached. Even if it wasn't cache -- well, 18 whatever. It's always cached. It's generated and 19 it's cached. So -- and typically in memory. 20 So there is basically no cost -- no real 21 savings benefit from an interactive protocol, in 22 my opinion.
82 1 ATTORNEY EKLEM: Objection to form. 2 A Tasks? Did you say "tasks"? 3 Is there an area you want to refer me to 4 in Basturk? 5 Q Just generally. 6 A I feel like we kind of discussed that. 7 One aspect of Basturk for "on the fly" is the 8 latency with respect to context retrieval. And I 9 went in to describe that. 10 Q What is being done in parallel when "on 11 the fly" is used? 12 ATTORNEY EKLEM: Objection to form. 13 A There is -- Basturk's definition of "on 14 the fly" that I read earlier had several elements. 15 And one of them -- one of the elements was, 16 "Reduce context retrieval latency by placing the 17 context information early in each packet, 18 particularly in the header." 19 And as I describe, that's already done 20 pretty much in every protocol. I can't think of a 21 protocol where that doesn't happen. 22 So I don't -- when you say "in parallel,"	84 1 Q How does putting the context information 2 early in each packet make retrieving the context 3 faster? 4 ATTORNEY EKLEM: Objection. Foundation. 5 A Context retrieval, the amount of times to 6 do context retrieval is -- especially from cache 7 or wherever, is going to be the same, no matter 8 when you do the retrieval. 9 Q How about the hash computation plan? Does 10 that take the same time no matter when you do it? 11 A Yes. The amount of time to run through 12 each block of message for a hash computation 13 that's not dependent upon a cryptographic key, it 14 takes the same amount of time. It's whatever 15 the -- how long it takes to do it. 16 Q Could you briefly describe the overall 17 benefits of "on the fly" as used in Basturk? 18 ATTORNEY EKLEM: Objection to form. 19 A Are you asking my opinion of the benefits? 20 Q Yes. 21 A That's not something I've opined on. 22 Q Sitting here today, do you have any

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85 1 opinions? 2 ATTORNEY EKLEM: Objection. Scope. 3 A I haven't opined upon that. I would have 4 to look deep and hard to see if there is anything 5 that is truly a benefit in what they're 6 describing. 7 When you think of benefit, you've got to 8 compare it to something else. It's a benefit to 9 what? So I don't -- without some analysis and 10 particular context, it's difficult to do -- to 11 find a benefit. 12 Q So your opinion is limited to the four 13 corners of your declaration? 14 ATTORNEY EKLEM: Objection to form. 15 A Pardon me? 16 Q So your opinion is limited to the four 17 corners of your declaration is what you're saying? 18 ATTORNEY EKLEM: Objection to form. 19 A I haven't said that. I've said that, as 20 we discussed, that I'll have opinions as we're 21 going forward. I'd like to stick to what have I 22 opined upon. But I've given you additional	87 1 perform. One of them is receiving a packet. 2 Can you think of a way to perform all of 3 the tasks in a less amount of time than each task 4 completely finishing before starting the next 5 task? 6 ATTORNEY EKLEM: Objection to scope. 7 A I'm kind of lost in the question, with the 8 specifics and the context of the question. 9 Q I'll ask it again. 10 A And, also, that isn't something I've 11 opined on, I believe, from what I understand so 12 far. 13 Q So assuming a computer has a number of 14 tasks to perform. One of them is receiving a 15 packet. 16 Do you understand that? 17 A Okay. 18 Q Can you think of a way to perform all of 19 the tasks in a less amount of time than each task 20 completely finishing before starting the next 21 task? 22 ATTORNEY EKLEM: Objection to form and
86 1 opinions. You've asked me, and I told you it 2 wasn't an opinion, and I've gone on to explain 3 things. 4 Q Can you think of any benefits that "on the 5 fly" could be used for? 6 ATTORNEY EKLEM: Objection to scope. 7 A I haven't opined on that, and I can't 8 think of a scenario that there is any benefit 9 that's -- has any significance. 10 Q What do you mean by "significance"? 11 A Using a computation simple MAC, of course, 12 that makes sense. Caching keys, that makes sense. 13 So it's almost kind of a repeat of -- you know, he 14 gave a name to these concepts. 15 Really, what -- his focus, though, was on 16 developing a reliable security transport protocol. 17 And an aside, he gave -- 18 (Reporter clarification.) 19 A An aside, these principles, but it's not 20 clear that any of this, what he gave, it wasn't 21 already being done at the time. 22 Q Assume a computer has a number of tasks to	88 1 scope. 2 A Yeah, I don't -- I don't understand. 3 Again, this isn't something I've opined on. I 4 don't understand the context. 5 Q Are there other ways to complete tasks 6 other than serially? 7 A In my report -- give me a second, please. 8 So to bring this home, Dr. Houh discussed 9 that concern that Basturk would speed up the 10 transmission of a packet, but you're talking about 11 receive. And I pointed out that data isn't -- 12 when you're looking at a protocol stack on a 13 network device, you're -- each layer processes 14 according to the layer protocol data unit. And it 15 successively passes the protocol data unit down to 16 the next layer. 17 And the idea here is that, in this 18 architecture, even if you had a speedup of any 19 type, you need to wait until all the computation 20 is done for an entire packet, and there is no 21 speedup of bit-by-bit transmission until the 22 entire PDU is passed to the lower layer.

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89 1 So – so any characterization, what you're 2 talking about here, on some computer and parallel 3 task, when you look at the context of the 4 references here, you need to look at the context 5 of a networking stack. 6 And so your argument is -- is far away 7 from that. Your computer scenarios and tasks is 8 far away from that. 9 Q In computing, what are the general goals 10 of implementing parallelization? 11 ATTORNEY EKLEM: Objection to form and 12 foundation. 13 A That's not something I've opined on. 14 Q Sitting here today, can you tell me the 15 goals of parallelization of computer networking? 16 ATTORNEY EKLEM: Same objections. 17 A Only computer networking? Can you be 18 specific? 19 Q In general. 20 A I would need more context information. 21 Q Is parallelization different than 22 computing tasks serially?	91 1 Q Have you ever implemented parallelization 2 in any of your past work or consulting? 3 A Parallelization just in general? 4 Q How would you define "parallelization" in 5 computer networking? 6 ATTORNEY EKLEM: Objection. Scope. 7 A That's not something I've opined on. 8 Q Sitting here today, as an expert in your 9 field, how would you define "parallelization" in 10 computer networking? 11 ATTORNEY EKLEM: Objection to scope. 12 A Again, that's not something I've opined 13 on. I wasn't asked to opine on that. It would 14 take careful analysis to answer that. 15 Q You would consider yourself an expert in 16 the field, correct? 17 ATTORNEY EKLEM: Objection to scope. 18 A In which field? 19 Q As you have listed in your declaration. 20 A Can you show me a paragraph? 21 Q Paragraph 9. 22 A Was there something specific in -- oh, so
90 1 ATTORNEY EKLEM: Objection to form and 2 scope. 3 A Again, this -- I haven't opined on this, 4 and I don't understand your question. 5 When you're saying "tasks," what are you 6 referring to? 7 Q Have you ever implemented parallelization 8 in any of your consulting or past work before? 9 ATTORNEY EKLEM: Objection to form. 10 A Parallelization of what? 11 Q Computer tasks. 12 A Computer what? 13 Q Tasks. 14 A What's a computer task? 15 Q Computations. 16 A So just simply a computation in parallel? 17 Q Sure. 18 A And you're saying parallel execution and 19 instruction? 20 Q However you best understand it. 21 A Well, what's the context you're referring 22 to? It's your context, not mine.	92 1 Paragraph 9. 2 (Document review.) 3 That's my expertise. Again, I wasn't 4 prepared to do this in the context of network -- 5 I'm not prepared to answer this in the context of 6 networking. 7 Q Would you consider yourself a person of 8 ordinary skill in the art in the scope of the '682 9 patent? 10 ATTORNEY EKLEM: Objection to form. 11 A On Page 17, I discuss Dr. Houh's -- what 12 he sent forth as the ordinary skill. And in 29, 13 I'd say I've met them. 14 So are you referring to that? 15 Q Yes. I'll re-ask the question. 16 Sitting here today, as an expert in your 17 field, how would you define "parallelization" in 18 computer networking? 19 ATTORNEY EKLEM: Objection to scope. 20 A I haven't come up with a definition of it. 21 Q Could you come up with one right now? 22 A I haven't been asked to in my report.

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93 1 Q I'm asking you right now. 2 ATTORNEY EKLEM: Objection to scope. 3 A It would take some time to think about it 4 to provide an accurate definition. 5 Q How much time? 6 A I would need resources, too, just to 7 consider -- we're talking about a broad area of 8 network communication, parallelization. 9 Q Do you have any initial thoughts as to how 10 to define "parallelization" in computer 11 networking, sitting here today, as an expert in 12 the field, as confirmed in Paragraph 29 of your 13 declaration? 14 ATTORNEY EKLEM: Objection to form and 15 scope. 16 A I haven't been asked to opine that -- on 17 that. That wasn't -- parallelization wasn't a 18 focus of my report. I addressed what was in the 19 various references and responded to Dr. Houh. 20 Q So are you refusing to provide any sort of 21 definition of "parallelization," sitting here 22 today?	95 1 the process of computing the style of MAC or in 2 parallel with the process of retrieving context 3 data for performing cryptographic operations." 4 Q What does "parallel" mean in the context 5 of the sentence you just read aloud? 6 A At the same time. Not necessarily at the 7 same time. It's basically the -- the words here, 8 "or process." So it means that there's two 9 processes: One of computing the style of MAC, and 10 the other process is retrieving context data. 11 So there's two processes that are working 12 at the same time. 13 Q Can you turn to Page 12 of Basturk. At 14 the last paragraph that starts with, "We now 15 turn." 16 Do you see that? 17 A Mm-hmm. 18 Q Do you see the sentence, the third 19 sentence in that paragraph, that starts with, 20 "Ideally"? 21 A Okay. I see the sentence with "ideally." 22 Q Can you read that sentence aloud.
94 1 A I would like to give you an accurate 2 answer, and you're talking about very broad areas. 3 You're talking about broad area parallelization 4 and in computer networking, and that would take 5 some time to come up with something that was 6 accurate. 7 Q How much time? 8 A It would take time and resources. I'd 9 have to look at other aspects of parallelization 10 and networking just to get something that kind of 11 formulated what the meaning would be. 12 Q Can you please turn to Page 92 of your 13 declaration, at Paragraph 107. 14 Can you read the first sentence aloud, 15 please. 16 A One second. Let me get my context. 17 (Document review.) 18 Okay. I've read 107. 19 Q Can you read the first sentence of 20 Paragraph 107 aloud. 21 A Sure. 22 "Instead, Basturk is referencing to start	96 1 A "Ideally, we want signatures to be 2 computed and verified on the fly, i.e., MAC 3 generation," and in parentheses, "(verification) 4 should be carried out as data transmissions and 5 receptions proceed rather than before and after 6 these operations have completed." 7 And when I read this, the context is data 8 transmission, a transmitter and receiver. And at 9 the lowest level, as I describe in my report, 10 transmission doesn't actually happen until the 11 physical layer. And at that time, after you've 12 gone through each of the protocol stacks, you have 13 to consider that aspect. And Dr. Houh and Basturk 14 don't consider the nature of networking layers 15 where it's not until you've received an entire PDU 16 from the higher layer and then passed that down. 17 And it's not -- you don't start working 18 bit by bit, going down the layers, the entire PDU 19 past the next layer, entire PDU next layer. So 20 there is no transmission whatsoever until every 21 PDU has met each level going down to the physical 22 level.

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97 1 So he's definitely saying data 2 transmissions, and I would disagree with this 3 characterization. 4 In a network stack architecture, i.e., for 5 example, Internet, or a networking layer or 6 higher, you're not getting this. And that's 7 because there is no bit-by-bit transmission until 8 you have the entire PDU at the layer that you 9 actually perform transmission, which is the 10 physical layer. 11 Q Do you cite any docs that say that? 12 A Which paragraph of my report are you 13 referring to? 14 Q Of Basturk, the same one, the sentence 15 that's in discussion right now. 16 A I refer you to Page 18 of my report, 17 Exhibit 1009, at 50, where it talks about the 18 layers. 19 Q Which paragraph is that? 20 A Paragraph -- starting at Paragraph 30 of 21 my report, which talks about the OSI reference 22 model, and layered -- layered processing. That's	99 1 "Data is first passed from the 2 applications sending process at the highest layer, 3 application layer. The application layer adds a 4 header and passes resulting data -- protocol data 5 unit, sometimes referred to as packet, to the next 6 lower layer, which receives the higher-layer's PDU 7 as its payload, and sends the resulting PDU to the 8 next lower layer. The process -- the process 9 repeated until the message is eventually sent down 10 to the lowest layer, called physical layer, and 11 across the physical network. 12 "As shown in the figures above and below, 13 units of exchange or protocol data unit, the 14 physical layer is bits because it's communicated 15 to another machine at bits at the physical layer, 16 Layer 2." 17 But we're seeing -- we're seeing in 18 Figure 1-16, in the description, in an OSI 19 reference model, you're passing the entire PDU 20 down and encapsulating or decapsulating it in each 21 layer. So you're passing it down. You're 22 encapsulating it with additional headers
98 1 the key term here is processing at each layer. 2 And what I say here is there's 3 standardized protocols used in each layer. The 4 OSI model has seven layers. Starting at the 5 bottom, you've got physical, data link, network, 6 transport, session, presentation, application. 7 And then it talks about, to transmit data 8 using the OSI model, a layer -- layer entity 9 communicates with its peer entity at each layer 10 according to one or more defined protocol for the 11 layer. And layer -- Layer 4 and above entities 12 communicate end to end. Layer 3 and below are not 13 necessarily end to end." 14 And then in 3, Paragraph 32, I say, 15 "Encapsulation and decapsulations processes that 16 wrap and unwrap the data, which is the PDU. With 17 each protocol" -- I don't say PDU here, but it's 18 in the figure -- "wrap and unwrap the data, with 19 protocol-specific information as it moves through 20 the layers that network stack, such as an OSI 21 model. This allows for modular and interoperable 22 network communications.	100 1 associated with the lower PDU until, finally, at 2 the physical layer, you've got the entire PDU, 3 which has all the -- all the header information of 4 each one of the layers. 5 And then the reverse process happens upon 6 receipt. You wait until -- basically, as you move 7 up the stack, you have different things. Here 8 we've got bit, frame, packet, transport PDU, 9 session PDU, whatever. 10 So, basically, particularly at the lower 11 layers, when you look at networking layer -- for 12 example, the networking layer. You don't -- you 13 don't -- so, basically, you wait for a PDU in 14 the -- you use PDUs in the processing. 15 And so just because you've made something 16 at one layer, it doesn't mean that you start 17 transmitting bit by bit at much lower layer. And 18 there is a technological reason for this. Because 19 even the headers in many of these layers create 20 error checking codes, like -- like with the IP 21 layer. It does a cyclical redundancy check, an 22 error check, on the entire PDU. So there is no

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101 1 way that it's possible that you could go bit by 2 bit going down to the next layer. You need the 3 entire packet so you can create the CRC on the 4 header of the IP packet at the network layer 5 before you can get down to the data link layer. 6 So this is just -- gives an example of how 7 networking works. 8 And I think we gave a reference for 9 transport -- let me see. We've got UDP. I don't 10 know if we have IP as a reference, but it's one of 11 ordinary skill in the art would know IP and know 12 that the header of an IP packet has a CRC computer 13 over the entire payload of the IP packet. So 14 it's -- it's -- this is the processing of the 15 network systems. 16 And it may also be in some of these other 17 references that I mentioned. I think -- let me 18 see. 19 (Document review.) 20 Yes, in -- on Page 21, at Exhibit 1009, at 21 43 -- I can take it slowly. So it's all in here, 22 inherently or specifically described.	103 1 necessary, to make a multiple of two octets. The 2 pseudo header conceptually prefixed with UDP 3 header contains the source address, the 4 destination address, the protocol, and the UDP 5 length. This information provides protection 6 against misrouted datagrams." 7 So it says "and of the data." So this is 8 an example where the data -- you couldn't send the 9 packet to a lower layer until you've done the 10 check sum over the data that's defined by the 11 check sum. And so if you start monkeying -- I 12 mean, you don't monkey with protocol data units 13 in -- and its protocol data units. You send the 14 entire PDU down the stack. And this is an example 15 where there is dependencies. 16 If you give me more time, I can look at IP 17 and other protocols to show the dependencies. But 18 this is an example where it's kind of a show 19 stopper in terms of -- of having all the data to 20 make a decision. 21 So this, for example, even at the lowest 22 lever of the -- I believe, also in Ethernet, there
102 1 Q Did your testimony just now state that the 2 CRC and IP is over the header or over the whole 3 PDU? 4 A Do you have a copy of the RFC for IP? 5 Q Do you have a specific exhibit number that 6 you're referring to? 7 A Actually, if you pull up UDP, I probably 8 have -- it potentially has some information. The 9 UDP is an exhibit. 10 So that's Exhibit 2007. 11 (S.S. Exhibit 4, Document Entitled, User 12 Datagram Protocol, marked for identification.) 13 A This is an example of check sums being 14 developed. Each protocol can have it over -- here 15 with UDP, we've got check sums over on Page -- 16 Exhibit 2007, Page 2 of three, this is an example 17 I was referring to, a check sum in UDP. 18 "The check sum is the 16-bit, one's 19 complement of the one's complement sum of a pseudo 20 header of information from the IP header, and the 21 UDP header, and the data" -- so this would be the 22 payload -- "padded with zeros to the end, if	104 1 is a frame check sequence. I think we have the 2 Ethernet reference. 3 Can I get Reference 1014, please. 4 The same concept that I described in UDP 5 also applies on -- related to that. 6 Q So let's move on for now -- 7 A Thank you. 8 Q -- and go back to what we were talking 9 about on Page 12 at Basturk. The sentence that 10 starts with, "Ideally." 11 A Okay. 12 Q So as you noted previously -- 13 A I just wanted to strike the last comment I 14 had with Ethernet. 15 It's a slightly different story, but, in 16 general, you've got dependencies of -- of higher 17 level protocol data units as you go up and down 18 the stack. And this is why, in general, you don't 19 have this process of sending one bit at a time. 20 That would be a computational nightmare if you're 21 keeping track of bits going all the way down the 22 stack to the transmission because you would have

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105 1 so many packets and bits and streams. It just 2 does not make sense. 3 Q So looking at the sentence that starts 4 with, "Ideally." 5 You had previously noted that there is a 6 few words in parentheses; is that right? 7 A Yes. "Verification"; "receptions," 8 plural; and "after." 9 Q How do you interpret this sentence? 10 ATTORNEY EKLEM: Objection to form. 11 A Just exactly how it's written. 12 Q What does "data transmission" mean? 13 ATTORNEY EKLEM: Objection to form. 14 Q And I'll clarify my question. 15 What is data transmissions in the context 16 of that sentence, starting with "ideally"? 17 A It says what it says there. It was 18 using -- when I wrote my declaration, I was 19 responding to Dr. Houh that, apparently, that 20 meant that data transmission and reception was 21 literally at the lowest layer. 22 Q Does the sentence include anything about	107 1 line -- the physical layer communicates with the 2 physical layer on the other side, depending on 3 what the format physical layer is. But the PDU is 4 bits. 5 And so that's an example where the 6 transmission -- data transmission is physical bits 7 from one side to the other. 8 When we're passing packets up and down the 9 stack, you typically don't use the term 10 "transmission." We use the term -- I'm not 11 familiar with really using the term -- using the 12 term "transmission" in that context. 13 I think there is other -- if you look at 14 the reference, I'm sure you're going to see 15 transmission -- anything at the physical layer, 16 you're going to see transmission entirely because 17 that's -- the purpose of the lowest layer is the 18 transceiver -- transmitter -- the transceiver is a 19 transmitter-receiver, and that's the entity that 20 connects to the physical medium for transmitting 21 and receiving. And it's at the bit layer. 22 Q If you look at Exhibit 1009, that figure
106 1 the lowest layer? 2 A I haven't opined on that. I was looking 3 at Dr. Houh's report. 4 Q Sitting here today, is there anything in 5 that sentence that indicates it's talking about 6 the lower layer? 7 A If you look at the sentence alone, it says 8 data transmissions and receptions. Data 9 transmission often is used -- that term is often 10 used at the lowest layer of actually physically 11 transmitting data communication system. 12 And within a system, you've got packet 13 processing or PDU processing, if you look at ISO. 14 You've got -- within ISO, it's not until 15 the physical layer -- give me a second. I'll look 16 at the... 17 If you look on Page 20 of my report, on 18 Exhibit 1009, at 55, we talk about -- we show ISO, 19 and we see the actual transmission path is of the 20 data. The actual transmission is at the physical 21 layer of bits. 22 And so the physical layer, you see the	108 1 you were just -- were referencing under 2 Paragraph 34 of your declaration. 3 A Okay. 4 Q Do you see the blocks of data with arrows 5 going between each layer? 6 A Yes. 7 Q Is that data transmission? 8 A No. And, in fact, if you look closely at 9 this, you'll see what they call it. They have 10 sending process and receiving process. And you 11 see that that line goes down this process, which 12 is right. You're processing PDUs. You're 13 processing data to be transmitted. 14 And it finally gets down to the physical 15 layer, and now you're finally at the point of 16 actual data transmission. 17 But when you're going from one layer to 18 the other, other than the physical layer, these 19 are processes for sending and receiving. 20 And the idea of the arrows going left and 21 right, it's just giving the notation that -- I 22 think is what you're referring to is the arrows

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109 1 left and right -- that just shows what the 2 protocol data unit looks like at that particular 3 layer. And it shows encapsulation and 4 decapsulation taking place. 5 Q The data in each layer is eventually 6 transmitted, correct? 7 A Can you be more specific what your 8 question is? 9 Q Just as you understand it. 10 The data that's shown in each layer is 11 eventually transmitted, correct? 12 ATTORNEY EKLEM: Objection to form. 13 A That's a broad question. 14 Q These data packets in each layer, are 15 these transmitted from the receiver to the sender? 16 ATTORNEY EKLEM: Objection to form. 17 Q From the sender to the receiver? 18 A Okay. So now you're talking about from 19 the sender to the receiver, and your question is 20 what? 21 Q Are these data packets transmitted? 22 A The term "packet" is typically at the	111 1 ATTORNEY EKLEM: Objection to form. 2 A There is processing, and you would have to 3 look for the protocol specification that would 4 tell you what the processing was in each layer. 5 Q So on the figure, do you see where it 6 says, "Actual data transmission path"? 7 A Yes. 8 Q Is it your position that you don't know if 9 the data is transmitted? 10 ATTORNEY EKLEM: Objection to form. 11 A I feel like I've answered that question. 12 Q I'm asking it again now. 13 A Whether something is transmitted or not is 14 whether it goes through each one of these layers 15 and the protocol. Whatever the protocol is allows 16 it to be passed down to the next layer, and 17 whatever the processing step that occurs. So 18 actual transmission depends upon the algorithms 19 and the design of each layer. 20 Q Is data transmitted between the 21 application layer of the sender and receiver? 22 ATTORNEY EKLEM: Objection to form.
110 1 network layer. And that you would call the PDU 2 packet, the network layer, are you calling that, 3 or are you just talking about each PDU on the 4 layer? 5 Q Just as shown in the diagram where the 6 blocks that say "data," is that data in those 7 blocks transmitted? 8 A You would have to look down to the lowest 9 layer to see if the networking stack actually sent 10 it out on the physical layer for it to be 11 transmitted. 12 Q In practice, is that data traditionally 13 sent? 14 A It depends on the -- it depends. I mean, 15 that's -- objective is to ultimately transmit it 16 on the physical layer, but it may not. You don't 17 know the address or where to send it or there is 18 other issues. 19 Q What happens to this data in each layer? 20 ATTORNEY EKLEM: Objection. 21 Q What happens to the data in each layer 22 during the sending and receiving process?	112 1 A Transmission occurs here at the physical 2 layer between -- the physical layer between both 3 entities. So I wouldn't characterize it the way 4 you did. You're looking at ISO model. 5 Q Does the application layer of -- of the 6 receiver receive the application data of the 7 sender? 8 A I feel like I've answered this question. 9 But this is actually a slightly different 10 question. 11 The transmission which occurs only at the 12 physical layer in this model, it depends whether, 13 for example, the data was received without error, 14 and from the transmission from the physical layer 15 to the other physical layer, and depends on 16 processing at each subsequent layer as to whether 17 it's -- whether the processing passes the data, 18 certain data, to the application layer. 19 Q Okay. Turning back to Page 12 of Basturk, 20 the sentence at the bottom that starts with, 21 "Ideally." 22 Do you see where it says "data

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1 transmissions"? 2 A Yes. 3 Q Is data transmissions used elsewhere in 4 Basturk? 5 ATTORNEY EKLEM: Objection to form. 6 A I would have to search the reference. Do 7 you want me to look? 8 Q I can point you to Page 6, at the top. 9 It's in the second to last sentence. 10 A I'm sorry. The second to last sentence of 11 the page? 12 Q Of the first paragraph. 13 A The first paragraph. 14 Okay. I've looked at it. 15 Q What does "data transmissions" mean in the 16 context of that sentence? 17 A I would have to look closely at the paper 18 to see how they've defined -- in the context of 19 how they defined data transmission. 20 Q Can you do that now? 21 A I think it would be helpful because -- do 22 you have Dr. Houh's report? Because I know he	113 115 1 me. But when I looked at the arguments in 2 Dr. Houh's report, he was clearly talking about 3 the lowest level transmission, and I pointed out 4 that this nature of stacks, where transmission 5 only occurs, as I just showed you with the ISO 6 model, occurs at the lowest layer, at the physical 7 bits. 8 Q So did you not take the time to review all 9 of Basturk and understand it before rebutting 10 Dr. Houh's report? 11 ATTORNEY EKLEM: Objection to form. 12 A I stand by my report. I responded to 13 Dr. Houh's assertions of Basturk, and there were 14 technical flaws, which I pointed out. 15 Q I'll re-ask the question. 16 Did you not take the time to review all of 17 Basturk and understand it before rebutting 18 Dr. Houh's report? 19 ATTORNEY EKLEM: Objection. 20 A No, I read -- 21 ATTORNEY EKLEM: One second, please. 22 Objection to form.
114 1 cited -- when he was talking about data 2 transmission, he cited something. 3 Do you have a copy of his declaration? 4 Q Well, just looking at Basturk here, what 5 does "data transmission" mean in the context of 6 this sentence? 7 A My focus of my report was countering 8 Dr. Houh's arguments, and Dr. Houh's arguments was 9 referring to bit-by-bit transmission. And I would 10 like to see that to answer your question to see if 11 he referenced something, just to speed this up. 12 Q Well, just looking at this sentence and 13 reading it now, what does "data transmission" mean 14 to you in this sentence? 15 A My focus was Dr. Houh's description of 16 "data transmission" as it related to this. 17 If I look just at this sentence, it's not 18 clear. It -- but I said, normally, when we use 19 the word transmission, we're referring to truly 20 transmission physical layer with a receiver, 21 transmitter receiver. 22 And so if they've redefined it, okay, show	116 1 A I read all of Basturk before I provided my 2 report. My focus was rebutting the arguments 3 that -- in Dr. Houh's declaration. 4 Q Did you come to an understanding of 5 Basturk when you reviewed it? 6 ATTORNEY EKLEM: Objection to form. 7 A I have some understanding of it. I 8 described that. 9 Q What is your understanding of data 10 transmission as used in this sentence on the top 11 of Page 6 that we're looking at now? 12 A They're talking about data transmission is 13 not necessarily delayed. It's not clear in this 14 sentence what he's referring to. But one in 15 ordinary skill in the art would know that data 16 transmission, according to ISO, is at the physical 17 layer. 18 Q Could it have any other meaning? 19 ATTORNEY EKLEM: Objection to form. 20 Q And I'll rephrase my question. 21 Can "data transmission" have any other 22 meaning?

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117 1 ATTORNEY EKLEM: Objection to form. 2 A I would look at the context of the -- of 3 the document, and I've looked at the context of 4 the arguments made by Dr. Houh -- 5 Q I'm talking about -- 6 A -- and I disagree with him. 7 Q -- in the context of Basturk. 8 A So you're asking, did Basturk redefine 9 transmission to be something other than 10 transmission of the physical layer? 11 Q I'll ask my question more clearly. 12 You've stated that, "One in the ordinary 13 skill in the art would know that data 14 transmission, according to ISO, is at the physical 15 layer." 16 But in the context of Basturk, are there 17 other meanings that a person of ordinary skill in 18 the art could recognize "data transmission" to 19 mean? 20 A I haven't opined on different meanings of 21 "data transmission." I opined on replying to 22 Dr. Houh's report, and I disagreed with the	119 1 sentence. 2 Q So you can come to an understanding of 3 "data transmission" in this sentence, but not the 4 one we were looking at previously on Page 6? 5 A Well, I read the entire paragraph. 6 Q Okay. Can you read the entire paragraph 7 of data transmission on Page 5 of 6, where it's 8 used, and come to an understanding of what data 9 transmission is? 10 A In Basturk? 11 Q In Basturk, correct. 12 A Which paragraph? 13 Q It's the last paragraph, starting on 14 Page 5, that starts with "in addition" and moves 15 on to Page 6. 16 A (Document review.) 17 It's not clear. 18 Q Why can you come to an understanding of 19 data transmission as used on -- 20 A Pardon? 21 Q Why can you come to an understanding of 22 data transmission as used on Page 7, but not on
118 1 arguments he provided. 2 Q While sitting here today, can you think of 3 any other meanings of data transmission in the 4 context of Basturk? 5 A If you point me to something, I'm happy to 6 look at it. 7 Q I'm pointing you to the sentence. 8 A I see no clarity in that sentence. 9 Q Well, let's move to the top of Page 7. 10 Do you see the section entitled, 11 "Additional Flows"? 12 A It's using the description, "Data 13 transmission. This translates to increased 14 overhead and greater latency before data 15 transmission to start." 16 It appears to me he's referring to the 17 lowest layer of data transmission. And I disagree 18 with Dr. Houh's assertion. And whether he relied 19 on or misinterpreted the reference, that's his 20 issue. 21 But this use of data transmission, I would 22 say this is at the physical layer when I read this	120 1 Page 6? 2 A Look back. You're ignoring the ISO 3 reference -- 4 Q I'm looking -- 5 A -- that uses transmission at the lowest 6 layer -- 7 Q Just in context of -- 8 A -- and it's unusual for data transmission 9 to be anything but the lowest layer. 10 And so now you're -- now this term is 11 here, and it's not very clear what's going on by 12 reading these. 13 And when I look at Dr. Houh's arguments, 14 they don't hold because of data transmission at 15 the lowest layer. 16 Q What are the possibilities that you can 17 think of, sitting here right now, that data 18 transmission could refer to, knowing that you've 19 been an expert in this field for over 30 years? 20 ATTORNEY EKLEM: Objection to form and 21 scope. 22 A I haven't given -- I haven't opined on the

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121 1 definition of "data transmission." One of 2 ordinary skill in the art would understand it 3 would be similar to what ISO has put forward for 4 data transmission at the physical layer. And – 5 and other layers. It's packet processing because 6 there is no transmitter. No transmitter, no 7 receiver, physical devices. There is packet 8 processing or PDU processing, which is described 9 in the figure, the ISO figure. 10 Q Moving back to Basturk on Page 12, at the 11 bottom, with the sentence that starts with, 12 "Ideally." 13 What does "data receptions" mean? 14 A (Document review.) 15 I see no indication that in anything 16 you've pointed to that this is anything other than 17 at the lowest layer, at the ISO physical layer. 18 As I said, when you've got the physical layer, 19 you've got a transceiver, something that's 20 transmitting data and receiving data. 21 And so receptions correspond to receiving. 22 So this – the way this is phrased, this is much	123 1 this case, there's nothing specific related to web 2 browsers. I haven't given an opinion on web 3 browsers. 4 Q If a web browser transmitted a request to 5 a web server, would a person of ordinary skill in 6 the art say that's wrong because it's not the 7 application that is doing the actual transmission? 8 ATTORNEY EKLEM: Objection to form, scope, 9 and foundation. 10 A I've got no opinion on that 11 characterization. And I also disagree that even 12 the context or the informality is very different 13 from the formality of, for example, the patent at 14 hand here and ISO. 15 Q So this is directly relevant to your 16 testimony today. I'll just ask the question 17 again. 18 If a web browser transmitted a request to 19 a web server, would a person of ordinary skill in 20 the art say that's wrong because it's not the 21 application that is doing the actual transmission? 22 ATTORNEY EKLEM: Objection to form.
122 1 more closely with what one of ordinary skill in 2 the art would understand would be the ISO model. 3 When you look at the ISO model, you don't 4 see transmission between levels. You see 5 transmission at the physical layer. The context 6 of this patent, and the protocol layers of ISO, I 7 would understand further that that was Dr. Houh's 8 meaning. 9 And if you can show me, I can give further 10 explanation that he was referring to the lowest 11 level, which is data transmission as opposed to 12 data packet processing or PDU processing. 13 Q Are you familiar with web browsers? 14 ATTORNEY EKLEM: Objection to form and 15 scope. 16 A That's not something I've opined on in my 17 report. 18 Q Just sitting here today, are you familiar 19 with web browsers? 20 ATTORNEY EKLEM: Objection to form and 21 scope. 22 A As far as I know, in Dr. Houh's report in	124 1 Scope. 2 A That's not something I've opined upon. 3 You're asking about what a person of ordinary 4 skill in the art would talk about, some informal 5 language about a web browser. That's not 6 something I've opined upon, what such informal 7 language would mean. 8 That's different from the context we have 9 here in this case where we're talking about 10 layers, ISO layers, which is a critical part of 11 what's going on here. 12 Q Would a person of ordinary skill in the 13 art understand a web browser to transmit a request 14 to a web server? 15 ATTORNEY EKLEM: Objection to form. 16 A Can you repeat it, please? 17 Q Would a person of ordinary skill in the 18 art understand a web browser to transmit a request 19 to a web server? 20 ATTORNEY EKLEM: Objection to form and 21 scope. 22 A That's not something I've opined upon. I

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125 1 think -- and further, it's a different context 2 than what we're talking about. We're talking 3 about a patent that is referring to the ISO 4 layers, and -- which is these layers that are at 5 hand or important to what's going on in precise 6 language. 7 And now you're moving above to a very 8 imprecise language, and I don't have -- I'm not an 9 expert of imprecise language, everyday language. 10 I haven't taken votes to see what people refer to 11 or haven't referred to. 12 Q Just your general understanding of web 13 browser and web server. I'll ask the question 14 again. 15 Would someone -- would a person of 16 ordinary skill in the art understand a web browser 17 to transmit a request to a web server? 18 ATTORNEY EKLEM: Objection. Scope. 19 A That's not something I've opined upon. 20 It's not in my report. 21 I don't believe Dr. Houh even brought up 22 web browsers or in the context of web browsers	127 1 context of these layers. That is, the claims 2 relate to layers. 3 Q Is it fair to say you would have to look 4 outside the four corners of Basturk to gain 5 understanding of the ISO layers? 6 ATTORNEY EKLEM: Objection to form. 7 A Do you want me to look through Basturk to 8 see if it describes ISO? 9 Q You already said you don't recall seeing 10 ISO layers in Basturk, correct? 11 A That's correct. 12 Q So I'll ask my question again. 13 Is it fair to say you would have to look 14 outside the four corners of Basturk to gain an 15 understanding of ISO layers? 16 ATTORNEY EKLEM: Objection to form. 17 A I'm confused by your question. 18 Q Looking at Page 12 of Basturk, with the 19 sentence that starts with, "Ideally," in your 20 opinion, what does "these operations" in this 21 sentence refer to? 22 A It appears that he's referring to
126 1 transmission. So that's not something I've opined 2 upon. 3 Q Are web browsers relevant to the RTP 4 protocol? 5 ATTORNEY EKLEM: Objection to form, scope, 6 and foundation. 7 A My focus in writing my declaration was to 8 respond to Dr. Houh's report, and in his report, I 9 don't recall him ever saying anything about web 10 browsers in the context of RTP. So that's not 11 something I've focused on myself in rebutting. So 12 that's not in my report, as far as I know, or in 13 his. 14 Q Can you point me to where in Basturk it 15 mentions the ISO layers? 16 A You want me to take the time and go 17 through each page and look for them? 18 Q Do you remember seeing the ISO layers 19 mentioned in Basturk? 20 A No, I don't remember seeing it. 21 I do remember that Dr. Houh's report 22 talked about ISO layers, and the patent is in the	128 1 symmetric signatures being generated or verified. 2 Q So is it your testimony that "these 3 operations" in this sentence is referring to the 4 MAC generation or verification? 5 A He says, "i.e., MAC generation 6 verification," and refers to the word, "these." 7 And it's "i.e.," so this is an example, "we want 8 signatures to be computed and verified on the 9 file." 10 So he's referring to -- he appears to be 11 referring to MAC generation and verification in 12 this sentence. 13 Q So is it your opinion that "these 14 operations" is not referring to data transmissions 15 or data receptions? 16 A No. It appears -- one second. 17 Can you repeat the question? 18 Q So is it your opinion that "these 19 operations" is not referring to data transmissions 20 or data receptions? 21 A It appears to me, when it says "these 22 operations," he's referring to MAC generation and

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129 1 MAC verification. 2 Q Is data transmission an operation? 3 A Let me look a little bit more at the 4 context. 5 Q No problem. 6 A Yeah, it appears he's referring to MAC 7 generation and verification, in a sense, when he's 8 referring to "these operations." 9 I would just have to say, it's a confusing 10 sentence. 11 ATTORNEY PERBOHNER: Would now be okay to 12 break for lunch? 13 ATTORNEY EKLEM: Yeah, if you'd like. 14 (Luncheon recess.) 15 BY ATTORNEY PERBOHNER: 16 Q All right. Did you discuss the substance 17 of your testimony with counsel during break? 18 A No. 19 Q What does it mean to transmit a packet? 20 ATTORNEY EKLEM: Objection to form. 21 A Can you give me the context? 22 Q Just sitting here today, an expert in your	131 1 A In ISO, packet is the Layer 3 PDU. And so 2 to someone technical as myself, I would be 3 thinking primarily that. But it depends on the 4 context. 5 On -- on -- in the patent, I think, in 6 places, it mentions PDU, but elsewhere it mentions 7 packet where it really means PDU. So sometimes, 8 informally, people use "packet" to mean data, a 9 PDU at a different -- at a different layer, 10 sometimes greater than Layer 3. 11 Q So let's go through both of those, then. 12 Let's go through both of those. 13 What is involved in the process of 14 transmitting a packet in the context of the first 15 scenario you listed, which was in terms of Layer 3 16 of a PDU? 17 ATTORNEY EKLEM: Objection to form. 18 A There is packet processing no matter what 19 layer you start at. There is PDU processing. In 20 Layer 3, the PDU is a packet, in ISO terms and in 21 more technical terms. And the PDU is passed down 22 to successive layers until it goes out on the
130 1 field. 2 A So not with respect to the report, my 3 report? 4 Q Correct. 5 A Or the patent? 6 Q Sure. 7 A To transmit a packet? It would include, 8 basically, transmit on Ethernet or from using IP 9 protocol or just from one router to another until 10 it hit the end destination. 11 Q And what's involved in the process of 12 transmitting a packet? 13 ATTORNEY EKLEM: Objection to form. 14 A It involves -- first of all, we need to be 15 clear about the language of "packet" as well. 16 What are you referring to as "packet"? 17 Q The ordinary meaning, as you understand 18 it. 19 A There are two meanings for packet which 20 are common, and I would look at the context for 21 that. 22 Q What are the two meanings?	132 1 physical layer and gets transmitted. 2 So that's what it means is to process the 3 PDU through the protocol stack until it's actually 4 transmitted. 5 Q Okay. So in context of the second item 6 you listed, which was in context of layers above 7 Layer 3, can you describe the process of packet 8 transmission in that context? 9 A At a high level, the point is, is that the 10 PDU is not necessarily called a packet at the 11 other layers. And some people will call it 12 packet, and I think that might happen in the 13 patents. Sometimes they said PDU, and 14 sometimes -- you would have to look at the context 15 of the patent where -- to understand -- you have 16 to understand what the context is when the word 17 "packet" is being used. 18 But, essentially, you would have 19 processing based on protocols, encapsulation, 20 decapsulation, until, ultimately, it's transmitted 21 at the physical layer. 22 Q So is it your opinion that the

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133 1 transmission only occurs at the physical layer? 2 ATTORNEY EKLEM: Objection to form. 3 A That's what one with ordinary skill in the 4 art would understand, what happens at the physical 5 layer and using the context of PDUs and packets. 6 Q Are there any other ways that someone -- a 7 person of ordinary skill in the art could 8 understand that transmission may not only be 9 occurring at the physical layer? 10 ATTORNEY EKLEM: Objection to scope. 11 A That's not something I've opined on. 12 Q Just sitting here today. 13 A I'd have to look at the context. 14 Q Can you think of any scenarios in which 15 they say that data transmission is not just at -- 16 that packet transmission is not just at the 17 physical layer? 18 A I would have to look at the context to see 19 what's described. 20 Q Can you think of any? 21 A I think the correct way is the way I 22 described it. But people can be informal with	135 1 A I'm just clarifying that within ISO, 2 Layer 3 is the packet -- the PDU is a packet. And 3 sometimes, informally, people refer to other PDUs 4 and other layers of the packet -- a packet. So 5 you'd have to look at the context. 6 Q How do you understand packet transmission 7 in the context of Basturk? 8 ATTORNEY EKLEM: Objection to form. And 9 objection to foundation. 10 A It -- can you point me to a place where it 11 says "packet transmission"? 12 Q Before I do, you are not asserting that 13 the patent is informal with any of its language, 14 correct? 15 ATTORNEY EKLEM: Objection to form. 16 A I'm simply saying that you need to look at 17 the context of terms. Look at the specification 18 first, for example, in the patent, to see how the 19 term is being used. 20 Q So is that a "yes" or a "no"? 21 A If you can -- that's a broad question. If 22 you can point me to --
134 1 their language. So I would look to the context. 2 Q Would you say the '682 patent is informal 3 with its language? 4 ATTORNEY EKLEM: Objection to form. 5 A No. It's really clear, at least with 6 respect to the packet. 7 So it talks about PDUs on Column 1, 8 starting at Line 63. It talks about PDUs between 9 which are specifically designed for each protocol 10 of the respective layer. So this is the correct 11 terminology when talking about OSI models. 12 Q Is packet transmission the same as data 13 transmission? 14 A So I just take -- I take back what I said 15 before. 16 It seems very clear it's talking about 17 PDUs. And I'm looking for an example. 18 Just -- so the point is, you'd have to 19 look at the context. 20 I'm sorry. Your question? 21 Q Can I ask what you're clarifying that 22 you're taking back?	136 1 Q Is -- 2 A -- point me to something specific, I can 3 answer that, but I don't -- I think it's pretty 4 clear what the patent is saying. 5 Q Is the '682 patent informal with any of 6 its language? 7 ATTORNEY EKLEM: Objection to form. 8 A That wasn't the purpose of my analysis, to 9 determine if anywhere in the '682, where there's 10 some informality in the description. 11 Q So you're an asserted expert witness in 12 the context of a patent as before the USPTO. You 13 previously opined that the '682 patent was 14 informal with its language. I'm just asking you a 15 direct opinion on that. 16 So, again, is the '682 patent informal 17 with any of its language? 18 ATTORNEY EKLEM: Objection to scope. 19 Mischaracterizes the testimony. 20 A I don't think that's a proper 21 characterization. 22 Q If you could please answer the question.

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137 1 A That's my answer. 2 Q I'll ask again. 3 Is the '682 patent informal with any of 4 its language? 5 ATTORNEY EKLEM: Objection to form. 6 A My focus was responding to Dr. Houh's 7 report, and I felt that there was clarity in the 8 patent and patent history to respond to Dr. Houh's 9 issues that he raised. So I didn't find a barrier 10 based on any form of informality. 11 Q This is a yes-or-no question. 12 Is the '682 patent informal with any of 13 its language? 14 A I don't know. 15 Q You can't say one way or the other? 16 A That wasn't something I was asked to 17 analyze. 18 Q Can you point me to any informal language 19 in the '682 patent today? 20 A Do you want me to walk through it? 21 Q Are you aware of any informal language in 22 the '682 patent right now?	139 1 A "Data" is less descriptive than "packets." 2 Q Can you elaborate? 3 A Lots of things can be data, and far fewer 4 things can be packets. 5 Q Let's turn to Page 8 of Basturk. 6 A This is pretty clear to me in this 7 description here -- 8 Q Where are you referencing? 9 A What you were just going over. 10 "The presence of an enemy has been 11 simulated by performing different actions on 12 transmitted packets. Namely, bit flipping, packet 13 delay, misordering, loss, and replaying." 14 We're clearly talking about an enemy that 15 is on the network or on a network and is able to 16 flip bits, delay packets, misorder packets, loss, 17 replay. 18 So this is not -- this -- the transmission 19 in this context here is clearly transmission 20 related to after it's gone out on the physical 21 layer. 22 Just by looking at the operations bit
138 1 A When I wrote my report and now, I think 2 it's very clear what the patent was talking about. 3 And I responded in my report based on the clarity 4 of the patent. So I didn't run into a problem 5 where it wasn't clear what was being talked about. 6 Q Going back to the term "packet 7 transmission," can you go to the bottom of Page 16 8 of Basturk. 9 And do you see on the last paragraph, in 10 the middle of that paragraph, the sentence where 11 it says, "The presence of an enemy"? 12 A I see that -- the start of that. 13 Q Do you see in that sentence it uses the 14 phrase "transmitted packets"? 15 A Yes, I see the sentence. 16 Q What are transmitted packets? 17 A These are packets that are being 18 communicated on a physical medium between 19 computers. 20 Q Is that different than transmitted data? 21 A Yes. 22 Q How so?	140 1 flipping, the fact that this is an enemy, and the 2 usual sense of an enemy is packet rewording, 3 delay, bit flipping, these are all actions that 4 occur -- potentially occur to packets that have 5 been transmitted on a physical medium. 6 So with this in mind, and when you look at 7 data transmission, it's becoming more and more 8 clear because of this reference that he's 9 referring to transmission as physical transmission 10 at the lower layer, at the physical layer. As 11 opposed to something within the stack as it's 12 going up and the process is going up and down a 13 stack. This clearly is not that. 14 Q Before, you said, "Lots of things can be 15 data, and far fewer things can be packets." 16 What are things that can be data? 17 A Sequences of ones and zeros. 18 Q And what are things that can be packets? 19 A Are you referring to in this context 20 within this one line? 21 Q In Basturk. 22 A In Basturk. I don't know if Basturk is

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141 1 consistent when he uses "packets." I need to look 2 at it. 3 Q Are you under the impression that Basturk 4 is inconsistent with its use of "packets"? 5 A I'm just simply saying, I don't have an 6 opinion on it. I haven't analyzed Basturk for 7 consistency in that regard. 8 Q When a packet is passed up and down the 9 stack, does it represent a sequence of ones and 10 zeros? 11 A I wouldn't consider it a sequence. In 12 data communications, typically, there is a 13 sequence of data that's being communicated, one 14 bit after another. 15 On -- within packet processing or PDU 16 processing, typically, all the data, entire field 17 or the entire PDU can be passed immediately 18 without serialized transmission. There is no 19 serialized transmission. It's just simply passing 20 data between protocol layers until you reach the 21 lowest layer where transmission occurs. 22 Q So the packet data being passed up and	143 1 therefore necessary for such processing." 2 Q And what was is being retrieved? 3 A It uses the same word, "information," when 4 it uses "this information" and we have "secret 5 information." 6 So it appears to be secret information 7 it's referring to. Maybe it's referring to 8 something else, but at first look, it appears to 9 be the secret information. 10 Q Is this context retrieval? 11 ATTORNEY EKLEM: Objection to form. 12 A That sentence -- the first two sentences 13 do not say that. 14 Q Does it match your -- do these two 15 sentences match your understanding of context 16 retrieval? 17 A I would like to look at this in context 18 with the paragraphs surrounding it. 19 Q Go ahead. 20 A (Document review.) 21 Yes and no. The next sentence 22 says, "While one can assume its immediate
142 1 down the stack has no ordering? 2 A The PDUs are what's passed up and down the 3 stack. 4 Is that what you're referring to? 5 Q Yes. 6 A Think of it -- think of a field or a data 7 object, yeah, sure, within a data object, there is 8 an order that you could pass simply a reference to 9 the data. And to the point you're in memory, and 10 you're not serializing the data as you would be 11 when you're transmitting data at the physical 12 layer. 13 When you're at the physical layer, if you 14 look in ISO, it's -- one bit at a time is the PDU. 15 Q Can you turn to Page 8 of Basturk. 16 Can you read the first sentence of that 17 page aloud. 18 A "Both signature computation and encryption 19 decryption rely on the use of secret information 20 (key) shared by two communicating parties." 21 Q And could you read the second sentence. 22 A "Retrieval of this information is	144 1 availability when transmitting data, it must 2 typically be retrieved upon receipt of a packet, 3 and this context retrieval step can introduce 4 latency." 5 So it's basically admitting that -- 6 basically, what I said before, and that is, when 7 you have -- when you're an environment where you 8 have been communicating with an entity, it's 9 immediately available. 10 And so this is an admission there in that 11 there is effectively caching. There's no -- it's 12 not rocket scientist -- science that you would 13 cache keys used to cryptographic information that 14 are used for communication. 15 So I'm not sure -- when reading this, I 16 think they basically admit that there is no 17 context retrieval. They're saying one can assume 18 its immediate availability. 19 In the context of this reference, it's 20 using context retrieval and associating it with 21 latency. And there is no latency here. It's 22 immediately available.

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145 1 So you're kind of in a weird area that I 2 was kind of referring to before. When two parties 3 are communicating and they negotiate a key, you're 4 not going to -- any design is not going to throw 5 that key away. You're just going to cache the key 6 so it's immediately available. And that's one of 7 the reasons why -- for my opinion. 8 Q And to be clear, you're talking in the 9 context of transmitting data when referring to the 10 immediate availability of context information; is 11 that right? 12 ATTORNEY EKLEM: Objection to form. 13 A Can you repeat the question, please? 14 Q When transmitting data, is there immediate 15 availability of the context information? 16 A It's referring to the context information 17 as secret information, and it's saying that one 18 can assume immediate availability when 19 transmitting data. That's referring to the secret 20 information. 21 And I'd further add, upon receipt 22 information -- receipt of information, as I've	147 1 communicating with someone. You don't throw the 2 key away. You keep the key until the 3 communication is completed. 4 Q If you -- 5 A So this is essentially Basturk admitting 6 that context retrieval really is not a relevant 7 issue because data is immediately available. 8 Q If you're not already communicating with 9 someone, as you say, would there be an 10 introduction of latency when you're retrieving the 11 context information on the reception side? 12 A Not in the context of Basturk. 13 Q What is your basis for that? 14 A It uses authenticated key exchange where 15 the parties negotiate a session key. And so both 16 parties, right then and there, have got the key 17 and have it in memory. 18 Q Do you disagree with Basturk when it 19 says, "It must typically be retrieved upon receipt 20 of a packet, and this context retrieval step can 21 introduce latency"? 22 A I'm sorry. I kind of missed where you
146 1 said many times, when you're communicating with a 2 party, you -- like, you have a -- when you're 3 communicating with a party -- and now I like the 4 word "immediate availability." That's what 5 happens when you've got something in cache or in 6 memory, because you're already communicating with 7 someone. So there is no latency to speak of. One 8 cycle, maybe, to do a lookup or retrieve something 9 out of memory. I wouldn't say that's latency, 10 like, increased latency. 11 Q Basturk is saying that context retrieval 12 step can introduce latency, right? 13 A While it's saying context retrieval can 14 be -- introduce latency, it's now admitting that 15 context retrieval, when you're the sender, has 16 immediate availability for context information. 17 And as it's moved to that position, it's also my 18 position -- so that's their position, that you 19 really don't have context retrieval upon sending, 20 which I would agree. 21 You really don't have context retrieval 22 issues upon receipt because you're already	148 1 were referring to. 2 Is that the same paragraph or... 3 Q Correct. 4 A What does the sentence start with? 5 Q "While one can assume its immediate 6 availability when transmitting data." 7 A Okay. 8 Q And my question was, for the second half 9 of that sentence, do you disagree with Basturk 10 when it says, "It must be typically retrieved upon 11 receipt of a packet, and this context retrieval 12 step can introduce latency"? 13 A I -- I think the paper is inaccurate when 14 it comes to it describing latency benefits. And 15 it essentially admits it right here when it 16 says, "Immediately availability when transmit." 17 So now, elsewhere in the paper, there is 18 no issue of -- of -- elsewhere in the paper, there 19 is supposedly an issue of latency for context 20 retrieval. But now there isn't any for 21 transmission. And for the same reasons there 22 isn't any latency for transmission, there is also

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149 1 no latency for reception. 2 And the reason being is, if you look -- at 3 least one reason -- if you look at the context 4 of -- of Basturk, it's using authenticated key 5 exchange protocol. And this is a protocol where 6 parties communicate to establish a key. And when 7 that occurs, both a sender and receiver have a key 8 in memory. And when the next packet happens, 9 there is no context retrieval. There is -- the 10 key is immediately available. 11 Even if you want to call that "context 12 retrieval," it's nothing. It's insignificant. 13 It's already in memory. 14 ATTORNEY PERBOHNER: Is it okay if we take 15 a five-minute break? 16 ATTORNEY EKLEM: Sure. 17 (Recess.) 18 BY ATTORNEY PERBOHNER: 19 Q Did you discuss the substance of your 20 testimony with counsel during the break? 21 A No. 22 (S.S. Exhibit 5, '682 Patent, marked for	151 1 Q Can you point me to where you've been -- 2 where you're referring to. 3 A On Page 11 of my vitae, at the top. 4 Q Can you describe the work you did for 5 Siemens? 6 A Yes. 7 I provided expert services for Avaya, 8 Siemens, and Mytel, in a case brought by VirnetX 9 regarding voiceover IP signaling protocols focused 10 on SIP-enabled IP telephony and security. 11 (Reporter clarification.) 12 A Sorry. 13 Voiceover IP signaling protocols focusing 14 on SIP-enabled IP telephony and security. And 15 there I provided an expert report on validity and 16 was deposed. 17 Q Have you ever been employed by Siemens as 18 an employee? 19 A No. 20 Q Do you have any relationship with Siemens 21 today? 22 A No.
150 1 identification.) 2 Q I'm handing you U.S. Patent Number 3 7266682, which is Exhibit 1001 in this IPR. 4 Do you recognize this exhibit? 5 A Yes. 6 Q What is it? 7 A It's the '682 patent. 8 Q When did you last review the '682 patent? 9 A A few minutes ago, I was looking at it. 10 Q When did you last review the '682 patent 11 in full? 12 Have you reviewed the '682 patent in full? 13 A Yes, many times. I would say, within the 14 last couple of days. 15 Q I noticed you brought in your own copy of 16 the '682 patent. I wanted to confirm that that 17 was a clean copy. 18 Do you see at the top left-hand side of 19 Page 1, the assignee is Siemens? 20 A Yes, yes. 21 Q Have you ever been employed by Siemens? 22 A Yes. As a consulting project.	152 1 Q Do you have any contracts with Siemens? 2 A I would view that as a relationship. No. 3 Q At the top left-hand side of the '682 4 patent, do you see where it lists the inventor, 5 Martin Euchner? 6 A Yes. 7 Q Do you know who Martin Euchner is? 8 A He's listed as the inventor. That's what 9 I know about him. 10 Q Had you heard of Martin Euchner prior to 11 looking at the '682 patent? 12 A I don't recall hearing about him. 13 Q Can you turn to Page 6 of the '682. 14 Do you see at Line 20, the term "OSI 15 reference model" is used? 16 ATTORNEY EKLEM: Objection to form. 17 A Can you repeat the question? I didn't 18 hear the beginning of it. 19 Q On Column -- in Column 1, at Line 20, do 20 you see the term "OSI reference model" used? 21 A Yes. 22 Q And do you see Column 1, Line 23, that the

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153 1 OSI reference model is considered "OSI model" for 2 short? 3 A Yes. 4 Q What is the OSI model? 5 A It's a way of describing protocol stacks 6 using seven layers. And it describes 7 functionality associated with layers. And it's – 8 I think it's referred to as a reference model, in 9 that, it's not specifically designing protocols, 10 but it's giving an idea of how to refer to and 11 understand communication protocols as they fit 12 within this model. 13 Q What is your understanding of the OSI 14 models as used in the '682 patent? 15 ATTORNEY EKLEM: Objection to form. 16 A Is there a specific area you're referring 17 to? 18 Q No. 19 A No? Well, in the background of the 20 invention, in Column 1, it refers to the OSI model 21 and describes the layer aspects. 22 It then says, "In practice, many	155 1 Q In the context of '682, your years of 2 experience in computer networking. 3 A So both my previous experience and the 4 '682? 5 Q Yes. 6 A I didn't look for the specific definition, 7 although I do have claim construction opinions on 8 Page 42 of my report. 9 I'd look to see – you're asking within 10 the context of '682. I need to, like, read a 11 little bit more of the '682, if there is a 12 particular area you want me to reference. 13 Otherwise, I'll look through '682 to see how it 14 uses the word "protocol." 15 Q Well, just generally, sitting here today, 16 in your years of experience, what is a protocol? 17 A So not in the context of the '682 patent? 18 Q Sure. We'll start there. 19 A And a protocol, even without the context 20 of communication, it's some set of rules or 21 rules – rules of operation. 22 Q And how about in the context of
154 1 applications do not always permit an exact 2 nomination of strict boundaries between the upper 3 protocol layers, particularly Layers 5 to 7." 4 Q What does that sentence mean? 5 A So we're talking about in practice. And 6 in practice, for example, it's in – when we've 7 got – when protocols have been established, now 8 we've got a reliable or Ethernet, which has been 9 around for a long time at the lowest level. We 10 have data link layers associated with the 11 Internet – you've got Internet protocol or 12 Internet protocol Version 4 and 6 at Layer 3. 13 Then there's various transport protocols. 14 But what it's saying is, in practice, when 15 we get up to the higher layers, the – many 16 applications do not permit exact nomination of 17 strict boundaries between the layers, particularly 18 5 through 7. 19 And then they give an example. 20 Q What is a protocol? 21 ATTORNEY EKLEM: Objection to form. 22 A What's the context?	156 1 communication on computer networking? 2 A It's similar, but then the context is, 3 with respect to, for example, what behavior you 4 would do based on different events that may occur. 5 Q Is the OSI model a protocol? 6 A So can you pull up the Tanenbaum 7 reference, Exhibit 1009? 8 Q Just sitting here today, can you tell me 9 whether the OSI model is a protocol, based on your 10 experience? 11 A The OSI model is very large, and I would 12 like to give an accurate answer to that question. 13 Q Just based on your years of experience. 14 A It's called "OSI reference model." I 15 would need to look at the reference to answer 16 that. 17 In part, for example, you can have a 18 protocol that's abstract that's still a protocol. 19 And I would need to look at the reference, for 20 example, to see if there an abstraction of the 21 protocol in the reference. So I don't know 22 without looking at it.

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157 1 Q So is it your testimony that without 2 Tanenbaum, you can't tell me whether an OSI model 3 is a protocol or not? 4 ATTORNEY EKLEM: Objection to form. 5 A The question was the OSI reference model, 6 and we're really talking about the entire document 7 that specifies the reference model. So I would -- 8 Q Do you agree with me -- 9 A I would like to -- and I can do it without 10 Tanenbaum if you just simply provide me the OSI 11 reference model document. And I've seen it 12 before, but it's been a time ago. I've seen, of 13 course, Tanenbaum, but I've seen an original 14 reference model. I would need to look at it. 15 I don't recall if there's a -- as I said 16 already, whether there is an abstract protocol 17 within the reference model. 18 Q Is the OSI reference model a protocol? 19 A I've kind of described the seven-layer 20 description that's normally used when you're 21 talking about the reference model. But the OSI 22 reference model is quite technical and it's quite	159 1 protocol, to answer your question. So I can't 2 answer your question the way you phrased it 3 without providing me the document. 4 Q Are there boundaries in the OSI model? 5 ATTORNEY EKLEM: Objection to form. 6 A There are description of the layers -- 7 there is a description of the layers in the OSI 8 reference model. And I'm not sure if "boundaries" 9 is the correct way to describe it, but there is 10 layers described and functionality associated with 11 layers. I'm not sure if the word "boundaries" is 12 used. I don't... 13 Q Can you look at Column 1, Line 37 of the 14 '682 patent, please. 15 A Yes. 16 Q What does "strict boundaries" mean in this 17 sentence? 18 A The OSI model has got layers, and that we 19 looked at before in Exhibit 1009, at 50, and 20 they're referring to between the upper protocol 21 layers, particularly Layers 5 and 7. So it's 22 referring to boundaries between the upper Layers 5
158 1 large. I would need to -- and when you say the 2 word "OSI reference model," you're really 3 referring to that document. 4 Q So I'll ask the question again. 5 Is the OSI reference model a protocol? 6 A To answer that question, I would need the 7 document. 8 Q So sitting here today, you can't answer 9 whether the OSI model is a protocol or not? 10 A Like I said, the OSI reference model is a 11 very large document that describes the layers. 12 And I would need to look at it to see if there is 13 a protocol in the document. 14 So, no. I wouldn't want to give you an 15 incorrect answer without looking at the document. 16 Q Would you disagree with me when I say that 17 the OSI reference model is not a protocol? 18 A Again, OSI reference model is kind of an 19 abstraction of protocol layers, and I would need 20 to look at the document, which is quite large and 21 quite complicated. And I would look at that to 22 see if it references, for example, an abstract	160 1 through 7. 2 So it appears to be talking about 3 between -- between 5 and 6, and 6 and 7 protocol 4 layers in the OSI reference model. 5 Q What is a boundary? 6 ATTORNEY EKLEM: Objection to form. 7 A For the exact phrase of "boundary," I 8 would like to see whether this reference, 1009, 9 uses the term "boundary" in the OSI reference 10 model. 11 Q In the context of the '682 patent, in the 12 sentence we just looked at, what does "boundaries" 13 mean? 14 A Well, they give an example. "By way of 15 example, within the context of Internet telephony, 16 i.e., the use of telephone service using the 17 medium of the Internet, the three layers above 18 transport Layer 4 combine to form an application 19 layer for which a similar way to" -- 20 Excuse me. 21 So "for which, in a similar way to in the 22 implementation above, an 'application protocol.'"

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161 1 Q Are you saying that's an example of a 2 boundary? 3 A They gave an example here where transport 4 layers three layers above the transport layer 5 combine to form an application layer. And that's 6 an example. 7 If you read it in this context, they're -- 8 you read in this context, then it's along the 9 lines of -- the lines of my claim construction 10 portion where the application layer would mean to 11 a POSITA with respect to '682 as being the layers 12 above the transport layers, layers above 4. So it 13 would be the layers, including the application 14 layer, which are above Layer 4. 15 Q In the context of the OSI model, are there 16 boundaries between each layer? 17 A I don't know if they used the term 18 "boundaries." I would have to look at the 19 reference. 20 Q Just sitting here today, as 30 years as an 21 expert in the field, are there boundaries in 22 between each layer of the OSI model?	163 1 functionalities associated with layers, and 2 they've got different names associated with the 3 layers. And there is this level that I describe 4 in my report, of levels of abstraction, where you 5 go from one layer to the next, and Exhibit 1009 at 6 50, which is described on Page 18 in my report. 7 So there is functionality associated with 8 each layer. 9 Q Could you please answer my question with a 10 "yes" or "no." 11 Are there boundaries between the OSI model 12 layers? 13 ATTORNEY EKLEM: Objection to form. 14 A I would like to read the OSI reference. I 15 mean, you're asking a very specific question about 16 the OSI reference, and I would like to see the 17 reference. I can't answer it unless I see the 18 reference. 19 I'd like to see, for example, do they 20 describe the word "boundaries" there? Where do 21 they describe other than what I have here? 22 Q In your opinion, why would the '682 patent
162 1 A I'd feel more comfortable looking at the 2 reference to give you a good answer. 3 Q That's not my question. I'll just repeat 4 it here. 5 Sitting here today, with 30 years as an 6 expert in the field, are there boundaries between 7 each layer of the OSI model? 8 A I'd like to see the reference that I cited 9 in my report to answer this question. And also, 10 it's referenced in the -- this particular portion 11 of the specifications, are you saying that you 12 won't provide the reference that this is referring 13 to? 14 For example, it refers to -- the 15 particular reference I use, Tanenbaum, when 16 describing OSI, I'd like to see that. I use -- I 17 had access to that when I wrote my report. 18 Q This is a simple yes-or-no question. 19 Are there boundaries between the OSI model 20 layers? 21 ATTORNEY EKLEM: Objection to form. 22 A The OSI model has got layers with	164 1 refer to in between layers as boundaries? 2 ATTORNEY EKLEM: Objection to form. 3 A Can you repeat the question, please? 4 Q In the '682 patent, why would they refer 5 to boundaries between layers? 6 A As they say here, "In practice, many 7 applications do not always permit exact nomination 8 of strict boundaries specifically between network 9 protocol layers, specifically Layers 5 to 7." 10 So they're saying, in practice, 11 applications are not -- do not necessarily follow 12 the specific layers mentioned in OSI between 13 Layers 5 and 7. 14 Q Would you agree with me that the OSI 15 reference model does not have boundaries? 16 A I can't answer that question. 17 Q Sitting here today, you can't give me a 18 "yes" or "no" as to whether you agree that the OSI 19 model does not have boundaries? 20 ATTORNEY EKLEM: Objection to form. 21 A I can answer that question if you can 22 provide me with a reference. That's a very large

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165 1 technical reference. I'd like to see -- and it's 2 an abstract model. I'd like to see what they say 3 about the word -- about boundaries within that. 4 But they give an example which gives you a 5 sense for what the patent is using in terms of the 6 boundaries. I'd like to see whether, within OSI 7 and OSI whether they're using the word 8 "boundaries," for example, and what words they use 9 between the layers. 10 Q So you can't tell me, sitting here today, 11 whether the boundaries, as used in the '682, is 12 the same as boundaries used in the ISO model? 13 ATTORNEY EKLEM: Objection to form. 14 Q The OSI model? 15 A I feel like I've answered that question 16 several times. I can answer that if you wish. 17 Q Yes. Please answer. 18 A Can you repeat the question? 19 Q Sitting here today, you can't give me a 20 "yes" or "no" as to whether the -- let me 21 rephrase. 22 Is the word "boundary," as used in the	167 1 ATTORNEY EKLEM: Objection to form. 2 A That wasn't a -- something I opined on. 3 Q In your experience, are you aware of any 4 other examples where layers are combined? 5 A I think, in the IEEE model -- in the IEEE 6 model, with respect to the physical and link 7 layer, the media access layer, I think there is 8 some differences in lining up the terminology 9 between the OSI model and the IEEE model. This is 10 for Ethernet, different versions of Ethernet. 11 Q Can you turn to your declaration. 12 On Page 93, Paragraph 108. Towards the 13 bottom -- 14 A Let me get a sense of the context of 15 what -- we just kind of jumped into my report. 16 It's 136 pages. I'd like to see what section I'm 17 in. 18 Okay. This is with respect to motivation 19 to combine Hanley with Basturk. 20 In what Paragraph? 108. 21 Q 108. 22 A Okay.
166 1 '682 patent, the same as "boundaries" as used in 2 the OSI model? 3 ATTORNEY EKLEM: Objection to foundation 4 and form. 5 A For me to answer that question, I would 6 need to look at the OSI reference model document. 7 Q This example, starting at Column 1, 8 Line 40, are Layers 5, 6, and 7 combined? 9 A Which lines are you referring to? 10 Q Column 1, Line 40 through 45. 11 A Okay. Repeat the question, please. 12 Q So this example, starting at Column 1, 13 Line 40, are Layers 5, 6, and 7 combined? 14 ATTORNEY EKLEM: Objection to form. 15 A It says in this -- in this portion it says 16 "the three layers above the transfer Layer 4" -- 17 so that would be 5, 6, and 7 -- "combine to form 18 an application layer for which, in a similar way, 19 to" -- and then in the notation above, "an 20 application protocol was used." 21 Q Are you aware of other examples in which 22 layers of the OSI model can be combined?	168 1 Q Do you see the sentence that starts at the 2 bottom, "Thus, a POSITA would have understood 3 that"? 4 A Are you looking at the very last sentence? 5 Q It's the fifth line from the bottom. 6 A The which line? 7 Q The fifth line from the bottom. 8 A Oh, just not the sentence, the line? 9 Q Correct. 10 Can you read that sentence aloud? 11 A "Thus, a POSITA would have understood that 12 even with Basturk on-the-fly processing, packets 13 would not be passed to the next layer until all 14 computations for the packet are complete. A 15 POSITA would, therefore" -- just that one line? 16 Q Just that one sentence. 17 How do you reconcile this sentence in 18 Paragraph 108 of your declaration with '682's 19 patents teaching that layers can be combined? 20 ATTORNEY EKLEM: Objection to form. 21 A Okay. We just jumped into a new 22 reference. This is in reference with Hanley as

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169 1 well. Let's see. I was talking about Basturk. 2 Okay. What's your question? 3 Q How do you reconcile the sentence in 4 Paragraph 108 of your declaration, the '682 5 patents teaching that layers can be combined? 6 ATTORNEY EKLEM: Objection to form. 7 A I think this -- as I describe later in 8 this paragraph, this is consistent with the 9 layering process where transmission occurs at the 10 physical layer. 11 Because the next sentence says, "A POSITA 12 would therefore not have understood Basturk's 13 on-the-fly computation be done with the 14 transmission of the packet, such that the computer 15 signal is placed at the end of the packet just as 16 the transmission is complete, as Dr. Houh 17 incorrectly suggests. 18 "A POSITA would therefore have understood 19 that Basturk's on-the-fly processing does not 20 require the use of the trailer replacing the 21 signature at the end of the packet." 22 So this is more than simply -- in this	171 1 halfway through, where it starts, "Basturk gives 2 examples"? 3 A I see that. 4 Q Can you read that sentence aloud. 5 A "Basturk gives examples stating that 6 integrity is usually guaranteed by signing the 7 data before passing it to the transport level." 8 In Exhibit 1005, at 3 to 4, "A POSITA 9 would have understood this" -- 10 Q That's enough. Just that sentence. 11 This sentence is saying that data is 12 signed, correct? 13 A Could this be the wrong reference number 14 for Basturk in this part? It should be 1006? 15 Q Correct. 16 A Okay. I see what it's referring to now in 17 the -- in Basturk. 18 What's the question? 19 Q This sentence is saying that data is 20 signed, correct? 21 A What about -- what about it? 22 It says, "Integrity is usually guaranteed
170 1 line here, it's more than just simply the next 2 layer. This really is where there is no issue 3 at -- even within the '682 patent. When you get 4 to the lower layers, there seems to be no 5 discrepancy with the OSI model. And -- and it is 6 consistent with the OSI model at the lower layers 7 where you still don't have transmission until 8 you're at the physical layer. 9 And like I said, you would not have 10 understood that Basturk's on-the-fly computation 11 to be done with -- to be done in parallel with 12 packet transmission. 13 So I think this is a lead-up to, really, 14 the last -- the next sentences, which, 15 effectively, are saying -- where there is no 16 question about the ISO layers and transmission at 17 the physical layer. 18 Q Will you please turn to Page 59 of your 19 declaration. 20 A Okay. 21 Q And I apologize. Page 59, Paragraph 76. 22 Do you see in the bottom paragraph,	172 1 by signing the data before passing it to the 2 transport layer." 3 Q So is -- are you saying that data is 4 signed before passing it to the transport level? 5 ATTORNEY EKLEM: Objection to form. 6 A I'm simply quoting Basturk. And in this, 7 he's talking about application level security. 8 And he's referring to the sender applying 9 cryptographic functions to his data before passing 10 it to the transport layer for conveyance. And in 11 this approach a Kerberos and KryptoKnight, 12 integrity is usually guaranteed by signing the 13 data before passing it to the transport layer." 14 So what's the question? 15 Q What level is the data signed at? 16 A At the application level. 17 Q Is the data signed by the application? 18 A Where are you seeing "the application"? 19 Q An application at the application level. 20 ATTORNEY EKLEM: Objection to form. 21 A I don't have a good context for your 22 question. I don't understand your question.

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173 1 Q What would be signing the data at the 2 application layer? 3 A In the reference, it says that the 4 application security occurs at the application 5 level, and it shows -- it says that this approach 6 of Kerberos and KryptoKnight does this approach. 7 Q So I'll ask the question again. 8 What would be signing the data at the 9 application layer? 10 A I just told you. 11 Q Can you clarify? 12 A It's the approach, in this example, that 13 Kerberos and KryptoKnight would be the entity 14 performing the signing. 15 Q So after the data is signed at the 16 application layer, what happens next? 17 ATTORNEY EKLEM: Objection to form. 18 A In this particular example, is he 19 referring to the particular example that's being 20 referenced? 21 Q Correct. 22 A It doesn't specify. I think it's highly	175 1 A Can you point to me where in your report 2 you're referring to? 3 Q Page 8, right before Subsection 2.2. 4 A In my report? 5 Q No. On Page 8 of Basturk. 6 A 2.2, Page 8. Okay. 7 Q What is hardware utilization? 8 A Which line is that on? 9 Q The line directly above Subsection 2.2. 10 A It says, "Hardware utilization is 11 facilitated whenever possible." 12 So I can see if it clarifies that 13 anywhere. 14 I think he's simply saying use hardware 15 where it's possible. 16 Q How would you use hardware where it's 17 possible? 18 ATTORNEY EKLEM: Objection to form. 19 Scope. 20 A That's not something I opined on. 21 Q Well, just sitting here today, what do you 22 think the authors of Basturk meant when they said,
174 1 dependent upon the application, what happens next 2 after it's signed by Kerberos or KryptoKnight. 3 Q Does it not say that it's passed down to 4 the transport layer? 5 A Not necessarily. It may say that, but 6 I've worked with Kerberos before, and that's -- 7 there is an application involved here, and it's 8 using the application security of crypto -- 9 Kerberos or KryptoKnight. 10 Q So Basturk is not saying that after the 11 data is signed, it's passed to the transport 12 layer? 13 A I think you're asking a different 14 question, whether the application was signed or 15 what the application -- or what is happening with 16 it. 17 The point is, is that, depending upon the 18 particular use of KryptoKnight or Kerberos, it 19 depends on the context of the example. 20 Q Let's turn back to Basturk. 21 Does Basturk contemplate the use of 22 hardware utilization?	176 1 "Use hardware"? 2 ATTORNEY EKLEM: Same objections. 3 A I can't get into their mind, what they 4 meant. They're simply saying there, use hardware 5 when it's possible, whenever it's possible. 6 Q What do you think of Basturk as a 7 reference means when it says, "Hardware 8 utilization"? 9 A I'm sorry. I didn't hear that. 10 Q What do you think that Basturk means when 11 it says, "Hardware utilization"? 12 A I think they're saying to summarize 13 requirement for timely and on-the-fly secure 14 computations translates into three specific design 15 rules. And the third is, hardware utilization is 16 facilitated wherever possible. 17 That seems like a fancy way of just 18 saying, "Use hardware when you're able." 19 Q In your experience, where would you use 20 hardware? 21 ATTORNEY EKLEM: Where? 22 Q Where would you use hardware in computer

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177 1 networking? 2 A That's not something I was asked to opine 3 on in my report. 4 ATTORNEY EKLEM: Objection. 5 Q Just sitting here today. 6 A Again, that's not something I was asked to 7 opine on. 8 Q Well, I'm asking you the question now, not 9 whether you'd been asked to opine on it or not. 10 ATTORNEY EKLEM: Is there a question 11 pending? 12 Q Where would you use hardware in computer 13 networking? 14 ATTORNEY EKLEM: Objection to form and 15 scope. 16 A This is a very broad question. So if you 17 can narrow the question down a little bit, that 18 would be helpful. 19 Q Can you turn to Page 7. 20 The last paragraph, can you read the first 21 sentence. 22 A "Computation of cryptographic functions	179 1 computation of cryptographic functions? 2 ATTORNEY EKLEM: Objection to scope. 3 A That's not something I've opined upon. Is 4 there a particular context you want to talk about? 5 Q In the context of Basturk. And that's not 6 what I'm asking. 7 I'm asking you, just sitting here today, 8 how would dedicated hardware help speed up 9 computation of cryptographic functions? 10 ATTORNEY EKLEM: Objection to scope. 11 A That's not something I've been asked to 12 opine on or even – that's not something I 13 addressed specifically. 14 Q Well, I'm asking you, right now, can you 15 tell me how the use of dedicated hardware would 16 speed up the computation of cryptographic 17 functions? 18 A It's just simply saying that, use 19 dedicated hardware to speed up cryptographic 20 functions. 21 Q So sitting here today, you can't tell me 22 why that's so?
178 1 can be greatly speeded up by using – by use of 2 dedicated hardware." 3 Q What does this sentence mean to you? 4 A Like – it means what it says. I can 5 reword it, but it's basically what it says. 6 Q Why would you use dedicated hardware to 7 compute cryptographic functions? 8 A This – this line says you want to do it 9 to speed up – to speed up the computation. 10 Q Why would it speed up the computation? 11 A It doesn't necessarily speed up the 12 computation, but depending on the context. But it 13 may speed up the computation. 14 Q How so? 15 A Dedicated hardware – so which 16 cryptographic function are you referring to? 17 Q Whichever one it's referring to in that 18 sentence. 19 A Doesn't say just computation of 20 cryptographic functions. 21 Q Well, as your years of experience, how 22 would using dedicated hardware speed up the	180 1 A It assumes that you have dedicated 2 hardware for whatever cryptographic function that 3 needs to be performed. 4 Q And you have nothing else to add? 5 A If you just look at that – that sentence, 6 that's what it says. 7 Q Is dedicated hardware separate from other 8 hardware? 9 ATTORNEY EKLEM: Objection to form. 10 A That's not something I've been asked to 11 opine on, and I don't understand your question. 12 Q Well, what does "dedicated hardware" mean 13 in the context of Basturk? 14 A It's hardware that's dedicated in that 15 line. 16 Q Does that mean that the hardware is 17 separate from other hardware? 18 A I don't know. 19 Q Sitting here today, you don't know? 20 A What do you mean by "separate"? 21 Q Just the word's plain and ordinary 22 meaning.

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181 1 A I don't understand the question. 2 Q Are there functions other than 3 cryptographic computation discussed in Basturk? 4 A In Basturk? 5 Q Correct. 6 A I'm beginning to look through. 7 It depends what you call cryptographic 8 functions. Is that what you said, cryptographic 9 functions? 10 Q Correct. 11 A I see on Page 3, it talks about a random 12 shared secret. That would be a random number 13 generator, not necessarily a cryptographic 14 function, but it's a function that's useful in 15 cryptography. 16 Q Do you see at the bottom of Page 4, in 17 Footnote 3, where it says, "Transport functions"? 18 A So you want me to skip and just go to 19 that. So bottom of Page 4? Okay. 20 Q Footnote 3. 21 A Where does the footnote go to? 22 Okay. I've looked at 3 and the paragraph	183 1 back. 2 And so what's your question? 3 Q Is transport functions in Footnote 3 4 different than cryptographic functions as listed 5 on Page 7? 6 A Okay. Can you repeat the question, 7 please? 8 Q Transport functions in Footnote 3 9 different than cryptographic functions listed on 10 Page 7? 11 A Footnote 3 is talking about an adversarial 12 attack where there was security on the application 13 level but not on the transport layer. And so they 14 give this hypothetical example. 15 And in the hypothetical example, I think 16 they show that the application might believe 17 something was delivered, even though it wasn't, 18 because there is no cryptography being used on the 19 transport layer. 20 Does that answer your question? 21 Q No. 22 A Okay.
182 1 associated with Footnote 3. 2 What's your question? 3 Q Do you see where it says, "Transport 4 functions" in Footnote 3? 5 A Yes. "Functions," plural. 6 Q Are those functions different than 7 cryptographic functions? Meaning, are those 8 functions different than the computation of 9 cryptographic functions? 10 A (Document review.) 11 Q Are you still reading? 12 A Yeah. I'm trying to understand what's 13 going on here. I need a little bit more time to 14 figure out what's going on, what they're talking 15 about here. 16 (Document review.) 17 Okay. I'm not sure if I fully understand 18 it, but it appears to be a scenario where there's 19 no security at the transport layer, and the 20 transport sender application believes that it had 21 been received because the adversary sent an 22 acknowledgment using -- without a signature going	184 1 Q I'll ask it again. 2 Are the transport functions, as listed in 3 Footnote 3, different from the cryptographic 4 functions listed on Page 7? 5 It's a simple yes-or-no question. 6 A That question doesn't make sense. 7 Q Are there -- are they talking about two 8 different sets of functions? 9 A They're talking about a hypothetical 10 example with an architecture. And they're not 11 talking about some specific design within Basturk. 12 Q What are transport functions? 13 A They're referring to reliable delivery, 14 like in TCP. 15 ATTORNEY PERBOHNER: Okay. Is now okay 16 for a five-minute break? 17 ATTORNEY EKLEM: Yeah, sure. 18 (Recess.) 19 BY ATTORNEY PERBOHNER: 20 Q Did you discuss the substance of your 21 testimony with counsel during the break? 22 A No.

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185 1 Q All right. Let's turn to Page 4 of 2 Basturk. 3 In the first full paragraph, do you see 4 where the word "reliability" is used? 5 A Yes. 6 Q What is reliability? 7 A They're referring to – they're referring 8 to reliable delivery. They didn't use the word 9 "delivery," but they're referring to reliable 10 delivery that you keep track – the sender is able 11 to keep track of what was actually received, each 12 packet, what was received by recipient. 13 The recipient acknowledges, in some 14 manner, receipt of the packet, and the sender 15 makes use of the acknowledgment to see that the 16 packet doesn't need to be resent. 17 So that's a primary aspect of reliability. 18 There's other aspects. 19 Q Can you turn to your declaration at 20 Page 96. 21 The first full sentence on that page 22 starts with, "Reliability is."	187 1 reference? 2 Q I can provide you a reference. 3 A Thank you. 4 (S.S. Exhibit 6, Document Entitled, Very 5 large conferences on the Internet: The Internet 6 Multimedia Conferencing Architecture and the 7 MBONE, marked for identification.) 8 A Okay. I'm ready. Thank you. 9 Q Okay. Do you see the sentence that starts 10 with, "Reliability is"? 11 On Page 96, the first full sentence. 12 A Yes. And what I just said before, lost 13 was one example, and as I said before, there is 14 other potential examples of reliability – 15 reliable delivery. 16 Q So including these and what you listed 17 previously, what are all the abilities that 18 reliability has? 19 A It includes these. Damaged. So it's – 20 it's been modified to somehow it's lost, which I 21 said before. Duplicated. For example, a packet 22 could be received twice, based on issues in the
186 1 Do you see that? 2 A I see that we're into Hanley. 3 Do I have the Hanley reference? 4 Q This is still discussing the switch 5 protocol for reliable transport. 6 A Well, the title of the subsection, if I'm 7 not wrong, on Page 95, the page before it, it 8 says, "Basturk's protocol for reliable transport 9 is incompatible with Hanley's use of RTP over 10 UDP." 11 I'd like to see Hanley. Maybe I have it. 12 Q You do have it. 13 Before we get to Hanley, do you see the 14 sentence that begins with, "Reliability is the 15 ability"? 16 A On which paragraph, 109? 17 Q Paragraph 111. 18 A Okay. 19 Q On Page 96. 20 A On the first – it's talking about Hanley. 21 Are you saying you won't provide the 22 reference to me when we're talking about a	188 1 network. And delivered out of order is quite 2 common. 3 Q Does reliability have any security 4 features? 5 A In which context? 6 Q Just in your experience. 7 A Does reliability have any security 8 features? 9 The context here is talking about 10 reliability in the context of reliable transport 11 protocols. I guess it depends on the 12 implementation in the protocol. 13 Q Does reliability have any security 14 features in the context of reliable transport 15 protocols? 16 A It depends on the protocol. 17 Q Which protocols would? 18 A Huh? 19 Q Which protocols would? 20 A If we're talking about TCP, an extension 21 on TCP that provides security, for example, 22 reliable delivery, and security cryptography,

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189 1 maybe authentication. 2 Q Does reliability guarantee the sender's 3 message was received by the intended recipient? 4 ATTORNEY EKLEM: Objection to form. 5 A Again, you keep bringing -- you keep using 6 "reliable" without using "reliable transport 7 protocol" or whatever. You -- are you using -- I 8 don't understand your context. 9 Q I'm using "reliability" in the context of 10 Basturk. 11 A So Basturk talks about the protocol that 12 they developed, which is a secure transfer 13 protocol. 14 Is that the protocol that you're referring 15 to? 16 Q Sure. 17 A So on Page 16 of Basturk, they discuss, 18 "Testing of protocol with a presence of an enemy 19 has been simulated by performing different actions 20 on transmitted packets; namely, bit flipping, 21 packet delay, misordering or loss and replay." 22 And it says, "The protocol was, therefore,	191 1 Basturk's definition of "secure delivery"? 2 A I -- I -- disagree with what he said, with 3 that secure delivery? 4 Q Yes. 5 A I think it's strange to call "not 6 intercepted." "Destroyed," I understand. "Not 7 intercepted," I don't fully understand. 8 Q Why don't you understand? 9 A You could intercept a packet, analyze it, 10 do whatever you want to it, and then put it back 11 on a network later. You would never know that it 12 was intercepted or not. 13 Q Is this saying that secured delivery 14 guarantees to the sender A, that his message was 15 received by B? 16 A Where are you reading from? I'm sorry. 17 Q That same sentence. 18 A Yeah. Yes. So it's a guarantee to the 19 sender that the message was received by B. 20 And then, not intercepted and destroyed by 21 the adversary, I think he's meaning just simply 22 destroyed. You're able to destroy the packet.
190 1 successful in preventing an enemy from taking any 2 active actions during the transfer -- transfer." 3 So I would interpret that, with other text 4 within this, that they're able to detect these 5 properties if it occurs. 6 Q Can you turn to Page 4 of Basturk, 7 subsection, "Transport Level Security Features." 8 Do you see that? 9 A Yes. This is first folder, correct? 10 Q Yes. 11 Can you read that first sentence. 12 A "Transport levels, security features, 13 secured delivering." 14 Q The first sentence of that section. 15 A "Secured delivery, roughly speaking, is to 16 guarantee to the sender, A, the message received 17 by B, not intercepted and destroyed by the 18 adversary." 19 Q Do you have any reason to disagree with 20 Basturk's definition of "secure delivery"? 21 A I'm sorry? 22 Q Do you have any reason to disagree with	192 1 Because he doesn't mean not intercepted, period, 2 or destroyed, period. It's -- he's taking this in 3 combined action, I think, is what he means by 4 this. 5 Q Do you personally have a different 6 understanding of what "secured delivery" means? 7 A He's saying, roughly speaking. So -- and 8 the examples we looked at before that I cited, 9 they're different from this. They're additional 10 properties. Let's see. 11 So bit flipping. So intercepted and 12 destroyed. I'm not -- I -- I think he was very 13 short with his definition in that paragraph. 14 Because he's much more comprehensive on Page 16, 15 where I talk about the form. 16 He's not talking about various things like 17 bit flipping, packet delay. Misordering. He is 18 talking about loss, and he's not talking about 19 replay in this particular sentence you pointed me 20 to. 21 Q Are you familiar with the transmission 22 control protocol?

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193 1 A I have familiar -- familiarity with it. 2 Q What is transmission protocol? And if 3 it's okay with you, can we refer to it as "TCP" 4 for short? 5 A Yes. 6 It's a reliable delivery transport 7 protocol. 8 Q What makes it reliable? 9 A It's Exhibit 206 -- 2006 to my report. If 10 you can provide that, I can read off exactly what 11 it says, what makes it reliable. 12 (S.S. Exhibit 7, Document Entitled, 13 Transmission Control Protocol Darpa Internet 14 Program Protocol Specification, marked for 15 identification.) 16 A I'm looking at the table of contents, and 17 it says, "2.6, Reliable Communication, Page 9." 18 So I would look there, but that's their 19 Page 9, which is the exhibit Page 15. 20 So it has, "A stream of data sent on TCP 21 connections is delivered reliably and in -- in 22 order at the destination."	195 1 between a reliable protocol versus a secure 2 protocol? 3 ATTORNEY EKLEM: Objection to form. 4 A Are you talking about transfer protocols? 5 Q Just in general, of secure protocols. 6 A I need to have some context of what you're 7 referring to. 8 Q How do you understand "secure protocol" to 9 mean, just based on your experience? 10 A Wow, that's a broad question. 11 It's a protocol, and at the very abstract 12 level, it's a protocol with some intent to provide 13 security. 14 Q Does TCP guarantee the sender's message 15 was received by the intended recipient? 16 A What do you mean by "guarantee" it was 17 received? 18 Q Can -- for example, you have Sender A to 19 Receiver B. Can Receiver B be guaranteed that the 20 message that was sent from Sender A was received 21 by B? 22 ATTORNEY EKLEM: Objection to form.
194 1 So -- so one aspect is ordering by use of 2 sequence numbers and acknowledgments. 3 Conceptually -- it performs it by retransmitting 4 packets that have been lost. Re -- actually, it 5 says TCP segments that have been lost, because 6 he's referring to segments. 7 Okay. So those are the properties. 8 It's -- there is an attempt to redeliver 9 if the packet is lost and to the end application, 10 or the end -- strike that. 11 To the end point, the TCP protocol is able 12 to order the segments so that it can pass those up 13 the stack. 14 There is no crypto -- cryptography in this 15 process. And it does it using acknowledgments in 16 sequence numbers. 17 Q Is TCP a reliable delivery protocol? 18 A It is. Now, just to be clear, it's not 19 reliable in the sense that -- if an adversary is 20 able to capture the communications, but it's 21 reliable in that -- or modify the communications. 22 Q Could you briefly describe the difference	196 1 A You could be guaranteed -- are you subject 2 to security issues in the transport -- or in 3 this -- in transport protocol? 4 Q Yes. 5 A So it's secure transport along the lines 6 of Basturk? 7 Q Well, just in general, looking at the TCP 8 protocol itself that we have here, would you say 9 that TCP guarantees the sender's message was 10 received by the intended recipient? 11 A The -- all protocols on the Internet are 12 generally best effort, and each PDU is sent with 13 best effort. It tries to deliver it. It may or 14 may not get delivered. 15 So along those lines, the fact it could be 16 dropped in a queue somewhere, but the transport 17 protocol has functionality related to those cases. 18 Q Does TCP guarantee that protocol messages 19 are not intercepted by an adversary? 20 A What do you mean by "intercepted by an 21 adversary"? 22 Q Such that the message is no longer

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197 1 received by its intended recipient. 2 A I'm not aware of any protocol on the 3 Internet that guarantees that something is 4 actually received. As I said, it's best effort. 5 The Internet is best effort to deliver it. 6 Q Does TCP guarantee protocol messages are 7 not destroyed by an adversary? 8 A No. There is no guarantee after it's -- 9 after -- no, there is no guarantees. 10 I think what you're missing in this entire 11 line of questioning is whether the sender knows 12 whether it was received or not. Part of the 13 reliable delivery protocols are that there are 14 acknowledgments in various form that enable the 15 sender to know whether retransmission is required. 16 Q Okay. Thank you for that. 17 Can we turn to Hanley. 18 Are you familiar with Hanley? 19 A Yes. 20 Q What is Hanley? 21 A It's an exhibit to Dr. Houh's report. 22 It's titled, "Very Large Conferences on the	199 1 A Can you give me the reference, please? I 2 have no reference for this. 3 Q Just sitting here today and your 4 background, generally speaking, how does RTP work? 5 A Okay. So you're going -- we're now 6 talking about RTP, and you're going to give a 7 reference? 8 Q I'm just asking, in general, in your years 9 of experience, are you familiar with RTP? 10 A I have familiarity with it. 11 Q What is RTP and how does it work? 12 A It's a realtime transport protocol that's 13 normally carried over UDP, and it's used for -- 14 primarily, for realtime communications. 15 Q So is it fair to say that Hanley discloses 16 the use of RTP? 17 A What do you mean by "discloses"? 18 Q Does it teach the use of RTP? 19 ATTORNEY EKLEM: Objection form. 20 A Was there an objection? 21 It -- it talks about use of RTP and cites 22 the specification, the RFC.
198 1 Internet. The Internet Multimedia Conferencing 2 Architecture and the MBONE." And MBONE is a 3 multicast backbone network of the Internet at the 4 time. 5 Q Have you read Hanley? 6 A Yes. 7 Q When was the last time you read Hanley? 8 A Within the last couple of days. 9 Q Can you turn to Page 8 of Hanley, 10 Section 5.2. 11 A Did you say Page 8? 12 Q Page 8, correct. 13 Does Hanley disclose the use of RTP? 14 A It has a subsection in 5.2 where it says 15 "RTP," and the main section is called, "Transport 16 Protocols." And it says, "The transport protocols 17 for realtime flows is RTP." 18 Q What is RTP? 19 A It's a realtime transport protocol. 20 Q How does that -- how does the realtime 21 transport protocol operate? 22 ATTORNEY EKLEM: Objection to form.	200 1 Q Is RTP a reliable transport protocol? 2 ATTORNEY EKLEM: Objection to form. 3 A It does not provide any enhanced 4 reliability when used over UDP. I would say, with 5 the exception that it does have ORTCP where 6 periodic reception reports are sent back so that 7 statistics, such as jitter, can potentially be 8 recognized by the sender. So that jitter can 9 be -- so that the sender can hear from recipients 10 that there may be jitter, J-I-T-T-E-R. 11 And so that's a transport feature of 12 RTP RFC. 13 (S.S. Exhibit 8, Document Entitled, 14 "PacketCable 1.4 Architecture Framework, Technical 15 Report, marked for identification.) 16 Q You've been handed a document entitled, 17 "PacketCable 1.4 Architecture Framework, Technical 18 Report," which is Exhibit 1007 in this IPR. 19 A Can we take a pause? 20 (An off-the-record discussion was held at 21 this time.) 22 (Recess.)

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201 1 BY ATTORNEY PERBOHNER: 2 Q Did you discuss the substance of your 3 testimony with counsel during the break? 4 A No. 5 Q Just before break, you were handed a 6 document titled, "PacketCable Architecture 7 Technical Report." 8 Is it okay if we refer to this as 9 "PacketCable"? 10 A Yes. 11 Q Are you familiar with this document? 12 A Yes. 13 Q What is it? 14 A It's a technical report on the 15 architecture of PacketCable Version 1.0. And it 16 talks about the functional components, protocol 17 interfaces, network design considerations, and 18 other things. 19 Q When did you first read PacketCable? 20 A I don't know. I -- I'm relatively sure 21 I've seen this many years ago. 22 Q Do you remember how many years ago?	203 1 A I've heard of them before. And, again, I 2 think my other case related to -- I believe my 3 other case related to CableLabs specifications. 4 Q What is CableLabs? 5 A It appears to be -- this document's 6 copyright, 1999, by Cable Television Laboratories 7 Inc. So it appears to be an incorporation. 8 Q Have you ever worked with CableLabs? 9 A Worked with? What do you mean by that? 10 Q Have you ever worked with the CableLabs 11 organization? 12 ATTORNEY EKLEM: Objection to form. 13 A I don't believe so, other than working 14 related to documents on the Metaswitch Networks 15 and Genband, but I don't believe they were 16 affiliated with CableLabs. I don't know. 17 Q Do you know if CableLabs is still in 18 existence today? 19 A I don't know. 20 Q Can you please turn to Page 18 of 21 CableLabs. That's Section 3.1. 22 A Okay. We're referring to Meta documents
202 1 A I'm not positive, but I believe I've 2 looked at it in 2019 -- 2018, 2019, in the 3 Metaswitch Networks case. There were a number of 4 documents. This might have been one. I don't 5 recall. 6 Q That was your first time seeing the 7 PacketCable reference? 8 A Again, I don't recall, but it could have 9 been. I could have seen it at that time. I don't 10 know. But I think, by simply looking that up, the 11 details would be there for many protocol 12 specifications. 13 Q When is the last time you read 14 PacketCable? 15 A Within the last couple of days. 16 Q Did you read PacketCable in its entirety? 17 A Within the last couple of days? 18 Q At all. 19 A When I did my report, I read it in its 20 entirety. 21 Q Are you familiar with Cable Television 22 Laboratories or CableLabs?	204 1 in this one? 2 Q Correct. 3 A Okay. 4 Q What is a multimedia terminal adapter? 5 ATTORNEY EKLEM: Objection to foundation. 6 Q Do you see the section titled, "3.1, 7 Multimedia Terminal Adapter"? 8 A I do, but having read this several times 9 and skimmed it many times, I find it's very useful 10 to look throughout the document because you pick 11 up little bits here and there with -- with these 12 components. 13 But, yes, it has a description there in 14 3.1. I put many of those aspects together with 15 respect to the MTA, the multimedia terminal 16 adapter. 17 Q So what is the purpose of an MTA? 18 A The purpose of the PacketCable 19 Architecture relates directly to the purpose of 20 the MTA. The purpose of the PacketCable 21 Architecture is, it provides requirements for 22 functional components and standardized interfaces

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205 1 between components. And they're defined in detail 2 in the specification. 3 An MTA might be an embedded client MTA. 4 And it's a client device -- MTA is a PacketCable 5 client device that contains a subscriber-side 6 interface to the subscriber's CPE, e.g., 7 telephone, and the network sites signaling 8 interface to control elements in the network. 9 CPE -- CPE refers to customer premise equipment. 10 And PacketCable also uses the term "MTA 11 application" when describing a conceptual 12 functional architecture. 13 Q What is an MTA device? 14 A I just told you. 15 Q Can you -- 16 A It's a device that contains a 17 subscriber-side interface and provides -- as I 18 discussed before, it provides standardized 19 interfaces between components. And that's one of 20 the components. 21 Q What is an MTA application? 22 A There's further description. If I can	207 1 Q Do you see the block that says, "MTA 2 application"? 3 A Yes, I see that. 4 Q What is an MTA application? 5 A If you give me a second, I need to browse 6 through the document to find that. I may have 7 written up something about it. 8 (Document review.) 9 I believe I have a discussion of it in my 10 report. Can you search for MTA application in my 11 report. Or I can look. I can take my time and 12 look. 13 (Document review.) 14 Okay. Here we go. So starting on 15 Paragraph 91, and on to the next page, on Page 81 16 to 82 of my report. 17 PacketCable states, "An MTA is a 18 PacketCable client device that contains a 19 subscriber-side interface to the subscriber's CPE, 20 customer premise equipment, e.g., telephone, and 21 network sites equipment signalling to call control 22 elements in the network. PacketCable also uses
206 1 just put a slight hold, there is a further 2 description of the MTA. 3 MTA provides CODEX and all signaling and 4 encapsulation functions required for media 5 transport and call signaling. 6 I have that on Page -- Paragraph 94 of my 7 report. 8 And you asked about MTA application. 9 Also says, "An MTA is responsible for" -- 10 this is in Paragraph 98 of my report -- 11 "responsible for authentication, confidentiality 12 integrity some messages between the MTA and other 13 PacketCable network elements." 14 Q So I'll ask my question again because I'm 15 not sure I got a clear answer. 16 What is an MTA application? 17 A Do you have a particular area in the 18 report you're referring to or the -- or the 19 PacketCable? 20 Q On Page 20 of PacketCable. 21 Do you see Figure 4? 22 A Yes.	208 1 the term 'MTA application' when describing a 2 conceptual functional architecture." 3 On Exhibit 107 at 20, "PacketCable uses 4 the phrases 'MTA application' as distinct from the 5 MTA device that contains a subscriber-side 6 interface and is consistent with packet cable's 7 motivation to support the development of 8 packetized voice and video applications." 9 Q What's the difference between an MTA 10 device and an MTA application? 11 A An MTA device is a PacketCable client 12 device that contains a subscriber-side interface 13 to the customer premise equipment and the 14 networking side interface to call control elements 15 in the network. That's different from an MTA 16 application. 17 An MTA application is distinct from an MTA 18 device that contains a subscriber-side interface 19 and is consistent with packet cable's motivation 20 to support the development and deployment of 21 packetized voice and video applications. 22 So here you see that the MTA application

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209 1 is an application that can make use of services 2 provided by the MTA. 3 Q Does the MTA device make use of the MTA 4 application? 5 A It's the other way around. You have an 6 application on the MTA device. And when you look 7 at the context here, you're looking at -- I mean, 8 look at Figure 1007, at 18. 9 Basically, you have an MTA/cable modem, 10 and you had in -- historically, you had the 11 interface to customer premise equipment. 12 Similarly, you have -- in this 13 architecture, you have -- you provide an interface 14 to the subscribers's customer premise equipment. 15 So the MTA provides all signaling encapsulation 16 functions required for media transport and call 17 signaling. 18 So that's very clear right there that it's 19 providing transport services functionality and 20 call signaling for MTA applications. 21 Q Is the MTA application on the MTA device? 22 A It's a --	211 1 we see various protocols. 2 Q Does the MTA device need an MTA 3 application to work? 4 ATTORNEY EKLEM: Objection to form. 5 A I think it depends. 6 Q Depends on what? 7 A This is an architecture framework 8 technical report, and it's essentially providing 9 functional requirements. So I'm not aware of it 10 being able to operate without an MTA application 11 or customer premise equipment. 12 Q You had mentioned before, call signaling. 13 What is call signaling? 14 A We look at the functional requirements on 15 Page 19, and there is various call signaling 16 functionalities to enable a call. 17 Q So it's fair to say call signaling is used 18 in making phone calls? 19 A Yes. 20 Q And in making a phone call, what is the 21 purpose of an MTA? 22 A I don't believe that's something I opined
210 1 (Reporter clarification.) 2 A I'm sorry. I'll start again. 3 On Meta Page 18, we see an embedded MTA, 4 which is -- references, "EMTA is a single hardware 5 device that incorporates a DOXIS 1.1 cable modem 6 as well as a PacketCable MTA component." 7 And then it says, "Figure 4 shows a 8 representative functional diagram of the EMTA." 9 So this is a functional diagram. 10 And on the EMTA, you see the MTA 11 application as being distinct from the MTA 12 components. 13 Q Are you saying the MTA application is not 14 on the EMTA? 15 A I didn't say that. 16 Q Would you disagree with me if I did say 17 that? 18 A In Figure 4, the MTA application is on the 19 EMTA in this conceptual functional architecture, 20 but the application is a separate function and 21 it's -- a block is given to it. And then you have 22 MTA functions required for media transport, which	212 1 on. 2 I don't believe that's an issue I opined 3 on. That was a part of Dr. Houh's report. If you 4 can point me to something. Otherwise, I'm happy 5 to look. 6 Q You reviewed PacketCable, right? 7 A That's right, but my job was to analyze 8 Dr. Houh's report and respond to it. My job was 9 not to -- that's -- that was the focus of my job. 10 Q Well, I'm just asking you right now, aside 11 from what you did in your report or job, making a 12 phone call, what is the purpose of an MTA? 13 A I don't know. I'd have to look. 14 Q You don't know? 15 A I think it -- they've got lots of call 16 signaling and -- going on. So that's not 17 something I specifically analyzed. I analyzed 18 Dr. Houh's -- what Dr. Houh put forward. I didn't 19 look at -- I didn't focus on all the other 20 functionalities within the device. 21 Q So sitting here today, you can't tell me 22 what the purpose of an MTA is in making a phone

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213 1 call? 2 A I haven't analyzed that. It would take me 3 a little bit of time to take a look at exactly 4 what takes place. 5 Q So you're telling me you can't tell me 6 without analyzing it? 7 A I'm telling you that the focus of my 8 report was not the question. I thought this 9 deposition was going to be about my report. 10 I don't believe Dr. Houh mentioned call 11 signaling, and now you're asking me about call 12 signaling. That's something I didn't focus on. I 13 would need some time to take a look at it. 14 Q I'm just asking you about a reference 15 that's used in this IPR proceeding that you said 16 you reviewed in its entirety. 17 So with that being said, can you tell me 18 what an MTA is used in call signaling? 19 A What? I didn't hear the end of that. 20 Q In making a phone call, what is the 21 purpose of an MTA? 22 ATTORNEY EKLEM: Objection to scope and	215 1 A Like I said, I would -- it was not in 2 Dr. Houh's report, that I recall. I didn't opine 3 on it. This is a very complicated specification 4 with lots of different protocols in it. It would 5 have taken me forever to go through every protocol 6 to understand what's going on. 7 My focus was Dr. Houh's report. So it is 8 fair that it will take me some time to analyze it, 9 but I can sit here and start looking at it, but 10 that's not something I've analyzed. So, no, I 11 can't answer that without doing some analysis to 12 give you an accurate answer. 13 Q Okay. Can you please turn to Page 47 of 14 PacketCable. 15 Do you see Section 4.8.2.6? 16 A Yes. 17 Q In that section, do you see the second 18 paragraph that starts with, "Each RTP"? 19 A Yes. 20 Q Can you read that sentence for me. 21 A "Each media RTP packet is encrypted for 22 privacy. The MTAs have an ability to negotiate a
214 1 form. 2 A That's not something I analyzed. 3 Q So are you refusing to answer my question 4 today? 5 A I could look more and try to dig in, but 6 that's not something I reported on, opined on, or 7 analyzed. I didn't even consider that aspect. 8 My job was to rebut Dr. Houh's report, not 9 to veer off into other directions. 10 Q Right. But right now, your job is to 11 answer my questions. So I'll ask it again. 12 In making a phone call, what is the 13 purpose of an MTA? 14 ATTORNEY EKLEM: Objection to scope and 15 form. 16 A Again, that was not the -- something I 17 opined on. It was not something that I analyzed 18 or even considered because it wasn't in Dr. Houh's 19 report. So it would take me some time to do that 20 analysis. 21 Q Is it fair to say that you don't know 22 right now?	216 1 particular encryption algorithm. Although the 2 only one that is currently specified is RC4, 3 encryption is applied to the packet's payload but 4 not to its header." 5 Do you want me to go on? 6 Q Yes. 7 A "Each RTP packet may include an optional 8 message authentication code. The MAC algorithm 9 can also be negotiated, although the only one 10 that's currently specified is MMH. The MAC 11 computation spans the packet's unencrypted header 12 and encrypted payload." 13 Q In the context of PacketCable, where are 14 the possible locations a MAC could be located in a 15 packet? 16 ATTORNEY EKLEM: Objection to form. 17 A Did you say where is the MAC located in a 18 packet? 19 Q Where are all the locations it could be 20 located? 21 ATTORNEY EKLEM: Objection to scope. 22 A The location of a message authentication

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217 1 code is not disclosed in PacketCable. I'm not 2 sure if I opined on all the places that it 3 potentially could go. 4 Q Well, where could it go? Just me asking 5 you right now. 6 ATTORNEY EKLEM: Objection to scope and 7 form. 8 A (Document review.) 9 I didn't -- I don't believe I opined on 10 all the possible locations it could go. 11 Q I'm asking you right now, based on your 12 years of experience, where could the MAC go? 13 ATTORNEY EKLEM: Objection to form. 14 Scope. 15 A My focus was addressing Dr. Houh's report. 16 My analysis didn't require enumerating all the 17 possible places a MAC could go. 18 Q What are the locations of a MAC in a 19 packet that you did consider? 20 ATTORNEY EKLEM: Objection to form. 21 A The PacketCable does not describe the 22 location of where the MAC is.	219 1 extension mechanism to allow additional data to be 2 placed in the header." 3 And "a POSITA would have understood that 4 there are to be headers comprised of fixed length 5 or length-determinal portions including the 6 extended portion make it computationally easier 7 and more efficient to find the data as opposed to 8 the payload area, which is variable and undefined 9 length and require more computational resources to 10 find the data there." 11 So this is an example where I considered 12 both the header, and I made comments about where, 13 if it wasn't in the header. 14 Q So you're telling me now that you have 15 considered locations of where the MAC would go in 16 the packet? 17 ATTORNEY EKLEM: Objection to form. 18 A What I said was, I addressed Dr. Houh's 19 report and responded to it. 20 Q So -- 21 A But, again -- so I made a comment that I 22 could be basically -- I observed that there would
218 1 Q That wasn't my question. 2 What are the locations of a MAC in a 3 packet that you did consider? 4 ATTORNEY EKLEM: Objection to form. 5 A That a packet what? 6 Q What are the locations of a MAC or where 7 in a packet could the location of a MAC be? 8 A That's not something I opined on. I 9 didn't analyze that. 10 Q Did you consider any locations in your 11 report of where a MAC could go? 12 A I discussed -- I addressed what Dr. Houh 13 suggested. He said, "It would have been 14 understood and obvious that the placement of 15 authentication data in the middle of a packet 16 payload would negatively impact performance and 17 cause packet fragmentation issues." 18 And I disagree with that. 19 Q Why? Why do you disagree with that? 20 A For one, in Paragraph 150 of my report, I 21 say that, "In the context of RTP, a POSITA would 22 have understood that the RTP provides a header	220 1 be a benefit potentially putting it in the header 2 or extended portion of the header. 3 Q Can you tell me why you disagreed that 4 putting a -- that putting a MAC in the middle of 5 the data payload would cause -- impact performance 6 or impact fragmentation issues? 7 ATTORNEY EKLEM: Objection to form. 8 Objection to foundation. 9 A So what's the question, please? 10 Q Why do you disagree with Dr. Houh when he 11 says that placing the packet -- placing the MAC in 12 the middle of a packet would negatively impact 13 performance and cause fragmentation issues? 14 ATTORNEY EKLEM: Objection to form and 15 foundation. 16 A I said, given each packet could include a 17 MAC, Dr. Houh has not identified a reason why 18 putting it in the middle of a payload or in a 19 header would cause fragmentation issue that would 20 be avoided by putting it at the end. That was 21 my -- that was my response. 22 Q If you put a MAC in the middle of a data

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221 1 payload, would that payload be fragmented? 2 A It depends. 3 Q On what? 4 A The context. 5 Q What context do you have in mind? 6 A You're the one asking the questions. 7 Q In the context of PacketCable. 8 A I don't think there is enough details in 9 the context of PacketCable to answer the question. 10 Q I'm just asking you right now. 11 What would be required to place a MAC in 12 the middle of a payload? 13 A What would be required to place a payload? 14 Is that the end of the question? 15 Q Yes. 16 ATTORNEY EKLEM: Objection to scope and 17 form. 18 A Yeah, I don't really understand the 19 purpose of the -- or, really, what the question is 20 about. 21 Q Do you disagree with Dr. Houh when he says 22 that placing the MAC in the middle of a data	223 1 we're not going to look at what Dr. Houh said -- 2 Q The -- 3 A We're going to look at what -- 4 Q You put in your -- 5 A -- wrote about it. Okay. 6 Q The question is, do you disagree with 7 Dr. Houh, where you cited in your report that 8 placing a MAC in the middle of the data payload 9 would negatively impact perform or cause packet 10 fragmentation issues? 11 ATTORNEY EKLEM: Objection to scope. 12 A So Dr. Houh came out with a blanket 13 statement in Paragraph 149, which I read, I 14 believe I read. 15 "I found it obvious the placement of 16 authentication data in the middle of a packet 17 payload would negatively impact performance, cause 18 packet fragmentation issues, and complicate the 19 implementation of network software." 20 It says, "The data in the packet would be 21 interrupted by authentication data and extra data 22 fields that would be needed to identify the exact
222 1 payload would cause fragmentation or impact 2 performance? 3 A Depends on the context. 4 Q In the context that Dr. Houh 5 (inaudible) -- 6 A In what? 7 Q In the context that Dr. Houh is using it? 8 ATTORNEY EKLEM: Objection to form and 9 scope. 10 A I would -- can you show me the paragraph 11 in Dr. Houh's report? 12 Q Are you looking at it right now? 13 A No, in Dr. Houh's report. 14 Q Well -- 15 A Because you're asking about Dr. Houh -- 16 Q -- you cited his report. 17 A You're asking about what Dr. Houh said. 18 I'd like to read to see what he said so I can 19 address it. 20 Q Well, it's limited to what you just put in 21 your report. 22 A Okay. So what's the question, now? So	224 1 location and authentication within the packet 2 payload." 3 He provides no examples or no support for 4 these blank statements, and I disagree with these 5 statements. 6 Q Why do you disagree with his statements? 7 A We can take it one step at a time. 8 Fragmentation. He provides no evidence there 9 would be fragmentation. 10 Q That's not a reason to disagree, though, 11 right? 12 ATTORNEY EKLEM: Objection to form. 13 THE WITNESS: Pardon? 14 ATTORNEY EKLEM: I said, "Objection to 15 form." 16 A Blanket putting out fragmentation. This 17 assumes that -- it makes a bunch of assumptions 18 about the architecture that fragmentation would 19 take place. And he didn't get into any analysis 20 whatsoever about whether fragmentation might take 21 place and where. 22 You don't automatically get fragmentation

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225 1 if something is in the middle of a packet, but if 2 it's a super short packet, there is no 3 fragmentation. RTP packets, potentially, are very 4 short. 5 So he just doesn't get into the whole 6 fragmentation issue, and the network issue is 7 really the fragmentation. He just throws it out 8 there. And I disagree with him. 9 Q Can you elaborate on your last statement 10 about RTP packets are potentially very short? 11 A The RTP PDU, which is carried within the 12 UDP PDU, the issue of whether there is 13 fragmentation can be completely controlled by the 14 transmitter. So he's assuming, necessarily, that 15 there is a fragmentation issue, and I disagree 16 with him. 17 Q So are there some RTP packets that are not 18 potentially very short? 19 A The point is, is that the transmitter has 20 complete control over the size of the packet 21 and the -- how the PDU and the resulting IP 22 packet. And so the transmitter knows how to	227 1 system where I would say it's unlikely you have 2 any fragmentation because you're able to control 3 all aspects of the system. You're able to control 4 the size of PDUs. So there is no fragmentation. 5 Q Are you aware of the word "fragmentation" 6 used in any other context than the one you're 7 using -- than the one you're describing right now? 8 ATTORNEY EKLEM: Objection to scope. 9 A I'm not really sure what the nature of 10 your question is. You're talking about 11 fragmentation of RTP? I'm not sure what the 12 context of your -- what the hypothetical is. 13 Q It's not much of a hypothetical. I'm just 14 asking, are you aware of the word "fragmentation" 15 used in any other contexts than the one you were 16 previously describing? 17 ATTORNEY EKLEM: Same objection. 18 A I was discussing RTP. There is 19 fragmentation elsewhere. 20 Q Where else? 21 A There could be fragmentation at the IP 22 level.
226 1 structure the PDU so there is no fragmentation. 2 Q You testified that there could be RTP 3 packets that are potentially very short. 4 Are there RTP packets that could be 5 potentially long? 6 A Relatively -- possibly, relatively long. 7 But, again, the most important issue is, long or 8 not, as long as the transmitter device is able to 9 put it out onto the -- out onto the Ethernet, and 10 without fragmentation and being aware of the 11 network conditions, the -- the entity transmitting 12 is able to control whether there is fragmentation 13 or not. 14 Q And to confirm, you're talking about 15 network fragmentation, right? 16 A Yes. 17 Q If you have a long RTP packet, could there 18 potentially be fragmentation if the MAC was placed 19 in the middle of the payload? 20 A Wait, what's the context? PacketCable? 21 Q Yes. 22 A In PacketCable, you've got a homogenous	228 1 Q Is it fair to say that you're taking a 2 very specific view of fragmentation? 3 ATTORNEY EKLEM: Objection to form. 4 A When you consider that this is a 5 homogenous system where the MTAs are running 6 standard -- providing standardized services, and 7 they've got complete control of the size of the 8 RTP packets, I don't -- I don't think I'm off base 9 here. 10 Q Have you ever heard of disk fragmentation? 11 A Which? 12 Q Disk fragmentation. 13 ATTORNEY EKLEM: Objection to form and 14 scope. 15 A Like hard disk? 16 Q Sure. 17 A Yes. 18 Q And what is that? 19 A That's not something I opined on. 20 Q But you're familiar with it? 21 A I have some familiarity with it. 22 Q What is that general familiarity?

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229 1 A There is read/write sectors on a disk, and 2 sometimes content is distributed on different 3 parts of the -- different sectors on the medium. 4 And to read a file, you may have to search on 5 multiple sectors to retrieve the entire file. 6 Multiple noncontiguous sectors. 7 Q In the context of PacketCable, is it 8 possible that the MAC could be placed at the end 9 of the RTP packet? 10 ATTORNEY EKLEM: Objection to scope. 11 A So -- I'm sorry. What's the question? 12 Q In the context of PacketCable, is it 13 possible that the MAC could be placed at the end 14 of the RTP packet? 15 ATTORNEY EKLEM: Objection to scope. 16 A I don't know. And there is not enough 17 details in the PacketCable document to understand 18 that issue. 19 Q Can you think of any reasons why the MAC 20 would be placed at the end of the RTP packet? 21 ATTORNEY EKLEM: Objection to scope. 22 A What's your question?	231 1 ATTORNEY EKLEM: Objection to scope. 2 A I -- I would not think the end of the -- 3 that a POSITA would favor at the end of a packet, 4 for the various reasons I gave in my report. 5 Q But it's possible you could put a MAC at 6 the end of the RTP packet? 7 ATTORNEY EKLEM: Objection to scope. 8 A You're talking about the context of 9 PacketCable. All we have is one specification 10 document, which doesn't even describe the location 11 of the MAC. So I think there is many more 12 dynamics in the specification that aren't in this 13 case. So it's difficult to answer your question 14 without knowing further details. 15 Q Well, I'm just asking if a person of 16 ordinary skill in the art could consider putting 17 the art -- put the MAC at the end of the RTP 18 packet. 19 ATTORNEY EKLEM: Objection to form and 20 scope. 21 A For the reasons explained in my report, 22 you're more likely to put it at the beginning of
230 1 Q Can you think of any reasons why the MAC 2 would be -- would not be placed at the end of the 3 RTP packet -- I apologize -- would be placed at 4 the RTP packet? 5 A Why it would be placed -- 6 Q Why it would be? 7 ATTORNEY EKLEM: Objection to scope. 8 A I gave reasons why it would be in the 9 front of the packet based on using the extensions 10 related to the fields. 11 Q So I'll re-ask my question. 12 Can you think of any reasons why the MAC 13 would be placed at the end of the RTP packet? 14 ATTORNEY EKLEM: Objection to scope. 15 A So in Paragraph 156 of my report, I argue 16 that a POSITA would not have been motivated to add 17 a trailer to the end of the whole RTP packet based 18 on computing the authentication data. 19 Q My question was a little different. 20 Can you think of any reasons why a person 21 of ordinary skill in the art would place a MAC at 22 the end of the RTP packet?	232 1 the packet, for various reasons. And if it's in a 2 fixed location, for example, even in the middle of 3 a packet, that's preferred to anything at the end 4 of the packet. So I wouldn't see any motivation 5 in putting it in a variable location at the end of 6 the packet. 7 Q If you're saying that it's preferred -- if 8 you're saying that it's preferred to put the MAC 9 elsewhere in the RTP packet, are you implying that 10 placing the MAC at the end of the RTP packet is a 11 possibility? 12 ATTORNEY EKLEM: Objection to form and 13 scope. 14 A There is not enough information to analyze 15 whether it's possible with the facts of this case. 16 Q Are there a finite number of locations in 17 the packet where you could even put the MAC? 18 ATTORNEY EKLEM: Objection to form and 19 scope. 20 A I would repeat my previous response, that 21 there is not enough information in the case with 22 respect to what PacketCable is actually doing to

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233 1 answer that question. Because there's more 2 specifications out there that aren't part of this 3 case, for example. 4 Q What -- 5 A So that question can't be answered whether 6 it's even possible. 7 I gave an example where it's potentially 8 possible within the header because RTP provides a 9 header extension mechanism. 10 Q Sitting here today, are you telling me 11 that it's not possible to put the MAC at the end 12 of the RTP packet? 13 ATTORNEY EKLEM: Objection to form and 14 scope. 15 A I've answered this question, that that's 16 not something I've opined on, and it's -- seems 17 difficult to answer without -- with the facts of 18 the case, as I've described. 19 Q In any context, is it possible to put MAC 20 at the end of an RTP packet? 21 ATTORNEY EKLEM: Objection to form and 22 scope.	235 1 ATTORNEY PERBOHNER: Can we take a 2 five-minute break? 3 ATTORNEY EKLEM: Sure. 4 (Recess.) 5 BY ATTORNEY PERBOHNER: 6 Q Did you discuss the substance of your 7 testimony with counsel during the break? 8 A No. 9 Q So I just wanted to quickly circle back to 10 some of the introductory questions that I asked 11 you. 12 I'll represent to you that in an email 13 dated April 11th, counsel for VideoLabs advised 14 counsel for petitioners that you are located in 15 Warsaw, Poland. 16 Do you have any reason to disagree with 17 that statement, as made by counsel for the patent 18 owner? 19 A You said "located." No, I'm located right 20 here. 21 ATTORNEY PERBOHNER: Okay. I pass the 22 witness.
234 1 A I can't hypothesize all the details 2 related to the PacketCable design. 3 Q I'm talking about not just PacketCable. 4 ATTORNEY EKLEM: Is there a question 5 pending? 6 Q In general -- I'll re-ask it. 7 In any context, is it possible to put the 8 MAC at the end of an RTP packet? 9 A So we're talking outside the scope 10 of the -- my report in this case? 11 Q In general. 12 ATTORNEY EKLEM: Objection to form and 13 scope. 14 A So outside this case -- for a protocol 15 that's implemented, I am hesitant to say that 16 that's where a POSITA would put a MAC. Like I 17 keep saying, putting it in -- even in this case, 18 but separate from the case, putting it in a fixed 19 location in the header is -- or is the easiest way 20 to determine the location of the MAC and the 21 processing to location of a MAC without having to 22 deal with variable size PDUs.	236 1 THE WITNESS: I mean, I've been in Warsaw, 2 yes, but I travel. And -- but I'm right here now. 3 So I -- you're actually asking me right now, the 4 context of your question? 5 ATTORNEY PERBOHNER: No further questions. 6 EXAMINATION BY 7 ATTORNEY EKLEM: 8 Q Just a couple quick ones. 9 Dr. Stubblebine, do you have a residence 10 in Warsaw, Poland? 11 A I have an apartment. I don't consider it 12 my residence. I'm a resident of Florida, but I 13 have an apartment there that I have. I'm the only 14 person on the lease of the apartment, and it's my 15 apartment. 16 Q Okay. So on April 11, 2011, were you at 17 your residence in Warsaw, Poland, or your 18 apartment, rather, in Warsaw, Poland? 19 A Yes. 20 ATTORNEY EKLEM: No further questions. 21 (Time Noted: 4:52 P.M.) 22

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237 1 ACKNOWLEDGMENT OF DEPONENT 2 3 I, STUART G. STUBBLEBINE, PH.D., do hereby 4 acknowledge that I have read and examined the 5 foregoing testimony and the same is a true, 6 correct, and complete transcription of the 7 testimony given by me and any corrections appear 8 on the attached errata sheet signed by me. 9 10 11 12 _____ 13 (SIGNATURE) (DATE) 14 15 16 17 18 19 20 21 22 238 1 CERTIFICATE OF SHORTHAND REPORTER-NOTARY PUBLIC 2 3 I, ANITA M. TROMBETTA, RMR, CRR the officer 4 before whom the foregoing deposition was taken, do 5 hereby certify that the foregoing transcript is a 6 true and correct record of the testimony given; 7 that said testimony was taken by me 8 stenographically and thereafter reduced to 9 typewriting under my direction; that reading and 10 signing was requested [or not requested, as 11 appropriate]; and that I am neither counsel for, 12 related to, nor employed by any of the parties to 13 this case and have no interest, financial or 14 otherwise, in its outcome. 15 I further certify that the adverse party was 16 represented by counsel at the deposition. 17 I further certify thatr the deposition of 18 STUART G. STUBBLEBINE, PH.D., occurred at the 19 offices of Reichman Jorgensen Lehman & Feldberg, 20 400 Madison Avenue, Suite 14D, New York, NY 10017 21 on Wednesday, May 15th, 2024, commencing at 22 8:01 A.M. to 4:52 P.M.	239 1 IN WITNESS WHEREOF, I have hereunto set my 2 hand and affixed my notarial seal this 28th day of 3 May, 2024. 4 My commission expires: 10.07.2025 5 6  7 _____ 8 9 ANITA M. TROMBETTA, RMR, CRR 10 11 12 13 14 15 16 17 18 19 20 21 22
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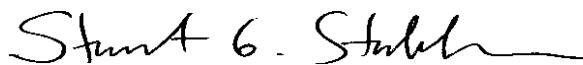
ACKNOWLEDGMENT OF DEPONENT

I, Stuart Stubblebine, Ph.D., do hereby acknowledge that I have read and examined the foregoing testimony, and the same is a true, correct and complete transcription of the testimony given by me and any corrections appear on the attached Errata sheet signed by me.

I have made no change to the transcript. There are no errata sheets attached to this document.

—

Stuart G. Stubblebine, June 14, 2024



_____ (Signature)