UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

ORACLE AMERICA, INC.,
Petitioner,
vs.
REALTIME DATA LLC,
Patent Owner.

Case IPR2016-00373
Patent 7,378,992
and
Case IPR2016-00374
Patent 8,643,513

VIDEOTAPED DEPOSITION OF KENNETH A. ZEGER, Ph.D.
VOLUME I
San Diego, California
Thursday, January 5, 2017

Reported by:
DENISE MARLOW
RPR, CLR, CSR No. 11631
Job No. 2498587
PAGES 1 - 154

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Videotaped Deposition of KENNETH A. ZEGER, Ph.D., taken at 12275 El Camino Real, Suite 200, Del Mar, California, commencing at 9:11 a.m. and ending at 2:56 p.m. on Thursday, January 5, 2017, before Denise Marlow, RPR, CLR, CSR No. 11631.

APPEARANCES:

FOR PETITIONER ORACLE AMERICA, INC.:
WILMER CUTLER PICKERING HALE & DORR, LLP
BY: GREGORY H. LANTIER, ESQ.
1875 Pennsylvania Avenue, NW
Washington, DC 20006
1.202.663.6327
gregory.lantier@wilmerhale.com

FOR PATENT OWNER REALTIME DATA LLC:
STERNE KESSLER GOLDSTEIN FOX
BY: JOSEPH E. MUTSCHELKNAUS, ESQ.
ZHU HE, ESQ.
1100 New York Avenue, NW
Washington, DC 20005
202.371.2600
jmutsche@skgf.com

ALSO PRESENT:
KORY ROSS, VIDEOGRAPHER
DR. JAMES STORER

I N D E X

THURSDAY, JANUARY 5, 2017

WITNESS
KENNETH A. ZEGER, Ph.D.

KENNETH A. ZEGER, Ph.D.
Oracle America, Inc. v. Realtime Data LLC
Thursday, January 5, 2017

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SAN DIEGO, CALIFORNIA, THURSDAY, JANUARY 5, 2017
9:11 A.M.

THE VIDEOGRAPHER: Good morning. We are on the record at 9:11 a.m. on January 5th, 2017. This is the video-recorded deposition of Dr. Kenneth Zeger. My name is Kory Ross, here with our court reporter, Denise Marlow. We are here from Veritext Legal Solutions at the request of counsel for petitioner. This deposition is being held at Sheppard Mullin, located at 12275 El Camino Real, No. 200, in Del Mar, California 92130. The caption of this case is "Oracle America, Inc., et al., versus Real Data LLC [sic]," Case No. IPR2016-00373 and IPR2016-00734 [sic].

Please note that audio and video recording will take place unless all parties agree to go off the record. Microphones are sensitive and may pick up whispers, private conversations, and cellular interference. I'm not related to any party in this action, nor am I financially interested in the outcome in any way.

If there are any objections to proceeding, please state them at the time of your appearance, beginning with the noticing attorney.

MR. LANTIER: I'm Greg Lantier from the law firm

Wilmer, Cutler, Pickering, Hale & Dorr, LLP, here today on behalf of the petitioner Oracle. Accompanying me at today's deposition is Dr. James Storer.

MR. MUTSCHELKNAUS: I am Joseph Mutschelknaus on behalf of Patent Owner Realtime Data. Accompanying me is my colleague, Zhu He.

And as a point of clarification, the IPR numbers are IPR2016-00373, which was correctly stated, and IPR2016-00374 as opposed to -- I think earlier you said -734.

THE VIDEOGRAPHER: Oh. I apologize. Thank you.

MR. MUTSCHELKNAUS: Okay.

THE WITNESS: My name is Ken Zeger. I'm being deposed today.

THE VIDEOGRAPHER: Thank you.

The witness will be sworn in, and counsel may begin examination.

KENNETH A. ZEGER, Ph.D.,
having been first duly sworn, testified as follows:

EXAMINATION

BY MR. LANTIER:

Q. Good morning.

A. Hi.

Q. Please state your name for the record. 09:14:19
A. Ken Zeger. 09:14:20
Q. Where do you reside? 09:14:21
A. San Diego, California. 09:14:22
Q. What's your occupation? 09:14:23
A. Professor at the University of California San Diego. 09:14:24 09:14:27
Q. How long have you been a professor at the University of California San Diego? 09:14:27 09:14:30
A. Since 1996. 09:14:32
Q. And in what department are you a professor? 09:14:33
A. It's called the department of electrical and computer engineering. 09:14:36 09:14:38
Q. Do you understand you're under oath today? 09:14:40
A. Yes. 09:14:42
Q. How many times, approximately, have you had your deposition taken before today? 09:14:43 09:14:45
A. About 15 times. 09:14:46
Q. Do you have any questions about how this deposition will proceed? 09:14:49 09:14:51
A. No. 09:14:52
Q. Do you think you understand the process, having been through it over a dozen times? 09:14:53 09:14:55
A. Yes, I do. 09:14:57
Q. Do you understand that you're legally obligated 09:14:59

to testify truthfully today? 09:15:02
A. Yes. 09:15:03
Q. And do you understand that you're legally obligated to provide the whole truth in your answers today? 09:15:04 09:15:06 09:15:09
A. Yes. 09:15:10
Q. Is there any reason that you might not be able to testify consistent with those obligations? 09:15:10 09:15:13
A. No. 09:15:16
Q. Let me explain just a little bit about how I will conduct the deposition. First, I'm happy to take a break anytime you need one. Okay? If you could answer me verbally -- 09:15:21 09:15:24 09:15:27 09:15:30
A. Yes. Yes, that's okay. 09:15:31
Q. The only thing I'll ask is that we don't take a break in between a question being asked and the answer to that question being given. Okay? 09:15:33 09:15:35 09:15:39
A. That's fine. 09:15:41
Q. Whether you ask for them or not, we'll take several breaks throughout the day today. Okay? 09:15:42 09:15:44
A. Okay. 09:15:48
Q. And when we're on break, we'll be off the record, and the court reporter will not be transcribing any of the discussions. Okay? 09:15:48 09:15:50 09:15:55
A. Yes. 09:15:57

Q. Each time we come back from break, I'm going to ask you whether you had any conversations with counsel for Realtime during the break. Okay? 09:15:58 09:16:00 09:16:04
A. Okay. 09:16:08
Q. And you will need to tell me everything that you discuss with counsel for Realtime at that point. Okay? 09:16:08 09:16:11
A. Okay. 09:16:15
Q. Just before we get started, are there any questions that you have about the deposition today? 09:16:17 09:16:20
A. No. 09:16:23
(Exhibit 1 marked) 09:16:23
BY MR. LANTIER: 09:16:23
Q. Let's just set up the record so that -- that it's clear. And because we are conducting the deposition for two separate IPR proceedings today, I'm going to mark exhibits with numbers during today's deposition, and we'll use those numbers to refer to the exhibits. 09:16:25 09:16:30 09:16:34 09:16:37 09:16:39 09:16:42
The first document that I'll ask the court reporter to mark, we'll call Exhibit 1. And this is a copy of your declaration submitted in the IPR No. 2016-00374. 09:16:46 09:16:48 09:16:57 09:17:02
I'm sorry. I -- I meant to say IPR2016-00373. 09:17:13
MR. LANTIER: Joe, it looks like I have a bumper crop of copies of the declaration in the five -- in the 09:17:53 09:17:56

-374 proceeding and have been shorted copies of the declaration in the -373 proceeding. Do you happen to have a copy of that with you? 09:17:57 09:18:01 09:18:04
THE WITNESS: I think so. 09:18:05
MR. MUTSCHELKNAUS: We do have a copy of the -373. 09:18:07 09:18:09
THE WITNESS: I can use these if you want to use -- 09:18:10 09:18:10
BY MR. LANTIER: 09:18:11
Q. Well, I need you to use the -- 09:18:11
A. Oh, the official? Okay. 09:18:12
Q. Yeah. Yes. Did you -- did you have any notes or anything -- 09:18:12 09:18:15
A. No. They're clean, completely clean. Yeah. 09:18:15
Q. So we'll provide a copy. The court reporter has marked that as Deposition Exhibit No. 1. 09:18:22 09:18:23
A. Okay. 09:18:26
Q. And the first question is, Dr. Zeger, do you recognize Exhibit 1? 09:18:32 09:18:34
A. Yes. 09:18:36
Q. What is it? 09:18:36
A. This is my declaration regarding the '992 patent. 09:18:37 09:18:40
Q. And that is the declaration that you submitted in IPR2016-00373. Is that correct? 09:18:43 09:18:45

A. It seems to be, yes. 09:18:51
Q. Okay. I -- I may refer to that declaration in 09:18:53
that proceeding today as the '992 patent IPR. If I do 09:18:56
that, will you understand what I'm talking about? 09:19:03
A. Yes. 09:19:06
Q. Is that your signature on Exhibit 1? 09:19:06
A. Yes, it is. 09:19:10
Q. Are there any statements in Exhibit 1 that you 09:19:12
would like to change? 09:19:15
A. Not that I know of at this time. 09:19:17
Q. And are there any statements in Exhibit 1 that 09:19:19
you'd like to delete? 09:19:22
A. Not that I know of. 09:19:23
(Exhibit 2 marked and subsequently withdrawn) 09:19:25
BY MR. LANTIER: 09:19:25
Q. I'll ask the reporter to mark as Exhibit 2 a 09:19:25
copy of a document that is titled the "Declaration of 09:19:30
Kenneth A. Zeger in Support of Patent Owner's Response 09:19:38
to Petition" in IPR2016-00373. 09:19:42
A. What's the difference? 09:20:11
MR. MUTSCHELKNAUS: Greg, I think this is the -- 09:20:13
THE WITNESS: Something's wrong. 09:20:14
MR. MUTSCHELKNAUS: -- this is the same -- same 09:20:16
declarations, 1 and 2. 09:20:16
THE WITNESS: Yeah, it got marked by two exhibit 09:20:18

numbers, but it looks like the same document. 09:20:21
MR. LANTIER: Oh. I apologize. And thank you 09:20:23
for pointing that out. 09:20:25
I'll ask the court reporter to take back the 09:20:27
document that was marked as Exhibit No. 2 and mark this 09:20:29
document, which is a copy of the declaration in 09:20:35
IPR2016-00374 regarding Patent No. 0[sic],643,513, as 09:20:42
Exhibit 2. 09:20:46
(Exhibit 2 marked) 09:20:46
THE WITNESS: Thank you. 09:21:03
BY MR. LANTIER: 09:21:04
Q. Dr. Zeger, do you recognize Exhibit 2? 09:21:14
A. Yes. 09:21:17
Q. What is it? 09:21:17
A. This is my declaration regarding the '513 09:21:18
patent. 09:21:21
Q. And the -- on the face of that document, it says 09:21:21
it relates to IPR2016-00374. Correct? 09:21:24
A. That's correct. 09:21:28
Q. I may refer to that proceeding as the '513 09:21:28
patent IPR. Is that okay? 09:21:31
A. Yes. 09:21:33
Q. And you'll understand what I'm referring to if 09:21:33
I -- if I call it the '513 patent IPR? 09:21:36
A. Yes. 09:21:39

Q. Is that your signature on Exhibit 2? 09:21:40
A. Yes. 09:21:43
Q. Are there any statements in Exhibit No. 2 that 09:21:44
you would like to change? 09:21:49
A. Not that I know of. 09:21:51
Q. Are there any statements in Exhibit 2 that you'd 09:21:52
like to delete? 09:21:54
A. Not that I know of. 09:21:55
Q. Now, as we said before, today's deposition will 09:21:58
be focused on both the '992 patent IPR and the '513 09:22:01
patent IPR proceedings. Do you understand that? 09:22:10
A. Yes. 09:22:12
Q. Unless I specify otherwise when I ask a 09:22:14
question, I'll be referring to both of the IPR 09:22:16
proceedings. Is that okay? 09:22:20
A. Yes. 09:22:22
Q. And if for any reason your answer would differ 09:22:22
for one IPR proceeding as opposed to the other one, 09:22:25
please just let me know, and I'll make sure I ask the 09:22:29
questions separately so that the record is clear on that 09:22:32
point. Okay? 09:22:36
A. Yes. 09:22:37
(Exhibit 3 marked) 09:22:37
MR. LANTIER: Let me mark as the next document, 09:22:37
just so we get things out of the way, a copy of the Hsu 09:22:39

article that is the subject of the declarations. So 09:22:49
I'll ask the court reporter to mark as Exhibit No. 3 a 09:22:53
document titled "Software Practice and Experience" on 09:22:58
its face. 09:23:02
THE WITNESS: Thanks. 09:23:20
BY MR. LANTIER: 09:23:30
Q. Dr. Zeger, do you recognize Exhibit 3? 09:23:30
A. Yes. 09:23:33
Q. What is it? 09:23:33
A. This is a copy of a -- one of the documents in 09:23:35
this case by -- the author is -- the first author is 09:23:39
H-S-U. I think we agree to pronounce it "Hsu," 09:23:45
approximately? 09:23:51
Q. Yes. 09:23:51
A. Okay. 09:23:52
Q. Okay. When is the first time you saw Exhibit 09:23:52
No. 3? 09:23:54
A. Well, as an exhibit right now, but do you mean 09:24:00
prior? 09:24:03
Q. Yes. So fair -- fair clarification. If you 09:24:03
turn to page 4 of Exhibit No. 3, do you see that there's 09:24:07
an article that begins on that page titled "Automatic 09:24:21
Synthesis of Compression Techniques for Heterogenous 09:24:25
Files"? 09:24:25
A. Yes. 09:24:27

Q. When is the first time that you saw this article? 09:24:28 09:24:30
A. So I -- I definitely saw it several months ago as part of this case. And I don't know if I saw it before that. I may have seen it years ago when it was published. I just don't remember. 09:24:30 09:24:35 09:24:37 09:24:40
Q. Okay. You are aware that this article was published. Correct? 09:24:42 09:24:44
A. It appears to be, yes. 09:24:45
Q. These -- if we turn back to page 1, the cover of Exhibit 3 says "Software Practice and Experience." Is that a journal that you're familiar with? 09:24:56 09:24:59 09:25:02
A. It's not a typical journal that I look at. I may have seen it before. 09:25:04 09:25:08
Q. Okay. And so fair to say that you're not a regular reader of Software Practice and Experience? 09:25:09 09:25:13
A. I'm not sure regular -- I mean, I -- I may have read -- it's -- it's the kind of thing where I may have even read this particular article and not really paid attention to the title on top. So I really don't know either way how often I read articles from it. 09:25:16 09:25:20 09:25:23 09:25:26 09:25:29
Q. Sure. Where -- where were you employed in 1995? 09:25:32
A. 1995 I was at the University of Illinois Urbana-Champaign. 09:25:35 09:25:47
Q. And were you a -- you were a professor there? 09:25:49

A. Yes. I was a associate professor at that time. 09:25:51
Q. In the computer science department? 09:25:52
A. Electrical engineering department, yeah. 09:25:53
Q. Okay. If you'd turn just to the -- the final page of Exhibit 3, which is page 1116 of the journal, do you see in the first sentence that there is a Kenneth Zeger who is thanked by the authors for -- for his assistance on some of the research? 09:25:55 09:25:56 09:26:03 09:26:04 09:26:04
A. Yes, I do. 09:26:12
Q. And are you that Kenneth Zeger? 09:26:13
A. I believe so. 09:26:16
Q. Okay. Do you recall discussing some of this research with either William Hsu or Amy Zwarico? 09:26:18 09:26:23
A. I have a very vague recollection. I think -- I think his name is Bill -- Bill Hsu. And I think he took my class or came by my office a couple times. This is about 23 years ago, so it's a very, very, very vague -- like I don't remember any of the details at all. 09:26:30 09:26:34 09:26:38 09:26:42 09:26:45
Q. Okay. 09:26:48
A. But, yeah, I do -- I do think he's not making that up. I think I actually did talk to him. 09:26:48 09:26:49
Q. And can you be any more specific about what you discussed with Mr. Hsu? 09:26:52 09:26:55
A. I really don't remember, actually. 09:26:58
Q. Were you aware at the time that you spoke with 09:27:02

Mr. Hsu that -- that he was working to publish his research? 09:27:05 09:27:09
A. I have no recollection of that. 09:27:10
Q. And have you ever met or spoken to Amy Zwarico? 09:27:13
A. I -- I don't think so. But, I mean, it's possible, but I certainly don't remember it. 09:27:20 09:27:23
Q. Okay. 09:27:25
A. Yeah. 09:27:26
Q. If you could turn to the second page of Exhibit 3, and the type is very small, and I -- I'm sorry about that, do you see that in the third paragraph from the bottom of the page, it says that Software Practice and Experience is published monthly by -- by John Wiley & Sons Limited? 09:27:35 09:27:37 09:27:50 09:27:55 09:28:00 09:28:03
A. Yes. And it has like an ISBN number in there? 09:28:06
Q. Yes. 09:28:11
A. Or ISSN, yeah. I do see that. 09:28:11
Q. What does the ISSN number mean? 09:28:15
A. You know, I'm -- I'm not a -- like a expert on ISSN numbers, but I think it refers to -- I'm guessing it's something like ISBN where it refers to a specific journal. It's an identifier number. 09:28:18 09:28:20 09:28:24 09:28:29
Q. And then -- and John Wiley is a well-known publisher of journals. Correct? 09:28:31 09:28:34
A. It's a well-known publisher, yes. 09:28:36

Q. And then in the second paragraph from the bottom, there is a note regarding how to subscribe to the journal. Correct? 09:28:39 09:28:41 09:28:45
A. I see where it says "To subscribe." 09:28:46
Q. And it says that in 1995 the subscription price was $825 US? 09:28:48 09:28:53
A. Yeah, although I think it's referring to England, but I'm -- I'm not sure if that price applies to people in England or not. 09:28:58 09:29:00 09:29:03
Q. Just to clarify that -- I think I agree -- what you're saying is that it appears that in order to subscribe to this journal, you need to contact a John Wiley & Sons office that's located in Sussex, England. Correct? 09:29:10 09:29:13 09:29:16 09:29:20 09:29:24
A. It says -- that's correct. You should contact somebody in England, and then it refers -- I don't know if that dollar amount refers -- I mean, it's clearly U.S. dollars. I really don't know exactly who pays that. I don't know if it's people in England, people in America. I'm just reading it for the first time. 09:29:26 09:29:29 09:29:31 09:29:34 09:29:37 09:29:40
Q. Fair point. And then there's a note to the USA Postmaster directly below. Right? 09:29:43 09:29:45
A. Yes, there is. 09:29:49
Q. Do you have any doubt that if a person contacted John Wiley and paid the subscription fee for the journal 09:29:50 09:29:54

Software, Practice and Experience, that they could obtain a copy of this journal? 09:29:59 09:30:01

A. I don't know one way or the other. I don't see why not, but I really can't confirm it or deny it either way. 09:30:05 09:30:08 09:30:12

Q. Okay. But you don't see anything on the face of this document that suggests that you couldn't do that. correct? 09:30:13 09:30:15 09:30:18

A. Doesn't say anything about not doing it. 09:30:18

Q. In the course of offering your opinions in these proceedings, did you have an opportunity to study Exhibit 3 carefully? 09:30:41 09:30:44 09:30:46

A. Yes. 09:30:47

Q. And did you study Exhibit 3 carefully in preparing to offer your opinions? 09:30:48 09:30:50

A. Yes. 09:30:53

Q. And is there anything in Exhibit 3 that you remember not understanding? 09:30:55 09:30:58

A. I don't remember offhand. I know that I certainly understood enough for my opinions. But whether there was some minor issue that I didn't understand that was unnecessary, I can't recall at this time. 09:31:13 09:31:15 09:31:18 09:31:21 09:31:23

Q. Sure. And it's not a memory test. I just -- if there was anything in particular that stood out to you 09:31:23 09:31:26

as something you didn't understand as you read it, I -- I would probably ask you some questions about that. 09:31:28 09:31:31

A. I mean -- 09:31:33

Q. So if there's anything that you can identify, just let me know. 09:31:34 09:31:36

A. I think I understand the teaching that's in here. You know, that doesn't mean that it's a complete detailed teaching as I would prefer it, but from what was taught, at least, I understand it. 09:31:38 09:31:39 09:31:44 09:31:47

(Exhibit 4 marked) 09:31:50

MR. LANTIER: Okay. We'll just mark the other two pieces of -- or the other two documents that we're going to focus on today in terms of prior art, so that those are available. First I'll ask the court reporter to mark as Exhibit No. 4 a document titled U.S. Patent No. 0 -- I'm sorry -- 5,870,036 to Franaszek, et al. 09:31:50 09:31:52 09:31:55 09:32:07 09:32:09 09:32:12

THE WITNESS: Thanks. 09:32:39

BY MR. LANTIER: 09:32:50

Q. Dr. Zeger, do you recognize Exhibit 4? 09:32:51

A. Yes, I do. 09:32:53

Q. What is it? 09:32:54

A. This is the '036 patent issued to what we call Franaszek. 09:32:55 09:32:59

Q. Did you study Exhibit 4 carefully before submitting your expert opinions in these proceedings? 09:33:00 09:33:03

A. Yes, I did. 09:33:07

Q. And did you read every word? 09:33:08

A. I think so. 09:33:09

Q. Did you study each figure? 09:33:10

A. I think so. 09:33:11

Q. Do you know any of the authors of Exhibit -- Exhibit 4? Strike that. 09:33:15 09:33:17

Do you see that there is a listing of inventors, and that inventor's William Sebastian? 09:33:18 09:33:25

A. No, I do not. 09:33:31

Q. Okay. If -- thank you for clarifying that. 09:33:32

Do you see that that's a listing of inventors and that those inventors are Peter Anthony Franaszek, John Timothy Robinson, and Joy Aloysius Thomas? 09:33:35 09:33:38 09:33:45

A. Yes, I do. 09:33:51

Q. Do you know any of those individuals? 09:33:52

A. I met Joy Thomas many, many years ago when I was in graduate school but not more than a few, like, couple times. I wouldn't say today I really know him. 09:33:55 09:33:58 09:34:01

Q. Was -- was that individual also a student? 09:34:04

A. He had been a student, I believe, at Stanford, and I was at a different school and -- you know, I -- I think I've met him at conferences as well, so it's -- yeah, at the time I met him, I think he had already graduated at that time. 09:34:07 09:34:10 09:34:14 09:34:17 09:34:21

Q. And approximately when would that have been? 09:34:29

A. Probably like 1989, 1990, and then maybe a couple years after that at conferences. 09:34:31 09:34:36

Q. And -- and as concerns the other two individuals identified as inventors of the '036 patent, which is Exhibit 4, do you know either of them? 09:34:38 09:34:41 09:34:45

A. I don't think so. I mean, often I meet hundreds of people at conferences. I may have shook his hand. But I just don't remember. 09:34:48 09:34:52 09:34:55

Q. And do you see that the '036 patent is assigned to IBM Corporation? 09:34:57 09:35:01

A. Yes. 09:35:03

Q. Are you familiar with IBM Corporation? 09:35:04

A. Yes. 09:35:06

Q. And was IBM known as a company that was working in the digital data compression space during the 1990s? 09:35:07 09:35:11

A. I wouldn't say it was well known for that. But, I mean, apparently they did some work on it, based on this patent. 09:35:18 09:35:20 09:35:23

(Exhibit 5 marked) 09:35:24

MR. LANTIER: And then let's mark as Exhibit 5 a document titled "U.S. Patent 6,253,264." 09:35:24 09:35:28

MR. MUTSCHELKNAUS: Greg, do you have a copy? 09:35:50

MR. LANTIER: Oh. Didn't mean to leave you out. 09:35:52

MR. MUTSCHELKNAUS: Thank you. 09:35:56

BY MR. LANTIER: 09:35:57
Q. Dr. Zeger, do you recognize Exhibit 5? 09:36:07
A. Yes. 09:36:09
Q. What is it? 09:36:09
A. This is the '264 patent with Inventor Sebastian. 09:36:10
Q. And do you know Mr. Sebastian? 09:36:14
A. I don't think I've ever met him. 09:36:17
Q. Have -- were you aware of his work before 09:36:18
working on these proceedings? 09:36:20
A. Yes. 09:36:22
Q. How so? 09:36:23
A. I believe I've -- I've been involved in other 09:36:24
Realtime cases that I -- his -- I think it was his 09:36:28
patent came up in those cases. 09:36:31
Q. Did you study Exhibit 5 carefully before 09:36:34
submitting your expert declaration in this case? 09:36:36
A. Yes. 09:36:39
Q. And did you review every word of it? 09:36:40
A. I believe so, yes. 09:36:41
Q. Did you review each figure? 09:36:42
A. Yes. 09:36:44
(Exhibit 6 marked) 09:36:44
MR. LANTIER: All right. And now what I'd like 09:36:45
to do is get out of the way marking the two patents that 09:36:49
are a subject of this proceedings so that they're 09:36:54

available to you if you need to refer to them at any 09:36:57
point. 09:37:04
First I will ask the court reporter to mark as 09:37:04
Exhibit No. 6 a document titled "U.S. Patent 7,378,992" 09:37:06
that names James J. Fallon as the inventor. 09:37:13
BY MR. LANTIER: 09:37:17
Q. Dr. Zeger, do you recognize Exhibit 6? 09:38:12
A. Yes. 09:38:14
Q. What is it? 09:38:14
A. This is the '992 patent in these proceedings. 09:38:14
Q. When's the first time you saw the '992 patent? 09:38:18
A. I've certainly seen it this year as part of 09:38:23
these proceedings. And I may have seen it in other 09:38:27
cases that I've been involved in for Realtime. 09:38:30
Q. Prior to being retained as an expert for 09:38:37
Realtime, had you ever seen the '992 patent? 09:38:40
A. I may have, but I don't recall. 09:38:42
Q. And do you recall approximately in what year you 09:38:43
would have first seen the '992 patent? 09:38:46
A. Well, if -- if this case was the first time I 09:38:55
saw it, then it would be 2016. If I'd seen it in a 09:38:58
prior Realtime case, I think like 2010 or '11-ish or 09:39:00
possibly could go back a couple years before that maybe, 09:39:03
so like within the last ten years is certainly true. 09:39:07
Q. And before submitting your expert declaration in 09:39:13

this proceeding, did you study the '992 patent 09:39:18
carefully? 09:39:21
A. Yes. 09:39:22
Q. And did you read every word? 09:39:23
A. I think so, yeah. 09:39:24
Q. Did you study every figure? 09:39:25
A. Yes. 09:39:26
Q. When is the first time that you heard of the 09:39:37
inventor of the '992 patent, James J. Fallon? 09:39:39
A. I think that would most likely be the same time 09:39:40
I first saw a patent issued to him, or -- or where he's 09:39:41
the inventor, and which I can't exactly pin down that 09:39:44
date, but they would be the same time. 09:39:48
Q. Before being retained as an expert for Realtime 09:39:50
Data, you had not heard of James J. Fallon. Correct? 09:39:52
A. Other than perhaps having seen his patent, not 09:39:58
part of the case or any of the cases. If I had seen his 09:39:59
patent, I may have seen his name but not -- I never met 09:40:03
him at that point or anything. 09:40:06
Q. And have you ever read any of James Fallon's 09:40:07
work other than issued patents? 09:40:12
A. No. 09:40:14
Q. Have you ever heard any of James Fallon's work 09:40:15
discussed at an industry conference? 09:40:17
A. Not that I can recall. 09:40:20

(Exhibit 7 marked) 09:40:21
MR. LANTIER: Let's mark as the next exhibit a 09:40:26
document titled "U.S. Patent No. 8,643,513," again, 09:40:28
identifying as the inventor James J. Fallon, and this 09:40:35
will be Exhibit 7. 09:40:39
BY MR. LANTIER: 09:40:41
Q. And take any time you need, but the first 09:41:10
question, predictably, will be, do you recognize Exhibit 09:41:12
7? 09:41:15
A. Yes. 09:41:16
Q. What is it? 09:41:16
A. This is the '513 patent in this proceeding. 09:41:17
Q. And when is the first time you saw the '513 09:41:21
patent? 09:41:21
A. I think the answer is the same as a gave for the 09:41:22
'992. 09:41:26
Q. Okay. And did you study the '513 patent before 09:41:27
submitting your expert declaration in this proceeding? 09:41:30
A. Yes. 09:41:33
Q. Did you read every word? 09:41:33
A. I think so. 09:41:35
Q. Did you review every figure? 09:41:37
A. Yes. 09:41:39
Q. If you could go back to Exhibit 6, which is the 09:41:40
'992 patent, I'd like to start with some points that I 09:41:44

think are uncontroversial so that we can sort of focus 09:41:50
our time on the issues where there may be more of a 09:41:54
disagreement of opinion. 09:41:57
If you could turn to Claim 48 of the '992 09:42:05
patent, and that's on the second-to-last page of the 09:42:08
exhibit, and just let me know when you're there. 09:42:12
A. I got it. 09:42:15
Q. Okay. I'm going to ask you a series of 09:42:16
questions about the limitations of Claim 48. But you 09:42:20
understand that Claim 48 is the only claim that's at 09:42:23
issue in the '992 IPR proceeding. 09:42:26
A. Yes. 09:42:31
Q. Correct? 09:42:32
So if we start at the beginning, in your '992 09:42:33
IPR declaration, you do not dispute that the Hsu 09:42:36
reference discloses receiving a data block. Correct? 09:42:50
A. I don't think I dispute that. 09:42:53
Q. And in your declaration you don't dispute that 09:42:55
the Hsu reference discloses associating at least one 09:42:59
encoder to each of one of several data types. Correct? 09:43:03
A. I believe that's correct. 09:43:10
Q. In your '992 IPR declaration, you don't dispute 09:43:11
that Hsu discloses analyzing data within the data block 09:43:17
to identify a first data type of the data within the 09:43:21
data block. Correct? 09:43:25

A. I believe that's correct. 09:43:27
Q. And in your '992 IPR declaration, you don't 09:43:29
dispute that Hsu discloses compressing, if said first 09:43:33
data type is the same as one of said several data types, 09:43:39
said data block with said at least one encoder 09:43:44
associated with said one of said several data types, 09:43:45
that is the same as said first data type to provide a 09:43:49
compressed data block. Correct? 09:43:53
A. I believe that's correct. 09:44:11
Q. Now, the next limitation is compressing, if said 09:44:12
first data type is not the same as one of said several 09:44:12
data types, said data block with a default encoder to 09:44:16
provide said compressed data block. Do you see that? 09:44:20
A. Yes. 09:44:24
Q. And you do dispute that Hsu discloses that claim 09:44:24
element. Correct? 09:44:28
A. That's correct. 09:44:29
Q. But you do not dispute that that claim element 09:44:30
is disclosed in the -- by the Franaszek reference. 09:44:34
Correct? 09:44:39
A. Yes, I believe that's correct. 09:45:20
Q. And you also, in your '992 IPR declaration, do 09:45:21
not dispute that that claim element is disclosed by the 09:45:24
Sebastian patent as well. Correct? 09:45:29
A. That's correct. 09:46:06

Q. And then in the final -- the final limitation, 09:46:06
it recites, Wherein the analyzing of the data within the 09:46:09
data block to identify one or more data types excludes 09:46:14
analyzing based only on a descriptor that is indicative 09:46:18
of the data type of the data within the data block. Do 09:46:23
you see that? 09:46:26
A. I see that. 09:46:27
Q. And in your '992 patent IPR declaration, you do 09:46:28
not dispute that Hsu discloses that limitation. 09:46:32
Correct? 09:46:36
A. That's correct. 09:46:58
Q. Now, if you could turn to the '513 patent, which 09:46:58
is Exhibit 7, there are a number of claims that are at 09:47:02
issue in the -- the '513 patent IPR. And if it's 09:47:12
helpful for you, I can represent to you which those are, 09:47:17
and you can circle them on your copy if that would be 09:47:21
helpful. I'm not saying you have to do that, but -- 09:47:23
A. Yeah, that's a good -- that's a good -- 09:47:25
Q. -- I did it on my copy. 09:47:25
A. Sorry. 09:47:26
Q. No, that's okay. 09:47:26
A. That's a good idea. 09:47:26
Q. So the claims that have been instituted -- and, 09:47:28
Joe, please speak up if -- if I do this wrong -- are 09:47:32
Claims 1, 2, 4, 6, 11, 12, 13, 14, 15, 16, 18, 19, 20, 09:47:38

and 22. And I think we can do this without going 09:48:06
through each of the claims individually, but we'll start 09:48:12
and -- and see. 09:48:15
So if we start with Claim 1 -- and take a moment 09:48:18
to review it if -- if that's helpful. 09:48:23
A. Okay. 09:48:36
Q. Do you see that the first claim limitation -- 09:48:37
well, strike that. 09:48:40
Do you see that there's what we call the 09:48:41
preamble that says "A method of compressing a plurality 09:48:44
of data blocks"? 09:48:48
A. Yes. 09:48:49
Q. And you don't dispute that both the Hsu and 09:48:50
Franaszek references disclosed methods of compressing a 09:48:54
plurality of data blocks. Correct? 09:48:59
A. I think that's accurate. 09:49:08
Q. So if we start with the first limitation, do you 09:49:09
see that the first limitation of Claim 1 of the '513 09:49:11
patent is, Analyzing the plurality of data blocks to 09:49:15
recognize when an appropriate content-independent 09:49:19
compression algorithm is to be applied to the plurality 09:49:22
of data blocks? 09:49:28
A. Yes, I see that. 09:49:29
Q. In your '513 IPR declaration, you -- you opine 09:49:30
that Hsu does not disclose that limitation. Correct? 09:49:34

A. Correct. 09:49:42
Q. But you do not dispute in that declaration that 09:49:45
the first limitation of Claim 1 is disclosed in the 09:49:48
Franaszek reference. Correct? 09:49:54
A. Well, let me clarify that the analyzing that -- 09:50:00
that first step of the method is qualified by the 09:50:06
"wherein" at the end, or one of the whereins at the end. 09:50:10
So together with the wherein clause, I do dispute it. 09:50:17
Q. And can you explain why that is? 09:50:22
A. Well, let's see. I got to be careful which 09:50:24
wherein it is. I believe it's the first of the two 09:50:29
whereins. So that would be like line 39, Column 26. 09:50:34
That wherein qualifies the analyzing the plurality step 09:50:41
up in line 24. And the qualification is that the 09:50:45
wherein says that the analyzing the plurality of data 09:50:48
blocks to recognize when the appropriate 09:50:52
content-independent compression algorithm is to be 09:50:54
applied excludes analyzing based only on a descriptor, 09:51:00
et cetera, et cetera. I'll just stop there. So it's -- 09:51:04
it's adding a further sort of limitation to the step of 09:51:08
analyzing the plurality of data blocks that you asked me 09:51:11
about. So the dispute is that Franaszek does not 09:51:15
perform the first step of the method subject to the 09:51:19
qualification starting in line 39. 09:51:23
Q. Okay. In other words, if I'm understanding you 09:51:27

correctly, in your opinion, Franaszek is analyzing only 09:51:29
based on a descriptor indicative of a characteristic 09:51:36
attribute or parameter. Is that fair? 09:51:43
A. That's my understanding, yes. 09:51:46
Q. Is there any other reason set forth in your '513 09:51:47
IPR declaration that Franaszek does not disclose the 09:51:51
first limitation of Claim 1? 09:51:59
A. I don't recall another reason. I mean, maybe 09:52:01
there is something. But I don't -- I can't think of 09:52:08
any. 09:52:10
Q. Okay. And you don't dispute in your '513 IPR 09:52:11
declaration that Hsu does disclose a data block analysis 09:52:16
that excludes analyzing based only on a descriptor 09:52:23
indicative of any of characteristic attribute or 09:52:27
parameter. Correct? 09:52:33
A. Well, it's a little confusing because we were 09:52:33
just talking about the first step of the method, and 09:52:36
that first step relates to content-independent 09:52:38
compression. Now you're asking me a question that I 09:52:40
don't think you mentioned content-independent 09:52:43
compression in there, so I feel like we're deviating 09:52:45
from the first step. Is that what's going on? 09:52:48
Q. No. It -- it is what's going on, but it 09:52:51
wasn't -- 09:52:53
A. Oh. 09:52:53

Q. -- intended to be confusing. 09:52:53
A. Okay. 09:52:55
Q. What I was intending to clarify is that you've 09:52:56
offered the opinion that Franaszek does not disclose 09:52:59
performing a -- an analysis of a uncompressed data block 09:53:03
using something other than a descriptor. Correct? 09:53:11
A. That's correct. 09:53:17
Q. And what I'm asking you is whether you agree 09:53:23
that in terms of just the performing the analysis of 09:53:26
that uncompressed data block, you haven't disputed in 09:53:28
your declaration that Hsu does perform an analysis of 09:53:32
uncompressed data that is not solely based on a 09:53:36
descriptor. 09:53:43
A. So basically that's correct, but let me state it 09:53:45
clearly. I do not dispute that Hsu analyzes data blocks 09:53:48
based other than on descriptors, but the -- but so long 09:53:53
as you do not include the fact that it would be for 09:53:59
something to do with content-independent compression. 09:54:02
Q. Yes. And I had tried to -- that had been the 09:54:06
question I'd asked a couple back, and that's -- 09:54:08
A. Okay. 09:54:09
Q. -- a good clarification. 09:54:10
A. Okay. So basically I agree with you, just with 09:54:11
that provision. 09:54:14
Q. So if we move down the claim, then, the second 09:54:19

limitation of Claim 1 of the '513 patent is applying the 09:54:20
appropriate content-independent data compression 09:54:24
algorithm to a portion of the plurality of data blocks 09:54:27
to provide a compressed data portion. Do you see that? 09:54:31
A. Yes. 09:54:34
Q. And in your expert declaration in the '513 IPR, 09:54:34
you don't dispute that that claim limitation is 09:54:38
disclosed by the Franaszek reference. Correct? 09:54:42
A. I believe that's correct. 09:54:56
Q. The third limitation of Claim 1 is analyzing a 09:54:57
data block from another portion of the plurality of data 09:55:01
blocks for recognition of any characteristic, attribute, 09:55:05
or parameter that is indicative of an appropriate 09:55:08
content-dependent algorithm to apply to the data block. 09:55:11
Do you see that? 09:55:17
A. Yes. 09:55:18
Q. And in your '513 IPR declaration, you don't 09:55:18
dispute that the Hsu reference discloses that claim 09:55:23
limitation. Correct? 09:55:26
A. I don't -- I think that's correct. 09:55:45
Q. And then the fourth limitation is applying the 09:55:47
appropriate content-dependent data compression algorithm 09:55:51
to the data block to provide a compressed data block 09:55:56
when the characteristic, attribute, or parameter is 09:55:59
identified. Do you see that? 09:56:04

A. Yes. 09:56:06
Q. And again, for the fourth limitation of Claim 1 09:56:06
in your '513 patent IPR declaration, you do not dispute 09:56:08
that Hsu discloses that limitation. Correct? 09:56:13
A. That's -- I believe that's correct. 09:56:32
Q. And we already spoke about the fifth limitation 09:56:33
of Claim 1. Correct? 09:56:37
A. The fifth limitation, I only see -- I see four 09:56:44
steps and then two whereins. 09:56:47
Q. Yes. I was referring to the first wherein 09:56:50
clause as a -- as the -- 09:56:52
A. Oh. 09:56:53
Q. -- limitation because it's set off -- 09:56:54
A. Okay. 09:56:57
Q. -- separately. But why don't I rephrase the 09:56:57
question. 09:57:01
Do you see that there are two wherein clauses at 09:57:01
the conclusion of Claim 1 of the '513 patent? 09:57:06
A. Yes. 09:57:09
Q. And in the testimony you already gave, we 09:57:09
discussed the -- the -- your opinions regarding the 09:57:11
disclosure or lack thereof of the first wherein clause 09:57:18
in the Hsu and Franaszek references. Correct? 09:57:22
A. Yes. 09:57:25
Q. So if we look at the second wherein clause, you 09:57:26

see that the second wherein clause is, Wherein the 09:57:29
analyzing the data block to recognize the any 09:57:32
characteristic, attribute, or parameter excludes 09:57:35
analyzing based only on the descriptor. 09:57:38
A. Yes, I see that. 09:57:49
Q. With respect to the content-dependent data 09:57:51
compression that is disclosed in Hsu, you don't dispute 09:57:54
that Hsu discloses that second wherein clause. Correct? 09:57:59
A. That's correct. 09:58:02
Q. If we look at the -- the claims that have been 09:58:08
circled on your copy of the '513 patent, which are the 09:58:12
claims at issue in the '513 IPR proceeding, do you see 09:58:16
that there's a second independent claim and that's Claim 09:58:20
15? 09:58:22
A. Yes. 09:58:23
Q. In your '513 IPR declaration, you haven't 09:58:24
provided any opinions that Claim 15 should be found not 09:58:30
invalid if Claim 1 is found to be obvious. Correct? 09:58:37
A. I think I got lost in -- too many "nots" in 09:58:44
there. 09:58:48
Q. Sure. Let me rephrase. 09:58:49
There are no arguments -- strike that. I don't 09:58:50
mean there are arguments. And let me begin over, the 09:58:50
new question. 09:58:50
You don't offer any opinions with respect to 09:58:51

Claim 15 that are different from your opinions with 09:59:04
respect to Claim 1 of the '513 patent. Correct? 09:59:08
A. Well, I think I have to provide different 09:59:14
opinions in the sense that 15 is a device or an 09:59:17
apparatus and Claim 1 is a -- is a collection of steps 09:59:20
and method. So with respect to that notion, they have 09:59:23
to be somewhat different. 09:59:27
Q. If it helps, feel free to refer to anywhere in 09:59:29
your declaration for the '513 IPR, and the table of 09:59:32
contents may be a helpful place to start. But what I'm 09:59:37
asking is, there are no opinions that you offer 09:59:41
regarding Claim 15 that would distinguish its validity 09:59:47
from the validity of Claim 1 of the '513 patent. 09:59:53
Correct? 09:59:59
A. So I think I -- I think I'm agreeing with you, 09:59:59
and I'll just clarify. I don't believe I provided any 10:00:03
opinions that state that the validity of either Claim 1 10:00:06
or Claim 15 is dependent upon the validity of the other. 10:00:10
Is that basically what you're asking? 10:00:14
Q. No, a slightly different question, which is -- 10:00:16
I'll back up. And I'm going to do this for all of the 10:00:18
claims that are in the -- in the proceeding just so we 10:00:22
can narrow the issues for today's deposition. 10:00:25
You understand that patent validity is assessed 10:00:27
on a claim-by-claim basis. Right? 10:00:32

A. I understand that. 10:00:36
Q. Yes. And so what I'm asking is, in terms of the 10:00:36
opinions regarding the failure of Oracle's petition to 10:00:39
demonstrate the invalidity of the claims at issue in the 10:00:44
'513 patent, the argue -- the opinions that you've 10:00:48
advanced with -- for -- with respect to Claim 1 apply 10:00:54
equally to Claim 15, in your opinion. Correct? 10:00:56
A. Basically, correct, other than the fact that I 10:00:59
pointed out one's a method and one's an apparatus claim. 10:01:01
But basically that's correct. 10:01:05
Q. Okay. And there's no opinion that you offer 10:01:06
that only applies to Claim 15 but doesn't apply to Claim 10:01:08
1. Correct? 10:01:12
A. Again, subject to the apparatus-versus-method 10:01:14
claim, I think that's basically correct. 10:01:17
Q. Okay. Then let's just go through the -- the 10:01:19
dependent claims so that we can, again, narrow the 10:01:21
issues for discussion today. As I mentioned before, the 10:01:26
following dependent claims are at issue in the '513 IPR 10:01:30
proceeding: Claims 2, 4, 6, 11, 12, 13, 14, 15, 16, 18, 10:01:34
19, 20, and 22. 10:01:51
A. I believe you said 15 in there is a dependent 10:02:03
claim, which is not correct. 10:02:04
Q. Thank you for clarifying. I didn't mean to do 10:02:05
that, and you're right that Claim 15 is an independent 10:02:06

claim.
Now, referring to Exhibit 2, which is the declaration in the '513 patent IPR, beginning at page 91 of that declaration, you have offered some additional opinions regarding the validity of Dependent Claims 4 and 18. Correct?
A. I don't know if that's the first place I do, but I certainly see Claims 4 and 18 in the caption on the boldface caption on page 91.
Q. And if you refer to page 101, I think you'll see that you have also offered some additional opinions regarding the validity of Claim 6 of the '513 patent. Do you see that?
A. Yes.
Q. With the exception of Claims 4, 6, and 18, in your '513 IPR declaration, you don't offer any separate opinions with respect to any of the other dependent claims at issue. Correct?
MR. MUTSCHELKNAUS: Objection. Vague.
THE WITNESS: I -- I don't know if I specifically addressed the other dependent claims. But certainly anything I say about the independent claims from which they depend applies. But whether I went beyond analysis of the underlying independent claims, I can't say just looking at this if there's nothing else

in this report. Whatever's in here is in here.
BY MR. LANTIER:
Q. Okay. Would it help you to review the declaration to determine whether you had offered any separate opinions?
A. I'd have to go through and just kind of march through each paragraph and make sure I didn't mention any other dependent claims.
Q. Just to be clear, I -- I did not mean to suggest that your opinions with respect to the independent claims wouldn't apply to the dependent claims to the extent that they're dependent from those independent claims. What I'm trying to do is avoid trodding ground that we don't need to trod during today's deposition.
And as I understand it, you're saying if you haven't identified a dependent claim and offered an opinion specific to that dependent claim in your declaration, then -- then you haven't offered an opinion with respect to the dependent claim. Correct?
A. I think that's correct. I would -- like I say, it's a hundred pages, so it's hard to memorize the entire thing. I'd have to go through and check.
Q. But it's your declaration. Correct?
A. It is my declaration.
Q. Could you turn to page 28 of your declaration in

the '513 patent IPR. And this is just for your reference, that this question will be with respect to both of the proceedings.
Let me know when you're there.
A. Yeah, I'm on page 28.
Q. And I -- I -- I think I misspoke. I meant to say page 10.
A. Ten?
Q. Yeah, I meant to say Paragraph 28 --
A. Okay.
Q. -- which is on page 10.
A. Okay. I see Paragraph 28.
Q. At the time you submitted your expert declarations, you understood that objective indicia of nonobviousness can be important evidence regarding whether a patent is obvious. Correct?
A. Yes.
Q. And you also understood what those objective indicia are. Correct?
A. Yes. That's outlined in my Paragraph 28.
Q. In your '513 IPR declaration, you didn't offer any opinion that objective indicia of nonobviousness provide any evidence that any of the instituted claims of the '513 patent are not obvious. Correct?
A. Despite the fact you had multiple negations

there, I believe I agree with that statement.
Q. Okay. I'll try to do it with fewer. In your '513 IPR declaration, you offer no opinions that any objective indicia of nonobviousness provides evidence that an instituted claim of the '513 patent is not obvious. Correct?
A. I believe that's correct.
Q. And in your declaration in the '992 IPR, you offer no opinion that objective indicia of nonobviousness provides any evidence that Claim 48 of the '992 patent is not obvious. Correct?
A. Correct.
Q. Okay. Then I will not ask you any questions on that topic.
We'll take a break in a minute. Just -- I'll ask you a couple more questions.
And you've provided your C.V. in this case, and it's -- it has extensive information about your background. One question I had is, have you ever, yourself, designed a data compression system?
A. Yes.
Q. Okay. How many times have you done that?
A. Many times. Quite a bit over the years. I've done it in research at the university. I've done it in industrial consulting and various other things.

Q. As of the year 2001, had you ever designed a data compression system? 10:08:04 10:08:08

A. Yes. 10:08:12

Q. Okay. About how many times had you done so by that point in time? 10:08:14 10:08:17

A. Probably every year starting in the early 1980s until then. I mean, it's hard to count them. It's hard to determine what a system actually is. But pretty much continuous for -- and you said what year? Ninety-- 10:08:18 10:08:21 10:08:24 10:08:28

Q. I think it's 2001. 10:08:29

A. 2001? So, I mean, I probably first started back when I was freshman, sophomore -- maybe sophomore at MIT, so that would be about 1981, continuous to whatever your date was, 2001, so 20 years. 10:08:31 10:08:34 10:08:40 10:08:44

Q. So I won't ask you about each of those examples. Could you describe in a general level what the system was that you designed as a sophomore at MIT? 10:08:48 10:08:51 10:08:57

A. Sure. I was a student in the electrical engineering department, and I was in a special program where I did research in a co-op program. And I did my research at Hewlett-Packard Laboratories in Palo Alto in the summer and also in -- in part of the school year. So I designed a processor for -- I mean a compression system for speech coding, and it's called ADPCM. I'll say it again slowly: A-D-P-C-M. And that stands for 10:09:00 10:09:02 10:09:05 10:09:09 10:09:15 10:09:17 10:09:20 10:09:27

Adaptive Differential Pulse Code Modulation. And basically that was a system that I designed, implemented, wrote software, got it to work on a piece of hardware for digitizing and encoding human speech. 10:09:28 10:09:35 10:09:38 10:09:43

Q. Let me just get some terminology straight. I want to hear more about that. But when you -- when I said a -- well, strike that. 10:09:50 10:09:55 10:09:58

Was ADPCM a new compression algorithm, or was it a new system for performing data compression? 10:10:00 10:10:05

A. Neither. ADPCM was a existing compression algorithm for speech, and I implemented that with a new twist to it, a slight improvement to it, which constituted the work that I did for my master's research. 10:10:09 10:10:12 10:10:17 10:10:20 10:10:23

Q. So you were making an improvement to a particular algorithm for compressing data. Is that correct? 10:10:24 10:10:28 10:10:32

A. Basically that's correct, yes. 10:10:32

Q. Okay. Now, the -- in addition to the particular algorithms that get used to compress data, there are different methodologies that can be used to compress data, and the patents at issue in this -- in these proceedings are an example of that. Right? 10:10:34 10:10:38 10:10:45 10:10:48 10:10:51

A. I'm not sure what you mean by "methodologies." 10:10:54

Q. Well, maybe this is the -- the better way to 10:10:57

present it. Are you familiar with levels of encoding? 10:11:02

A. Yes. 10:11:08

Q. And are you familiar with the Lempel-Ziv-Welch algorithm? 10:11:09 10:11:13

A. Yes. 10:11:15

Q. That is an algorithm that is used to compress certain types of data. Correct? 10:11:18 10:11:22

A. That -- that's -- roughly speaking, that's correct, yes. 10:11:24 10:11:26

Q. Now, the -- the -- the inventions described in the claims of the '513 and the '992 patents are directed to a particular compression algorithm like Lempel-Ziv. Correct? 10:11:27 10:11:31 10:11:36 10:11:41

A. Well, again, it -- I mean, I don't mean to nitpick the words, but it depends what you mean by "directed to." They certainly could involve them. 10:11:43 10:11:44 10:11:48

Q. That's right. But they don't -- the claims are not limited to one particular algorithm, are they? 10:11:52 10:11:54

A. That's correct. 10:11:58

Q. So -- 10:11:59

A. Oh, I'm sorry. Let me clarify. They're not limited to one particular algorithm such as Lempel-Ziv. It depends how you define "algorithm." It's all -- the words matter here. 10:12:00 10:12:02 10:12:06 10:12:09

Q. And that's why I wanted to have the discussion, 10:12:10

because I -- I want to be clear as we go on today when we're talking about a compression algorithm, as I would think of Lempel-Ziv or LZW being, as opposed to a system or method for data compression, which I would think of as being more similar to what's claimed in the '992 and '513 patents. Does that make sense? 10:12:13 10:12:17 10:12:22 10:12:30 10:12:33 10:12:39

A. Roughly speaking, I -- that's okay. But we have to be careful because the word "algorithm" is not part of the claim language, as far as I remember. So, I mean, just on a general, rough scale that's -- that's okay. 10:12:42 10:12:44 10:12:48 10:12:50 10:12:53

Q. Are there words that you'd prefer to use to differentiate when -- between when we're talking about a particular compression algorithm like LZW versus a broader system that may incorporate different algorithms? 10:12:53 10:12:56 10:13:01 10:13:06 10:13:09

A. Well, I'm not sure that that distinction -- well, I'm not sure how that distinction is going to play a role in discussing the patents and the claims. But I guess we can just use the word "algorithm" and "system" if that's what you'd like to use, and we'll try to make sure we're clear on it. 10:13:11 10:13:13 10:13:16 10:13:20 10:13:21 10:13:21

Q. Okay. And I -- I -- okay. 10:13:23

A. But just to -- with the note that algorithm often refers to the whole system too. So it really 10:13:25 10:13:28

depends who you're talking to and what the context is. 10:13:33
Q. Yes. And I was -- for the time being I was -- I 10:13:35
was just trying to get some clarification about your 10:13:38
background/experience. 10:13:41
A. Okay. 10:13:43
Q. With that distinction in mind, have you ever 10:13:43
designed a data compression system? 10:13:46
A. Yes. And now maybe -- maybe we need to back up 10:13:49
and undo what we just agreed to -- 10:13:52
Q. Sure. 10:13:56
A. -- because I think there's going to be inherent 10:13:56
confusion. It's -- it's a very vague question when you 10:13:59
ask about did I design a system versus an algorithm. 10:14:01
Sometimes a distinction is whether, you know, a 10:14:03
particular thing you design has somebody's name attached 10:14:07
to it, like Abraham Lempel or Jacob Ziv. And, you know, 10:14:11
sometimes an unnamed thing may be called one thing and 10:14:15
algorithm may be associated with a named technique. So 10:14:17
if you're asking me have I ever designed a system, I've 10:14:22
designed -- I mean, I would call them algorithm systems 10:14:25
that I can implement in software that compress data. So 10:14:29
I'm not sure exactly what your distinction is. 10:14:32
Q. Why don't I try it a different way. Have you 10:14:37
ever designed a new data compression system that 10:14:40
incorporated previously known data compression 10:14:44

algorithms? 10:14:50
A. Yes. I just told you about one. 10:14:52
Q. Oh, great. So then let's go back to the work 10:14:53
you did as a sophomore at MIT on ADPCM. Can you explain 10:14:56
what your contribution was to that technology? 10:15:04
A. You mean -- when you say "contribution," you 10:15:08
mean what I added that didn't previously exist? 10:15:10
Q. Correct. 10:15:13
A. Okay. So what I added there, it's a little 10:15:14
complicated, but part of the ADPCM system which I had 10:15:17
not yet described to you used a technique called 10:15:22
"linear predictive coding," often referred to as LPC. 10:15:26
And linear predictive coding is a method of estimating 10:15:31
the value of digitized speech samples based on 10:15:35
previously seen speech samples or previously 10:15:40
reconstructed speech samples. And that involves using 10:15:44
what's called a filter or a prediction filter. And a 10:15:50
prediction filter has a particular order. And the order 10:15:54
is how many previous samples you look at when you make 10:15:57
that estimation. 10:16:00
My contribution was designing a new type of LPC 10:16:01
prediction system where the order varied in time, so it 10:16:05
was adaptive as opposed to a fixed-order LPC system. 10:16:10
Q. And what was the process you went through to 10:16:33
make that contribution to the ADPCM system? 10:16:38

A. Well, first I had to read the literature to see 10:16:41
what existed. I read a number of technical papers. 10:16:44
Then I had to so-call brainstorm, had to think of ideas. 10:16:48
And then I used pencil and paper to write down equations 10:16:52
and formulas and make sure that my methods were accurate 10:16:59
and correct. And then I wrote software to simulate it 10:16:59
at a higher-level language. I think I used C at that 10:17:03
time. Then I actually implemented it in realtime on a 10:17:08
digital signal processor called a TMS320. It's made by 10:17:13
Texas Instruments. And then I wrote the assembly code 10:17:18
for that and hooked it up to speakers and microphones 10:17:22
and then got it to work. 10:17:25
Q. And how is it that you first had the idea to 10:17:27
attempt to develop software that would allow the LPC 10:17:34
system to handle -- did you say it was data in varying 10:17:45
orders? Is that -- 10:17:54
A. No. The linear predictive coding filter had a 10:17:55
variable order to it, which means that instead of 10:17:59
looking at like the last ten samples and predicting the 10:18:01
next one, sometimes you look at the last six, the last 10:18:05
12. That number varies. 10:18:08
Q. How did you get the idea to attempt to write 10:18:10
software that would -- that would perform that 10:18:20
operation? 10:18:22
A. Well, the hard part was getting the idea of how 10:18:22

to come up with the technique. The writing the software 10:18:25
was the natural way to test it. And that's what -- I 10:18:28
was an employee of HP at the time. And, you know, they 10:18:32
said, Oh, that's a great idea. Let's see how it works, 10:18:35
and maybe we can use it for something. So they 10:18:39
suggested I implement it. 10:18:42
Q. So just maybe -- maybe I didn't ask the question 10:18:44
clearly. How did you get that -- that original idea? 10:18:46
A. Okay. The -- the original idea, I read the 10:18:50
literature, saw what was out there, and I realized that 10:18:53
there's potentially a way to improve the system. So I 10:19:02
just thought about it for a while and said, Hmm, maybe 10:19:05
varying the order might give us something because 10:19:11
nobody's done that before. And so I just kind of 10:19:14
thought about it as an independent idea based on -- I 10:19:16
would look at what existed out there. I think I looked 10:19:19
at one particular -- or I -- you know, I read in the 10:19:22
textbook, I knew what was out there, and then I just 10:19:26
thought of an improvement. 10:19:29
Q. And at that -- at the point in time you did 10:19:31
that, were there known techniques for varying the order? 10:19:32
A. Yeah, I think there was -- not -- not the exact 10:19:40
thing that I did, but there was certainly the notion of 10:19:44
varying orders of similar things were out there. You 10:19:47
know, just what's called adaptive systems, things that 10:19:52

change in time. That was a known thing. That's kind of ahead of in the head of any engineer. So that's probably what stimulated my idea to think about -- about changing the order of the LPC filter.

Q. Now, so that was work you did when you were a sophomore in college. Correct?

A. I think it was the summer of my -- after my sophomore year.

Q. Or thereabouts.

A. Yes.

Q. Okay. And you said that you've designed many, many algorithms or systems since that time, so I don't want to ask you about all of them. Is there any algorithm or system that you've designed over the course of your career that you would think is the most similar to what's being described in the claims of the '513 and '992 patents?

A. I don't think I've ever designed any system, certainly not what the claims say. I never put together content-independent, content-dependent claims -- I mean compression techniques. So, no, I don't think I've ever done that.

Q. Okay. Now, and I'm -- just to be open, I'm not trying to get you to invalidate the claims of the patents. What I'm -- what I'm asking is you talked

about sort of the work that you did on ADPCM which involved varying the order of -- in connection with that system. The nine -- as we discussed a little bit earlier, the 9,920,513 patents are directed to a claimed invention that can use any number of different preexisting data compression algorithms. Correct?

A. Well, I don't know what you mean by "directed to," but they certainly -- you could use multiple compression techniques or algorithms or whichever word we want to us use just informally as part of -- as part of the invention.

Q. And so what I was asking is, have you ever developed or designed any data compression systems that used preexisting data compression algorithms but in a new way?

A. I think that's the same question you asked me. It's the same answer. It's -- the one I gave you is one example of it.

Q. Okay.

A. The -- I mean, that's not the only example, but ADPCM with linear predictive coding was an existing technique, and I -- and I built upon that.

Q. And you described the process that you went through to do that work at Hewlett-Packard while you were in college. Over time has your methodology for how

you approach designing a new data compression system changed?

A. Again, I -- I'm not sure what you mean by "methodology." What's that?

Q. As I recall your testimony, you said that in the course of developing the modified ADPCM technique, you went back and reviewed the literature. Is that correct?

A. That's certainly true.

Q. And that you were aware of some literature that discussed in a slightly -- in a somewhat different way varying the order in a -- in a compression system. Correct?

A. Not -- maybe -- I had the notion of varying the order or just varying things in general, not necessarily specific to that.

Q. But you had reviewed literature that -- that discussed that. You said that adaptive coding was -- was known at the time. Correct?

A. I either reviewed literature, or I just knew about it from previous review.

Q. Yeah.

A. I mean, there's a certain amount of knowledge in your head.

Q. Sure. And then you sat down and you developed an idea for making this modification to ADPCM. Correct?

A. Very generally speaking, that's correct, yes.

Q. So my question is, since that point in time, for the other systems that you've developed, have you basically used the same process, or did you use a different process to design systems?

A. First, I wouldn't really characterize it as a process. It's more of a haphazard thing. I -- sometimes I sit down and deliberately read the literature and try to come up with a better way to do something. Sometimes it just pops into my head. And this happens to all people that are researchers. And sometimes you just get lucky; something comes in. Sometimes you are confronted with a problem, and you spend a long time trying to solve it. So it's -- it really depends on the situation.

Q. Is there any system that you've designed that you can recall going through a different process with?

A. Yeah. I mean, probably each one's a little bit different, actually.

Q. Give one example, please.

A. I can just go chronologically. The next one would be -- well, I designed another one while I was an undergraduate, but I'll skip that, go to graduate school. So I was a Ph.D. student, and I designed a system whose fundamental components are based on what's

called vector quantization. That's abbreviated VQ. So 10:25:34
that was for my Ph.D. work. I designed a number of 10:25:42
different systems. I analyzed them mathematically. I 10:25:45
wrote software to simulate them. Some of them I even 10:25:49
implemented in realtime. 10:25:52
Q. What was the improvement that you made to VQ? 10:25:55
A. Well, there's -- there's -- it's not just one 10:25:59
thing. There's a -- there's a number of different ones. 10:26:02
It depends which one you're talking about. 10:26:04
Q. Sorry. It's not an area I'm familiar with. 10:26:07
Could you start with one, and we can talk from there? 10:26:10
A. Okay. So one example would be to improve the 10:26:13
quality in terms of the -- let's say to improve the 10:26:16
end-to-end distortion versus rate comparison of VQ 10:26:23
subject to what's called channel noise, and with a 10:26:30
complexity constraint. 10:26:42
Q. And so I apologize for being a step behind. 10:26:45
How -- how did this improve data compression in 10:26:49
particular? 10:26:54
A. Well, again, it's kind of complicated. But data 10:27:02
compression by itself doesn't often take into account 10:27:06
many constraints in the world, such as speed, 10:27:07
complexity, channel noise, space. So one of the 10:27:08
constraints that I took in account, which is a real 10:27:13
world constraint, is channel noise. And that means that 10:27:19

after you compress the data, if you transmit the data 10:27:21
over like a radio link, for example, some of the bits 10:27:22
that you send might not come out the same as when you 10:27:25
sent them. That's called channel noise. 10:27:28
So what I did is I worked on a way of 10:27:31
compressing the data so that it anticipates the 10:27:34
statistical fluctuations of a channel and can try to 10:27:38
make the end result better than it would have been had I 10:27:42
not compressed it with the channel noise in mind. 10:27:45
Q. So was this some form of encrypting it with some 10:27:49
kind of redundancy check, or was it some other way to 10:27:57
deal with channel noise? 10:28:00
A. It's neither. You sort of just combined two 10:28:01
things that don't normally get combined. But it -- what 10:28:05
it involved is modifying the data compressor to mitigate 10:28:09
the effects of channel noise. It's -- the lingo people 10:28:13
usually use for that is called joint source-channel 10:28:18
coding, and you put like a hyphen between the word 10:28:21
"source" and "channel." 10:28:24
Q. Did performing -- well, strike that. 10:28:38
So this was mainly a technique that dealt with 10:28:40
distortions that could occur during transmission over 10:28:48
the channel. Correct? 10:28:51
A. It took into account distortion that could occur 10:28:52
due to the channel. And that would ultimately affect 10:28:57

the quality of the compression. 10:29:00
Q. Now, the '513 and '992 patents don't have 10:29:02
anything to do with that. Correct? 10:29:06
A. Well, they don't talk about channel noise. 10:29:08
Q. What was the other system that you -- that you 10:29:15
developed while you were an undergrad? 10:29:17
A. So there was another one. This was part of a 10:29:20
lab course I took. And it was a little bit tangential. 10:29:22
It was mostly involved in actually building a computer 10:29:27
from scratch. So we -- back then we had -- we didn't 10:29:33
have microprocessors that we could use, so they -- in 10:29:35
fact, the rules of the class were that we had to use 10:29:39
discrete elements. These were called TTL logic. And we 10:29:42
had to design a computer from just basic gates -- AND 10:29:47
gates, OR gates, NAND gates -- without using what's 10:29:53
called an ALU, an arithmetic logic unit. And so we 10:29:56
basically designed a computer from scratch. I did this 10:29:58
with two lab partners. 10:30:01
And on top of that, I -- as part of this 10:30:03
project, I designed a compression system for -- it was 10:30:06
speech again. So we -- we interfaced it with a speech, 10:30:09
a microphone, and we did compression speech. 10:30:12
Q. How did the system work? 10:30:18
A. Well, I'm not sure what your question is. 10:30:24
Sorry. 10:30:26

Q. Could you describe for me -- I don't need to 10:30:27
hear about the -- the noncompression-related aspects. 10:30:29
But could you describe for me how the speech compression 10:30:32
aspect of that project operated? 10:30:35
A. So that -- the -- maybe this might save you some 10:30:38
time. The speech compression aspect of that, I -- I 10:30:42
would not say is particularly innovative. It wasn't a 10:30:44
new thing it was just implementing a speech compression 10:30:48
algorithm based on existing prior art, let's say, just 10:30:52
to demonstrate that the computer we built was adequate. 10:30:56
So the main focus was the building the computer, but you 10:30:59
asked about compression, so -- 10:31:04
Q. Okay. I didn't want to skip it, because you -- 10:31:05
you had raised it, but -- but fair enough. 10:31:07
Why don't we take a break, and we'll come back 10:31:11
in ten minutes. 10:31:15
A. Sure. 10:31:21
THE VIDEOGRAPHER: This ends Media No. 1 in the 10:31:22
deposition of Dr. Kenneth Zeger. We are off the record. 10:31:25
The time is 10:31 a.m. 10:31:26
(Off record) 10:31:32
THE VIDEOGRAPHER: This begins Media No. 2 in 10:54:38
the deposition of Dr. Kenneth Zeger. We are back on the 10:54:41
record. The time is 10:54 a.m. 10:54:44

BY MR. LANTIER: 10:54:46
Q. Okay. Dr. Zeger, what did you discuss with 10:54:46
counsel during the break? 10:54:49
A. Talked about lunch, we talked about kidney 10:54:51
stones, and we talked about stingrays. 10:54:55
Q. Mostly very good. 10:55:00
Have you ever designed any hardware for data 10:55:03
compression? 10:55:07
A. Yes. 10:55:11
Q. What hardware was that? 10:55:12
A. So actually let me just clarify. When you say 10:55:17
design hardware, does that include putting together 10:55:21
existing components to create a hardware system or 10:55:24
board? 10:55:29
Q. Yes, it does. 10:55:29
A. Okay. Well, the very first thing I told you 10:55:30
about at HP involved that. 10:55:32
Q. Have you ever designed a new piece of hardware 10:55:34
that wasn't constituted of -- of preexisting compression 10:55:36
hardware? 10:55:43
A. I think, yeah, I can say once. 10:55:49
Q. When was that? 10:55:51
A. That would be around late '90s. 10:55:54
Q. And what did you design? 10:55:58
A. Unfortunately I can't tell you. It was 10:56:00

classified work for the government. 10:56:04
Q. Okay. Did you receive any patents for that 10:56:07
work? 10:56:13
A. No. No. 10:56:13
Q. And you didn't publish anything concerning that 10:56:14
work. Correct? 10:56:17
A. I did publish, but it was classified 10:56:18
publication. 10:56:21
Q. Okay. You didn't publish anything that I could 10:56:22
obtain. Correct? 10:56:25
A. Most likely not. 10:56:27
Q. Let's turn to the Hsu reference, then. And I 10:56:29
wanted to ask you a couple questions about that one. 10:56:34
Hsu is Exhibit No. 3. Do you have it before you? 10:56:38
A. Yes. 10:56:47
Q. And I was interested in a couple of things here. 10:56:47
If we start with the summary, do you see that the second 10:56:57
sentence has a parenthetical clause? 10:57:06
A. Yes. 10:57:13
Q. And the parenthetical clause says "possibly a 10:57:14
different algorithm for each block." Correct? 10:57:17
A. Yes. 10:57:21
Q. So in the Hsu article, it's contemplated that a 10:57:22
different compression algorithm will be used for each 10:57:28
data block that's being compressed. Correct? 10:57:32

A. Well, it's allowing the possibility of it. 10:57:35
Q. Let me ask you a question not specific to Hsu. 10:57:39
What is -- what is a data block? 10:57:45
A. So that, have to be careful because "data block" 10:57:50
I believe is part of the claim language in our claim. 10:57:54
So are you talking about inside the context of the 10:57:57
patents or just outside of them? 10:58:01
Q. Would your answer be different? 10:58:03
A. It could be. I don't know, you know, if -- I 10:58:04
don't know if you want a formal construction or just a 10:58:10
general off-the-cuff kind of idea. 10:58:12
Q. I'm not asking for you to perform any legal 10:58:15
claim construction. I'm just asking for your opinions 10:58:18
as a person who's an expert in this area. 10:58:21
Let's start with outside the context of the '992 10:58:26
and '513 patents. What is a data block? 10:58:30
A. Well, you just asked me about the Hsu reference 10:58:34
that's Exhibit 3, so I can tell you in -- in their 10:58:36
context I believe a block is just a collection of bytes. 10:58:40
I think they may have even specified how many bytes. 10:58:49
And I believe they're contiguous. They're in a row. I 10:58:52
mean, I'm not sure where that was, but somewhere in 10:58:56
there I recall they had blocks of a particular length. 10:58:58
Q. And I think in the Hsu reference they use 10:59:04
5000-byte-long sections, but that -- that may be 10:59:08

incorrect. Let's just confirm that. 10:59:16
A. They talk about 500 -- I'm sorry. That's not a 10:59:28
block. 10:59:32
Q. And I think it's on maybe page 1102 of the 10:59:32
journal. It's page 9 of the article. 10:59:35
A. Oh, yeah, under the heading "Heterogeneous 10:59:42
Compressor." 10:59:45
Q. Yeah. 10:59:46
A. Fixed size blocks, 5K in the current 10:59:46
implementation. 10:59:50
Q. Is that 5,000 bytes, or is it 5,000 bits, or you 10:59:52
don't know? 10:59:56
A. Actually I'm not sure, but I would have guessed 10:59:57
bytes, but that's just a guess. I'd have to go and try 11:00:01
to verify that. 11:00:04
Q. Is it fair to say, though, that a data block is 11:00:06
not limited to a 5,000-byte collection of bits? 11:00:09
Correct? 11:00:16
A. I -- I mean, I think their examples are specific 11:00:18
numbers, but I don't think the techniques taught, you 11:00:23
know, require a specific -- I don't think they're 11:00:26
limited to that number. 11:00:29
Q. Sure. And I'm not asking this question with 11:00:31
respect specifically to Hsu. I'm just trying to 11:00:33
understand what your understanding is of the -- of what 11:00:36

a data block is. 11:00:38
A. So just in general outside of the context of the 11:00:41
patents in this -- in this case, roughly speaking, a 11:00:44
block is typically just a collection of information, 11:00:47
collection of bits, bytes, presumably continuously 11:00:50
connected but not -- maybe not necessarily -- that's how 11:00:57
most people typically would use the term "block." 11:01:02
Sometimes people would use the word "vector." 11:01:05
Q. Okay. And then as you read the '513 and '992 11:01:08
patents, did you have a -- was your understanding of 11:01:11
what a data block was in those patents different from 11:01:15
your ordinary understanding? 11:01:18
A. Let me take a look. 11:01:19
So I think in the -- I'm looking right now at 11:01:43
'513 patent, as an example, Claim 1. I think here data 11:01:46
blocks could refer to what I just said, but it may have 11:01:52
a broader meaning, you know, if we're using broadest 11:01:56
reasonable interpretation. I didn't specifically 11:02:02
construe the entire scope of what they mean. I didn't 11:02:05
need to do that for this -- this case. But I don't 11:02:09
think that they would necessarily be restricted to what 11:02:11
I just said. It could be a much more general meaning. 11:02:15
Q. Okay. One other piece of terminology. I just 11:02:19
want to make sure I understand what your understanding 11:02:21
is. For you, what is data compression? 11:02:23

A. Now, is that in the context of a particular 11:02:29
claim language or just generally speaking? 11:02:32
Q. No, just generally speaking. 11:02:35
A. Okay. Generally speaking, or again roughly 11:02:36
speaking, data compression is -- and it's somewhat 11:02:38
tautological, compressing data, reducing the amount of 11:02:40
information, bits/bytes, to represent data. 11:02:44
Q. And so how does the compression process 11:02:48
typically work? 11:02:53
A. I'm not sure there is a typical type of process. 11:02:54
There's many different techniques. 11:02:57
Q. And I understand there's different techniques. 11:02:59
And I'm trying to ask the question from a higher level 11:03:00
than that. So maybe we can just walk through it. 11:03:05
There's a -- there's a block of uncompressed date. 11:03:08
Okay? That you're going to compress. 11:03:11
A. That's not required, but that's -- that could be 11:03:14
an example. 11:03:16
Q. Yes, it is an example. 11:03:17
A. Okay. 11:03:19
Q. And that block of uncompressed data is going to 11:03:19
be compressed. What -- what happens during the 11:03:23
compression process? 11:03:26
A. It really depends on the technique. Some -- 11:03:27
some techniques will analyze statistically how often 11:03:30

certain things within that block occur. Other 11:03:34
techniques will look for patterns. Other techniques 11:03:37
will just -- I mean, there's -- again, it depends if 11:03:40
it's lossly, depends if it's lossless. There's many 11:03:48
different techniques. 11:03:53
Q. What happens to the data in the block itself 11:03:56
during the compression process? 11:03:56
A. When you say what happens to it, I mean, the way 11:03:58
this works is if you -- let's say, for example, you 11:03:59
implement it on a computer. The data would typically -- 11:04:00
if that's your input, it would reside somewhere in 11:04:04
memory. And then you would run programs, techniques, 11:04:07
subroutines, whatever you want to call it, that would 11:04:09
process the data and produce a compressed version of it. 11:04:14
What actually happens to that data, it just sits in 11:04:18
memory typically. It doesn't wander away or anything. 11:04:21
Q. The uncompressed data still sits in the memory? 11:04:23
A. I mean, could. You could -- you could 11:04:24
intentionally delete it if you want. You could change 11:04:24
it if you want. It's really up to you. It's really up 11:04:27
to the designer, the programmer. 11:04:30
Q. And then what's the relationship between the 11:04:31
compressed data and the uncompressed data? 11:04:34
A. Well, so it depends what type of compression 11:04:38
you're doing. If you're doing what's called lossless 11:04:42

compression, the relationship is that the compressed 11:04:46
data needs to retain enough information to recover the 11:04:50
original uncompressed data completely. Okay. So it's 11:04:55
completely -- the -- the original data is recoverable 11:04:58
from the compressed data if it's lossless coding. 11:05:02
The other relationship is that the idea -- the 11:05:07
whole idea behind it is to reduce the amount of data. 11:05:08
So presumably the compressed data is smaller than the 11:05:11
uncompressed data. And then the -- the second situation 11:05:15
is when you have lossy coding. And that's spelled 11:05:19
L-O-S-S-Y. In that situation the data that comes in is 11:05:25
compressed to data which does not necessarily exactly 11:05:32
recover the original data but only approximately does. 11:05:33
So that would be the relationship there. 11:05:39
Q. Okay. If we go back to Exhibit 3, which is Hsu, 11:05:41
and I'm still on the first page of the article, which is 11:05:50
page 4 of the -- the exhibit -- 11:05:54
A. Okay. 11:06:00
Q. Under the title "Introduction," do you see it 11:06:01
says "The primary motivation in studying compression is 11:06:04
the savings in space that it provides"? 11:06:07
A. Yes. 11:06:10
Q. Do you agree with that? 11:06:11
A. It's a very general statement. I would 11:06:18
certainly say that it really depends on the context. In 11:06:20

some contexts it has nothing to do with space. It has 11:06:26
to do with time. Sometimes it has to do with 11:06:30
transmission bandwidth in a channel, how much -- how 11:06:34
much you have to pay to send bits per second across a 11:06:38
channel. Sometimes it has to do with complexity. 11:06:43
Sometimes it has to do with heat dissipation. Like in a 11:06:46
cellphone, you don't want to burn the battery out. 11:06:50
Sometimes it has to do with how many instructions you 11:06:53
use because you have a limited amount. There's many 11:06:57
different reasons. 11:06:57

So I would say as a general statement I disagree 11:06:57
with this. But perhaps these authors have a particular, 11:07:02
you know, idea in mind that -- for which maybe this is 11:07:05
important. 11:07:08

Q. Now, I'm going to ask you a couple of questions 11:07:09
without directing you to a particular sentence, because 11:07:14
I think they're covered in your report. But feel free 11:07:17
to refer to anything you want to in Hsu. 11:07:21

The -- the Hsu reference discloses a two-pass 11:07:27
system for data compression. Correct? 11:07:34

A. That's correct. 11:07:38

Q. And in the first step, or the first pass, the 11:07:38
data blocks are -- are analyzed. Correct? 11:07:43

A. That's correct. 11:07:47

Q. And those would be the uncompressed data blocks. 11:07:48

They're analyzed to determine whether the -- there is a 11:07:53
particular encoding algorithm that should be used for 11:07:56
that data. Correct? 11:08:01

A. That's one thing that's done, yes. 11:08:02

Q. Okay. And then in the second pass, that 11:08:05
compression occurs. Correct? 11:08:08

A. That's one thing that occurs, yes. 11:08:11

Q. And if no two blocks of uncompressed data that 11:08:13
are adjacent to one another are going to receive the 11:08:25
same compression algorithm, then in Hsu the data will be 11:08:29
compressed on a block-by-block basis. Correct? 11:08:34

A. Well, the premise there is not the idea behind 11:08:39
the paper. It's not behind what's taught by Hsu. Hsu's 11:08:43
fundamental premise is that you will have neighboring 11:08:47
blocks compressed by the same compression algorithm. So 11:08:51
you're asking a question that's -- whose premise is 11:08:56
really contradictory to the whole idea behind Hsu. 11:09:00

Q. Are you able to answer my question? 11:09:03

A. I don't think I can because it's sort of -- it's 11:09:06
a question with what I consider a false premise. 11:09:09

Q. Your opinion in connection with these 11:09:23
proceedings is based on your belief that Hsu does not 11:09:26
account for a situation where no two adjacent blocks of 11:09:33
data will receive the same compression algorithm. Is 11:09:39
that correct? 11:09:42

A. No. That's a mischaracterization. My -- my 11:09:43
statement is that the whole idea behind Hsu -- or one of 11:09:46
the main ideas behind Hsu is to take blocks that are 11:09:50
compressed by the same compressor and kind of merge them 11:09:57
together in a way, connect them, for reasons that they 11:10:00
describe very clearly. So I'm not saying they don't 11:10:02
account for the situation you described, but that's 11:10:06
certainly not the main teaching of Hsu. I mean, it -- 11:10:09
yeah. 11:10:12

Q. I mean, if we go back to the -- the summary of 11:10:13
Hsu, in the parenthetical we viewed before, it states 11:10:19
that there would possibly be a different algorithm for 11:10:27
each block. Correct? 11:10:31

A. That's correct. 11:10:32

Q. And that would be, for example, the situation 11:10:33
where no two data blocks that are adjacent to one 11:10:34
another are going to be compressed using the same 11:10:40
algorithm. Correct? 11:10:44

A. That could -- it could happen, but that's not 11:10:45
the main idea behind Hsu. That's just kind of like a 11:10:48
backup plan is how I would view that. That's not the 11:10:50
goal of the teaching of Hsu. 11:10:54

Q. But it is disclosed by Hsu. Correct? 11:10:56

A. It's allowed by Hsu. 11:10:58

Q. And in the -- in the first pass, which is the -- 11:11:04

where we agreed that analysis of the uncompressed data 11:11:08
occurs, the data blocks are always analyzed on a 11:11:13
block-by-block basis in Hsu. Correct? 11:11:18

A. In the first -- yeah, in the first pass, I agree 11:11:23
with that statement. 11:11:26

Q. Now, if you turn to page 1104 of Exhibit 3, the 11:11:36
Hsu reference -- 11:11:40

A. Okay. 11:11:42

Q. -- I wanted to ask some questions about the 11:11:43
first full paragraph on that page, which begins with the 11:11:46
phrase "To determine the block type." 11:11:50

A. I see that. 11:11:52

Q. Okay. This is the paragraph in Hsu where the 11:11:53
document describes how the block type will be 11:12:01
determined. Correct? 11:12:06

A. It describes it there, yes. 11:12:09

Q. This is the -- this is a description of 11:12:12
something that will occur during Phase 1 in Hsu. 11:12:14
Correct? 11:12:18

A. It describes how the block type is determined, 11:12:19
but let me point out it doesn't do it in very much 11:12:22
detail. 11:12:26

Q. But it -- this is something that is describing a 11:12:28
portion of what happens in Phase 1. Correct? 11:12:31

A. It's describing -- it's describing events that 11:12:34

occur in Phase 1. That's correct. 11:12:38
Q. The first sentence in that paragraph states that 11:12:39
Hsu uses a procedure called new-file. Correct? 11:12:43
A. That's right. 11:12:48
Q. And it also states in that paragraph that 11:12:48
new-file is an extension of the UNIX file command. 11:12:52
Correct? 11:12:56
A. That's correct. 11:12:57
Q. As of 1995 were you familiar with the UNIX file 11:12:58
command? 11:13:03
A. Yes. 11:13:03
Q. And how familiar with it were you? 11:13:04
A. Well, I've -- I've been a UNIX user ever since 11:13:08
the early 1980s, and I've used it continuously since 11:13:11
then, probably never more than a week without using it. 11:13:15
Q. And the UNIX file command is something that 11:13:19
persons of skill in the data compression field would 11:13:22
have been familiar with by the year 2001. Correct? 11:13:25
A. People who are skilled in the art who use 11:13:29
UNIX -- I mean, a lot of people don't use UNIX. But 11:13:35
those that do use UNIX probably would be familiar with 11:13:40
using the file command. They would almost certainly not 11:13:44
be familiar with how it actually works. 11:13:49
Q. Had you -- you had used the UNIX file command -- 11:13:51
I'm sorry. You had used the UNIX file command yourself 11:13:55

prior to 2001. Correct? 11:13:56
A. Correct. 11:13:57
Q. And it's a file type detector. Correct? 11:13:58
A. I would call it a file type estimator. 11:14:03
Q. And the -- the paragraph in Hsu that we've been 11:14:07
looking at states that UNIX file works by examining the 11:14:13
first 512 bytes of a file and comparing the pattern of 11:14:17
data contained in it to a collection of known data 11:14:23
patterns from UNIX and other operating systems. 11:14:27
Do you see that? 11:14:30
A. Yes. 11:14:31
Q. And you agree that that's a fair description of 11:14:32
how the UNIX file command works. Correct? 11:14:35
A. Let me point out -- I don't know if I fully 11:14:40
agree with that. At that time -- so are we talking 11:14:43
about 1994 or '5? 11:14:46
Q. Yes. We're talking about the time at which the 11:14:49
article was written. 11:14:51
A. Okay. The article was written, I believe, in 11:14:53
'94. 11:14:56
Q. Sorry. Published. In 1995. 11:14:57
A. But the author's knowledge of UNIX would be at 11:15:00
the time they submitted it, at least. I don't know 11:15:03
which one you want me to talk about. 11:15:07
Q. Fair enough to make the distinction. What I'm 11:15:09

really more focused on is how a person of skill in the 11:15:12
art reading this article in 2001 would understand it. 11:15:16
But if -- 11:15:19
A. Okay. 11:15:20
Q. If you want to make a point about 1994 versus 11:15:20
1995, that's okay too. 11:15:23
A. Okay. I think there actually is a slight 11:15:26
distinction because -- 11:15:28
Q. Sure. 11:15:29
A. -- in my understanding of what Hsu's teaching, I 11:15:29
have to know what Hsu knew at that time. And if a 11:15:32
person like Hsu is writing this in '94, I have to 11:15:36
understand, What is it that he's teaching? And file at 11:15:41
that time, I don't -- I haven't seen any evidence that 11:15:45
that was in the public domain or even known. I mean, 11:15:48
these days sometimes things are published. But the 11:15:52
source code for that, I haven't seen any evidence by 11:15:53
Oracle or otherwise, or not that I know of, that file -- 11:15:55
a source code behind file, how it really works, was 11:15:59
available to a person of ordinary skill. So for all I 11:16:02
know, a person of ordinary skill would know what's 11:16:06
written in this paragraph and they would know what file 11:16:10
does when you sit down in front of a computer and 11:16:13
actually use it. And I certainly have sat down in front 11:16:16
of a computer at that time period and used it, and I -- 11:16:18

I know what it produced. But there's no way to deduce 11:16:18
from that what's really going on so-called under the 11:16:22
hood at that time period. 11:16:26
So furthermore -- I'm trying to get back to your 11:16:28
question. But furthermore, there were many, many 11:16:32
different UNIXes that existed at that time, as there do 11:16:35
today. And UNIX was not necessarily consistent, or the 11:16:38
functions like file were not necessarily operating the 11:16:44
same or even programmed the same way. 11:16:47
In fact, the footnote here, Footnote 20 on that 11:16:50
first sentence that you -- of the paragraph that begins 11:16:54
"To determine the block type," if you go back to the 11:16:57
references, it refers to Ian Darwin in the Berkeley UNIX 11:17:00
operating system. Now, this author Hsu doesn't say that 11:17:08
he's referring to the file command as written by Ian 11:17:12
Darwin. He's just footnoting the fact that there is a 11:17:17
file command. So I don't even know if a person of 11:17:20
ordinary skill in the art would know that. But it's -- 11:17:23
it's pretty well known that Ian Darwin created his own 11:17:26
file software from scratch. He even writes that he 11:17:29
doesn't look at anybody else's code. So he just created 11:17:30
that from scratch. 11:17:34
I don't know what other file systems -- how 11:17:35
they're written on other UNIX systems. They could be 11:17:37
different. They probably are to some extent. And there 11:17:37

was no standard at that time. So the bottom line is I'm 11:17:40
note sure if I agree with the sentence. You asked me 11:17:44
about that. I'm not sure to what extent that's 11:17:46
reliable. 11:17:49
Q. And that was in 1990 -- that's your -- that's 11:17:54
you stating your understanding of what you believe Hsu 11:17:59
would have understood at the time that he wrote this 11:18:01
article. Correct? 11:18:07
A. That's correct. 11:18:09
Q. As a user of UNIX and the UNIX file command, by 11:18:10
the year 2000 you knew that sometimes the UNIX file 11:18:16
command would return an indication that the file was 11:18:25
processed but its type was undetermined. Correct? 11:18:30
A. That's correct, and it would -- it would produce 11:18:33
the word "data" to indicate that fact. 11:18:35
Q. And anyone who was familiar with the actual use 11:18:38
of the UNIX file command by the year 2000 would have 11:18:42
known that. Correct? 11:18:46
A. Well, again, let me point out that by the year 11:18:47
2000 there are many, many different types of UNIXes. 11:18:51
And I'm basing this on the UNIXes that I've used. I 11:18:54
can't certify that all UNIXes did the same thing. So 11:18:58
I -- the answer is I don't know -- I can't account for 11:19:01
every single UNIX, so I don't know. 11:19:03
Q. But with respect to your experience, you 11:19:05

understood that the UNIX file command could not use 11:19:08
determine a data type. Correct? 11:19:15
A. From the times I used UNIX on the systems, the 11:19:17
particular flavors of UNIX I used, that is correct. 11:19:21
Q. And you're not aware of any version of UNIX that 11:19:24
would always identify a data type. Correct? 11:19:29
A. Again, what time period are you talking about? 11:19:33
Q. By the year 2000. 11:19:36
A. Oh. I don't know one way or the other because I 11:19:37
haven't used every UNIX. 11:19:40
Q. The description in Hsu of UNIX new-file is 11:19:45
that -- excuse me, I -- I made a mistake. Strike the 11:19:50
question. 11:19:55
The description in Hsu of the UNIX file command 11:19:55
states that it operated by examining the first 512 bytes 11:20:00
of a file and comparing the pattern of data contained in 11:20:06
it to a collection of known data patterns. Correct? 11:20:10
A. That -- that's part of how Hsu characterized it. 11:20:11
Q. And Hsu said that it -- its new-file proceeding 11:20:14
works in a similar fashion. Correct? 11:20:26
A. Correct. 11:20:31
Q. But that there were two modifications. Correct? 11:20:32
A. It says there it's with two modifications yeah. 11:20:34
Q. The first modification is that under new-file 11:20:39
not only the first 512 bytes of the file were examined 11:20:44

and compared to known patterns of data, but also the 512 11:20:52
bytes in the middle of the set and the 512 bytes that 11:20:58
were the last portion of the set, if they existed. 11:21:03
Correct? 11:21:08
A. Well, you're -- you're paraphrasing. That's not 11:21:09
the entire sentence. But that's some of what's in that 11:21:12
sentence. 11:21:16
Q. Okay. Let me restate, then. The first 11:21:16
modification that new-file made to UNIX file is that it 11:21:20
would examine and compare not only the first 512 bytes 11:21:24
of a data set but also 512 bytes in the middle of the 11:21:30
set and the 512 bytes at the end if they exist. 11:21:36
Correct? 11:21:42
A. That's correct the way he wrote it. 11:21:43
Q. And that first modification doesn't have 11:21:49
anything to do with the way in which each of those 11:21:50
512-byte segments will be analyzed. Correct? 11:21:54
A. I disagree with that. 11:21:59
Q. Okay. Where -- okay. How do you disagree? 11:22:01
A. I believe that the first five words, it says 11:22:04
first it examines and compares, and then it goes to tell 11:22:07
about the various different portions. My understanding 11:22:10
of this teaching from -- it's a -- it's a very limited 11:22:13
teaching here. It's very vague, not detailed. It's 11:22:15
very hard to understand what's going on. But my 11:22:19

understanding is that the examination and the comparison 11:22:21
includes modifications. 11:22:24
Q. What words specifically in Hsu are you relying 11:22:29
on for that opinion? 11:22:33
A. Well, the previous sentence says, New-file works 11:22:35
in a similar fashion with two modifications. First -- 11:22:38
now, so everything that comes after "first" is part of 11:22:42
the first modification. So part of that is the 11:22:47
examination and comparison and then what it is that's 11:22:50
compared. And then furthermore, if you read to the end 11:22:55
of the paragraph in the context of the paragraph, it's 11:22:59
very clear to me. 11:23:02
Q. So your opinion -- your opinions about the -- 11:23:07
the Hsu reference in this proceeding is based on your 11:23:12
belief that the sentence beginning, First, comma, it 11:23:21
examines, describes a modification that is made to the 11:23:26
way in which an individual set of 512 bytes will be 11:23:31
analyzed? 11:23:39
A. Not exactly. My understanding is that if you 11:23:41
read the entirety of Hsu and you have an understanding 11:23:46
of how the UNIX file command works and you read Hsu, and 11:23:50
specifically we talked about the situation where the 11:23:54
ordinary file command in certain UNIXes, there's a 11:23:57
situation where it doesn't recognize a type, so it 11:24:02
returns a value of type -- it calls it data -- taking 11:24:06

all of that into account, Hsu never mentions anything about that situation, so the logical deduction of what a person of ordinary skill in the art would understand when they read this at the 2000 -- whatever it was, 2001/2000 period of time, their understanding of what Hsu is teaching would have to be that there is some kind of change going on to the file command more than just where it looks. And furthermore, like I said, I didn't see any evidence that the -- a person of ordinary skill would even know what the file command is doing under the hood, say, how it works, because I don't think that was publically available. So I think a reasonable inference is that a person of ordinary skill in the art, when reading this paragraph of Hsu, would understand there's some slack here, and it -- Hsu may not be literally taking the file -- is almost certainly not taking the file command from UNIX and modifying it directly but somehow implementing their own version of it, and here they're summarizing the main ideas, the main changes. So that's why the phrase "it examines and compares" is -- would be understood by a person of ordinary skill at the time of the inventions in this IPR hearing to mean that there are modifications that are made, specifically, not allowing the case of a -- an "I don't know" situation.

Q. Okay. So your opinion is that the words "examines and compares" in the third sentence of the first full paragraph in -- on page 1104 of Hsu would have been understood by a person of skill in the art to state that contrary to the ordinary operation of UNIX file, the new-file procedure will no longer be able to return an indication that the data type could not be determined. Is that correct?

MR. MUTSCHELKNAUS: Objection to form.

THE WITNESS: I believe that when a person of ordinary skill in the art reads those words "it examines and compares," in the context of everything disclosed in Hsu and their understanding of how file works, would mean basically what you said, that the -- the default case no longer exists in new-file.

BY MR. LANTIER:

Q. That is the basis for your opinion that changing Hsu to incorporate content-independent data compression would change the fundamental operation of Hsu. Correct?

A. Well, all of my opinions are in my report. I mean, I can't just say that's my entire opinion. But there's -- in my report I outline a lot of the evidence and reasoning behind my opinion. But, you know, since I'm looking at this paragraph, I can point out here there's a sentence in this paragraph that reads, "This

provides a better indication of the primary data type of a file," et cetera, et cetera. And that word "primary" is italicized by Hsu, which is suggesting that it may not get the data type exactly right, but it just comes up with some answer. And then later on, the second-to-last sentence in that paragraph says, "Thus new-file decides on the most applicable data type." And the word "most applicable," that two-word phrase, is in quotation marks for emphasis by Hsu. And Hsu again is emphasizing that it basically never gives up. It never comes up with an "I don't know" or default situation. It always gets an answer even if it's perhaps not correct. It's either the primary data type, most applicable data type. Taking all that into account in the entirety of Hsu, that's why the phrase earlier, "it examines and compares," to me indicates that there's going to be modifications to the file -- the older UNIX file command in order to create the new-file command. And one of those modifications is certainly to get rid of the default case.

Q. So just so I understand, the -- your opinion is that there are actually more than two modifications to the UNIX file command that are made for the purposes of new-file. Is that correct?

A. Well, I think the way Hsu is counting

modifications, if we're trying to enumerate modifications, his first modification is everything in the sentence that says "first." So I think he views the examination and comparing, which could be different than in file, together with the 512 bytes at the beginning, middle, and end, that's all his first modification. And the second modification is adding more of the known patterns. So that's the way he counts modifications.

Q. And then Hsu is titled "Automatic Synthesis of Compression Techniques for Heterogenous Files." Correct?

A. Yeah.

Q. What's a heterogeneous file?

A. I think he defines it as a mixture of different types of files. He says on page 1098, line 2, "Heterogeneous files are those which contain multiple types of data, such as text, images, binary, audio, or animation."

Q. So a heterogeneous file is a -- is a single file that will contain data of multiple different data types. Correct?

A. That seems to be the way he's defining it.

Q. And so in Hsu, if we're looking back at page 1104, one way to understand the reference to the indication of a primary data type of the file is that

Hsu is interested in identifying which of the multiple data types in that particular file is the primary data type. Correct? 11:30:57 11:31:01 11:31:06

MR. MUTSCHELKNAUS: Object to form. 11:31:15

THE WITNESS: No. I don't think that's correct. I think that "primary" there means best guess at what the data type is. 11:31:46 11:31:48 11:31:52

BY MR. LANTIER: 11:31:54

Q. Data type of what? 11:31:55

A. Well, okay. I -- I guess it's a little bit of what you said. It's kind of a mixture, actually. It's not a definite yes or no. It's if you have a -- if you have a file with multiple data types, the file may have more of one data type than the other. You know, it may be mostly images or something else. So I think it's trying to find out which one is the most significant in terms of occurrence so that it knows how to compress it. 11:31:57 11:32:03 11:32:07 11:32:09 11:32:13 11:32:17 11:32:22 11:32:27

Q. The idea being that if -- if a particular file is two thirds text data and one third image data, the compression algorithm that should be used on that file should be a compression algorithm that is good for text data. Correct? 11:32:32 11:32:34 11:32:41 11:32:44 11:32:48

A. In that example that's probably reasonable. 11:32:50

Q. And then there's a second modification to UNIX file that's described in the first full paragraph on 11:32:53 11:33:00

1104. And that's -- that's described in the final sentence of that paragraph. Correct? 11:33:04 11:33:08

A. That's correct. 11:33:14

Q. And Hsu -- the Hsu reference states there that the other change to the UNIX file command is that the known patterns of data have been increased by adding three graphics patterns. Do you see that? 11:33:16 11:33:19 11:33:24 11:33:28

A. Yes. 11:33:30

Q. And a person of skill in the art would have understood that to -- in 2001 to refer to adding three additional known patterns of data that correspond to graphics data. Correct? 11:33:30 11:33:33 11:33:40 11:33:46

A. Yes. And actually I notice now there's something I need to correct a little bit. I don't know if I said it wrong, or let me just clarify. In a previous question I think I may have said that the first of those two modifications was that sentence that started "First it examines and compares," what I meant to say is it starts there, but it goes all the way down to the sentence you just referred to. So it -- that first modification starts from the word "first" and ends where it says "a three-way tie" at the -- and then a parenthesis and period. So that entirety is that so-called first of the two modifications. 11:33:48 11:33:50 11:33:53 11:33:56 11:33:58 11:34:01 11:34:05 11:34:09 11:34:11 11:34:15 11:34:19 11:34:25

Q. Okay. Thank you for clarifying. 11:34:28

To clarify one point, then, if we look the at the last sentence in that section -- it's the one that begins with "Thus new-file decides on the most applicable data type"? 11:34:31 11:34:33 11:34:37 11:34:40

A. Yes. 11:34:42

Q. See that? 11:34:42

That's describing that new-file decides on the most applicable data type for the file. Correct? 11:34:43 11:34:46

A. Yes. 11:34:55

Q. Now, there -- and you've covered this in your -- your report, so I won't -- I won't belabor it. But there's a discussion then following the paragraph we were just discussing -- 11:35:01 11:35:04 11:35:08 11:35:10

A. Actually, I'm sorry. Sorry to interrupt you. I -- I need to correct my previous answer. 11:35:10 11:35:13

Q. Okay. 11:35:15

A. Sorry. It's -- I believe that this is actually determining -- okay. Let's go back to the beginning of this paragraph. It says, "To determine the block type, we use the procedure new-file." So I believe it's determining the file -- the type for a block. 11:35:16 11:35:18 11:35:20 11:35:25 11:35:28

Q. And in that paragraph is the block something different from the file, in your opinion? 11:35:36 11:35:44

A. Let me just take a second to review my notes. 11:35:47

Yeah, I'm sorry. So I misspoke before. Hsu is 11:37:59

actually determining a type on a block-by-block basis. And this is described in my report, Exhibit 2, in Paragraph 54, for example. And this is mentioned in Hsu in a number of places. So, for example, on page 1102 of Hsu, under the heading "The Heterogeneous Compressor," in the fourth line below that heading, it says -- oh, I'm sorry, in the, yeah, fourth line below, it says, "In the first phase the system determines the type and compressibility of each block." 11:38:03 11:38:07 11:38:11 11:38:18 11:38:26 11:38:31 11:38:36 11:38:40 11:38:42

Okay. And then -- and then if we go to page 1104 at that paragraph we were talking about, which is eight lines down from the top, it starts, "To determine the block type." So there it's mentioning that we're determining the block type. So this is -- this determination is on a block-by-block basis. I think before I misspoke and said it was on a file basis. But it actually does it for each block. 11:38:45 11:38:51 11:38:54 11:39:00 11:39:07 11:39:09 11:39:13 11:39:17

Q. And the blocks are 5,000 bytes in length. Correct? 11:39:20 11:39:24

A. I think it said 5,000-something. I don't know if it was bytes. And that was just one example. 11:39:25 11:39:29

Q. I think if we go back to page 1102 and review the section where it's describing the heterogeneous compressor -- 11:39:34 11:39:39 11:39:42

A. That's right, and it says 5,000 in the current 11:39:44

implementation.
Actually, I'm not sure if that 5,000 is talking about -- yeah. It's not -- it's not entirely clear what that 5K is referring to there.
Q. In your experience, what would a person of skill in the art understand it to refer to?
A. I think a person of ordinary skill would be confused. They might guess it's 5K bits per block. They might guess it's 5K bytes per block. They might guess it's 5K blocks per file. There's three options there. This teaching is not very clear at all.
Q. And so you don't know what it means? Is that fair?
A. Well, I've considered all the different options, and my opinion doesn't change depending on which of those options it is.
Q. Now, if we go back to page 1104, Hsu discusses that it will examine the first 512 bytes of a data set, the 512 bytes in the middle of the set, and the 512 bytes at the end of the set. Do you see that?
A. Yes. And by the way, in my Paragraph 54 I notice that I wrote that Hsu uses fixed size blocks of 5 kilobytes in size. So when I wrote this report, that was my best guess of what a person would understand of ordinary skill. But there is some ambiguity there.

Q. Okay. Going back to my question, you do see the sentence that states that new-file will examine and compare not only the first 512 bytes of the data set but also the 512 bytes in the middle of the set and the 512 bytes at the end if they exist. Correct?
A. Yes, I see that.
Q. And in that sentence the data set refers to a block. Correct?
A. I mean, unless I'm missing something, that seems correct.
Let me just actually double-check on that.
Yes, I believe that's true.
Q. And then in the next sentence, where it says "Thus new-file decides on the most applicable data type by a majority vote or the first data type detected in the case of a three-way tie," that's referring to a decision about the most applicable data type for the block. Correct?
A. Correct.
Q. Okay. Now --
A. Which means -- I'm sorry to overtalk you. Which means my previous testimony regarding files, that that was incorrect. I'm correcting it now.
Q. Correcting it in the sentence that when you were referring to a file, you had intended to refer to a

5-kilobyte block instead. Correct?
A. No, not a 5-kilobyte -- oh. Let's say just a block, not necessarily 5 kilobytes. In this example it is. But when we were discussing what the word "primary" meant, you had offered the possibility in a question to me whether primary was used to distinguish a primary type of a file consisting of many types within the file. And that was an incorrect answer I'd given you, so I'm correcting that at this time. It's on a block-by-block basis. It's not for the whole file.
Q. Got it. And Hsu contemplates that a single 5-kilobyte block could contain multiple different data types. Correct?
A. I don't see that taught by Hsu.
Q. You don't. Your -- you don't -- you don't see that taught in the paragraph on page 1104?
A. I mean, unless I'm missing something, I don't currently see it. Or maybe I don't remember, maybe I'm forgetting, but I don't see -- I don't recall that being taught by Hsu.
Q. Your understanding when Hsu teaches that there will be a majority vote to determine the most applicable data type -- strike that. I'm sorry. I lost my train of thought.
You agree that new-file decides on the most

applicable data type for a data block by a majority vote. Correct?
A. Well, just to be precise, new-file decides on the most applicable data type by a majority vote.
Q. Correct. So the new-file process described in Hsu decides on the most applicable data type for the data block by a majority vote. Correct?
A. That's correct.
Q. And the majority vote is based on the analysis of the first 520 bytes in that block, the middle 520 bytes in that block, and the 520 bytes at the end of that block if they exist. Correct?
A. Well, it says 512, not 520. But otherwise, yes.
Q. Thank you for clarifying that.
And it's your opinion that Hsu doesn't contemplate that within a single data block there could be data with different types -- of different types?
A. Hsu's --
MR. MUTSCHELKNAUS: Objection to form.
THE WITNESS: When -- when I analyze how a person of ordinary skill in the art at the time of the invention in this patent case would understand what Hsu was teaching, Hsu was -- there's no teaching of that at all in here.

BY MR. LANTIER:
Q. So your opinion is based on your understanding that the description of using a majority vote is unrelated to heterogeneous data. Is that correct?
A. I don't know what you mean by "unrelated." You'd have to define that for me.
Q. Well, heterogeneous data is data of multiple different data types. Correct?
A. Well, as I -- as I mentioned before, Hsu defines this notion on page 10 -- 098 where he talks about heterogeneous files. I'm not sure he uses the expression "heterogeneous data." If it's in there, maybe you could point me to it.
Q. That's a fair clarification. Thanks.
So a heterogeneous file would be a file that contains data of multiple different data types. Correct?
A. Basically, yes.
Q. Is there -- is there any disclosure in Hsu that states that a 5000-byte block of data could not be heterogeneous?
A. I don't think Hsu teaches one way or the other. Hsu just teaches that types are to be determined for blocks; never, ever suggests, hints, mentions explicitly or otherwise that a block would have multiple types.

Q. And that's the basis for your opinion. Correct?
A. What's the word "that" mean in that question?
Q. That your understanding is Hsu doesn't suggest that a 5,000-byte block of data could consist of multiple data types.
A. It's certainly -- it's certainly a true statement that Hsu does not teach that nor suggest that fact.
Q. And so in your opinion, what's the significance of the majority vote?
A. Well, Hsu describes -- let's take a look at that sentence. So it says, "New-file decides on the most applicable data type by a majority vote," in parentheses, "or the first data type detected in the case of a three-way tie." So my understanding is since the preceding sentences talk about taking three -- three looks -- one at the beginning -- 512 bytes at the beginning of what they're looking at, a middle 512, and then an end 512 -- that corresponds to the votes.
So assuming there are, you know, enough of these 512 bytes to go around, the first 512 would be Vote No. 1, the middle would be Vote No. 2, et cetera. And it's not a -- the whole concept of estimating a file type is not a perfect science. It's a guessing game. It's an estimation problem. That's even how they define

it -- describe it if you look at the manual pages for the file functions out in the Web.
And so it's a guessing game, and you try to get it right. And that's why sometimes you have disagreement between the three different parts of a file. So the vote tries to resolve that difference. And if two of them say one thing and the other says another, then you go for the two votes. That's what majority vote means in my understanding of how a person of ordinary skill would read this.
Q. And you describe that the process is sort of an estimation. Is that right?
A. The UNIX file command and this modification called new-file, in my opinion, are estimation processes where they try to guess the file type. They may not get it right, but they try to get it right as best as possible.
Q. And that's true for homogeneous files as much as it is for heterogeneous files. Correct?
A. You mean that if you use -- are you asking me if you use some sort of file or new-file-type command on a homogeneous file, whether it's still a guessing process?
Q. No. I'm saying that if -- that the UNIX file command, in your opinion, is always a guessing process, and that would be true even if it was evaluating a

homogeneous file or all the data was of the same data type. Correct?
A. We're talking about the file -- UNIX file, not this new-file command?
Q. Right.
A. Yes. I -- in general the UNIX file command has to guess what type the file is that it's looking at. Sometimes it gets it exactly right; sometimes it's not right.
Q. But just to be clear on one point, as you read the Hsu disclosure, your -- your opinion is that a purchase of ordinary skill in the art would understand that a single data block will always contain data of only one data type. Is that correct?
A. I never said that. What I said is that Hsu tries to assign a data type, a single data type, to a block. Hsu doesn't teach anything whatsoever about whether blocks can have more than one data type. So my inference is that a person of ordinary skill in the art reading the Hsu disclosure would understand that a single block is to be assigned a single type by Hsu's new-file command. Whether or not that works, whether or not that's a good thing to do -- it's not taught, it's not described -- I don't know. I don't -- I don't even know how it works. It's very vague here. There's not

much teaching. So, but there's certainly no hint whatsoever that you could have multiple data types within a block. 11:53:37 11:53:41 11:53:44

Q. Okay. Let's move. Underneath that section there's a section on redundancy metrics. Do you -- oh, I'm sorry. Before we move on, I think we had started the discussion, and then you had to correct your answer. So I just need to finish the questioning there. 11:53:55 11:53:57 11:54:02 11:54:05 11:54:08

Looking at the final sentence of the first full paragraph on 1104, it states, "The other change is that the known patterns of data have been increased by adding three graphics patterns." Do you see that? 11:54:10 11:54:13 11:54:17 11:54:22

A. Yes. 11:54:25

Q. That refers to a modification made in new-file to include, in the known patterns of data that will be used as a basis for comparing the uncompressed data under analysis, three graphics patterns. Correct? 11:54:25 11:54:28 11:54:31 11:54:38

A. Basically that's right. 11:54:42

Q. So that -- those would be, in other words, patterns that are typical of graph -- of particular types of graphics data? 11:54:43 11:54:46 11:54:50

A. Roughly speaking, yes. 11:54:51

Q. So then let's move on to the next portion of the disclosure. And that is the section on redundancy metrics. 11:54:53 11:54:58 11:55:03

A. I see that. 11:55:04

Q. Do you see that? The -- the analysis of the redundancy metrics in Hsu is used to determine whether -- whether the uncompressed data is further compressible. Correct? 11:55:05 11:55:08 11:55:14 11:55:19

A. Correct. 11:55:21

Q. Now, why don't we turn to Claim 48 of the '992 patent. Strike that. 11:55:42 11:55:47

Why don't we use Claim 1 of the '513 patent instead. 11:55:49 11:55:57

A. Okay. 11:55:57

Q. So that's Exhibit 7, Claim 1. 11:55:57

A. I've got that open. 11:56:07

Q. Okay. Now, you said before that the Hsu reference discloses a two-pass system in which -- in which analysis occurs during the first phase, the uncompressed data, and then the compression step occurs in the second phase. Is that right? 11:56:08 11:56:10 11:56:15 11:56:19 11:56:24

A. That's correct. 11:56:27

Q. Does Claim 1 of the '513 patent encompass two-pass methods for compressing data? 11:56:34 11:56:39

A. You know, I didn't specifically analyze that question as part of my report, so I didn't offer an opinion about that. Offhand I don't see a reason why that would be excluded. But again, I didn't really -- I 11:56:50 11:56:53 11:56:55 11:56:59

didn't really analyze it, so I don't have a definitive answer. 11:57:03 11:57:07

Q. And then Franaszek, Exhibit 4, is a piece of prior art that you described as performing a block-by-block analysis and compression. Is that correct? 11:57:08 11:57:14 11:57:20 11:57:21

A. I believe that's correct, yes. 11:57:22

Q. So in other words, in Franaszek there will be analysis and compression performed for each block rather than a two-pass system. Is that fair? 11:57:24 11:57:27 11:57:31

A. Basically that's right. 11:57:37

Q. Now, does Claim 1 of the '513 patent encompass a system that performs data compression on a block-by-block basis? 11:57:38 11:57:43 11:57:47

A. Again, I didn't, you know, analyze the full scope of Claim 1. But certainly it applies to blocks, and I don't see any particular reason why it's restricted to blocks. 11:57:49 11:57:52 11:57:55 11:58:00

Q. In other words, in your view, Claim 1 would be broad enough that it would encompass a -- potentially encompass a compression system that performs analysis and compression on a block-by-block basis. Correct? 11:58:02 11:58:04 11:58:09 11:58:13

A. It would allow for that, yes. 11:58:17

Q. Let's turn to Claim 4, which is one of the -- the claims on which you offered an opinion. And I'm not 11:58:21 11:58:27

trying to make this a memory test, so this is the one that I think begins at page 91 of your expert declaration, if that's -- if that's useful to you. 11:58:30 11:58:34 11:58:38

A. Okay. I'm looking at page 91 of Exhibit 2. 11:58:57

Q. Yeah. And I think if you just refresh your memory, if needed, with a review of Paragraph 1 -- 183, that would -- would likely be helpful for this question. 11:59:01 11:59:04 11:59:11

A. Okay. 11:59:15

Okay. I've read that. 11:59:15

Q. Okay. And feel free to read the remainder of your opinion there. I just -- I just have a question about the -- the basis for your opinion. And I'll ask it, and you can review as needed. 11:59:48 11:59:50 11:59:53 11:59:55

A. I've read Paragraph 183, just that -- 12:00:00

Q. Yes. And I'm saying if after I ask my question you think it would be helpful to review any additional paragraphs, I'm not rushing you and please do so. 12:00:02 12:00:05 12:00:08

A. Okay. 12:00:12

Q. But as I understand your opinion stated at Paragraph 183 and follows in the '513 patent IPR declaration, your -- you understand Claim 4 to require that the content-dependent analysis and compression be completed before the content-independent analysis and compression begins. Is that correct? 12:00:12 12:00:16 12:00:21 12:00:28 12:00:34 12:00:41

A. Well, it's slightly different wording. I use 12:01:00

the word "occurs," not "completed." So my Paragraph 183 is saying that the content-dependent compression in the analysis occurs before the content-independent analysis and compression. 12:01:08 12:01:16 12:01:25 12:01:30

Q. Yes. And the claim uses the word "occurs," so it -- you know, that is the right word to use. But what I'm trying to get at is I understand your opinion to be that Claim 4 would require that both the analysis of the data block and the application of content-dependent compression to the data block be complete, or have occurred, before any analysis of the data blocks for applying content-independent compression begins. Am I right to understand you that way? 12:01:32 12:01:35 12:01:39 12:01:45 12:01:51 12:01:56 12:02:02 12:02:15 12:02:21

A. Let me think about it for a second. 12:02:24

Well, okay. I think if -- this may help if we look at -- where is it? -- my Paragraph 187 in Exhibit 2. In that Paragraph 187 -- this is on page 93 -- I'll start reading from the second-to-last line. Here I'm referring to Hsu. And this will help clarify what I meant in the question you asked. 12:02:29 12:05:22 12:05:41 12:05:55 12:05:59 12:06:02

It says, "Therefore, Hsu cannot teach or suggest the timing features of Claim 4, i.e., that a first analysis and compression occur before a second analysis and compression, because in Hsu all analysis must be done before any compression can occur." 12:06:04 12:06:06 12:06:10 12:06:12 12:06:16

Well, okay. I'm sorry. Let me -- maybe that wasn't too helpful. But let me back up and say that, first of all, I believe that whichever of the two options of understanding what "occurs" means in Claim 4 of the '513, let me clarify what those two options are. One is that -- in my mind, one option is that the applying the content-dependent data compression algorithm and the analyzing the data block, the fact that that occurs before analyzing the plurality of data blocks and the applying the content-independent data compression algorithm, the "occurs" there could theoretically -- let's just talk about a theory for a second -- mean that -- let me -- let me reduce that whole thing to A occurs before B, just for simplicity. Okay? 12:06:35 12:06:37 12:06:41 12:06:45 12:06:49 12:06:55 12:06:59 12:07:03 12:07:07 12:07:12 12:07:14 12:07:18 12:07:21 12:07:23 12:07:27

"A occurs before B" on one hand might mean that A must be completed before B is started. That's part of the question you asked. Or it might mean that some portion of A takes place before some portion of B takes place. So in other words, you can't start B until at least something in A gets started. Okay. That's -- let me call that Option 2. 12:07:29 12:07:32 12:07:34 12:07:37 12:07:41 12:07:44 12:07:48

In my opinion, the opinions that I expressed in this report, as far as I can tell, don't depend on which of those two options the real answer is. I think that 12:07:50 12:07:54 12:07:58

my opinion holds in both cases. 12:08:02

Now, whether it's -- which one it is, I'm not sure I explicitly distinguished between them. I'm not sure I needed to. I think my writing suggests that it's -- it's the former, in other words, that the totality of A has to be completed before B even starts. But now that I look at it based on, you know, your question you're asking me, even if the second option is -- is let's say the correct one, I don't think my opinions would change at all. So I didn't have to -- I didn't need to fully construct what that phrase meant in order to analyze this alleged prior art. 12:08:05 12:08:08 12:08:13 12:08:19 12:08:23 12:08:27 12:08:31 12:08:35 12:08:40 12:08:44 12:08:48

Q. So just so we're clear on the record, explain what Option 2 would be again? 12:08:52 12:08:55

A. Okay. I'll say both the options, so -- 12:08:57

Q. Yeah. 12:08:59

A. If I'm saying A occurs before B -- 12:09:00

Q. We'll call that Option 1. 12:09:03

A. Option 1. A occurs before B. Let me define that to mean that all of A is completed before any of B begins. And Option 2 would be that at least some of A occurs before any of B begins. 12:09:05 12:09:08 12:09:12 12:09:21

Do you want me, for the record, to say what A and B mean? 12:09:35 12:09:37

Q. I think we have that above. 12:09:39

A. Okay. 12:09:41

Q. There's an -- but there's an Option 3, which would be that A must be completed -- A must have occurred -- before B is completed. 12:09:42 12:09:44 12:09:53

A. I see. 12:09:59

I don't think that would change my opinion regarding what I wrote about that in my report, as far as I can tell. 12:10:34 12:10:37 12:10:39

Q. So in Option 3, A -- which we define to be the analysis of the data block plus the application of a content dependent compression algorithm. Correct? 12:10:41 12:10:47 12:10:51

A. That's correct. 12:10:57

Q. -- would need to have a -- would need to occur, that is, the compression would need to be applied, before B. Correct? 12:10:57 12:11:02 12:11:06

A. Well, I think you stated it as it would have to end before B ends. 12:11:11 12:11:15

Q. That's right. And B is the analysis of plurality of data blocks and the application of the content-independent compression algorithm. Correct? 12:11:18 12:11:26 12:11:31

A. Right. That's the definition of B. I don't think -- in my opinion, that Option 3 you gave is not what this means. But even if it was, I think my opinion would still hold. I think it's really Option 1 or 2. I didn't specifically -- this wasn't -- I didn't need to, 12:11:35 12:11:38 12:11:42 12:11:45 12:11:50

you know, exactly pinpoint what this meant in order to analyze the -- the Hsu reference. So I think under either interpretation, my -- either 1, 2, or 3, even though I don't agree with 3, I think my opinion would still hold. 12:11:52 12:11:56 12:12:00 12:12:09 12:12:12

Q. But in your declaration for the '513 patent, you didn't offer any opinions under Option 3. Correct? 12:12:13 12:12:17

A. I don't believe that I -- that I explicitly did. But in response to your question, I'm saying right now that I think the same opinions would hold. 12:12:20 12:12:23 12:12:28

Q. Let's talk about Hsu in the context of Option 3. In Hsu all of the data blocks are analyzed before -- well, strike that. 12:12:32 12:12:36 12:12:44

In Phase 1 of Hsu, all of the data blocks were analyzed. Correct? 12:12:45 12:12:49

A. Correct. 12:12:51

Q. And then in Phase 2 the data blocks are compressed. Correct? 12:12:51 12:12:55

A. That's correct. 12:12:58

Q. And there's -- Hsu doesn't state one way or the other whether all of Phase 1 needs to be completed before one begins Phase 2. Correct? 12:13:00 12:13:05 12:13:10

A. I'm sorry. Could you repeat that? 12:13:15

Q. Yes. There's no statement one way or the other in Hsu as to whether all of Phase 1 must be completed 12:13:17 12:13:19

before Phase 2 begins, is there? 12:13:23

A. I don't think -- I think it's not explicitly taught one way or the other. But I think implicitly that's what one would understand. Let me just take a quick look to refresh my memory here. 12:13:36 12:13:38 12:13:44 12:13:48

No. So I disagree with your statement. I'm looking at the Hsu reference. Again, this is Exhibit 3, page 1100, the second full -- or, I'm sorry, third full paragraph that begins "Our approach." It says, "Our approach differs from adaptive compression because the system chooses each algorithm as well as the duration of its applicability before compression begins." So that indicates that all of the analysis has to be done before the compression starts. 12:14:28 12:14:31 12:14:35 12:14:41 12:14:46 12:14:51 12:14:55 12:14:58 12:15:01

Q. Okay. So all of the -- in Hsu all of the data blocks that are to be compressed will be analyzed prior to the beginning of compression. Correct? 12:15:05 12:15:09 12:15:12

A. Yes. 12:15:23

Q. And then in the Phase 2 step, Hsu will apply different compression algorithms to different sets of data blocks. Correct? 12:15:24 12:15:36 12:15:40

A. It could, yes. 12:15:45

Q. And it does that serially. Correct? 12:15:48

A. I'm not sure what you mean exactly. 12:15:55

Q. Well, what you discussed in your -- in your 12:15:57

declaration is that in Hsu, if there are, for example, two adjacent data blocks that are going to receive the same compression algorithm, that those two blocks will be compressed together. Correct? 12:16:01 12:16:07 12:16:11 12:16:16

A. Well, there will be a joint. There's no -- it's sort of a seamless compression as you transition from one to the other. 12:16:21 12:16:23 12:16:29

Q. But if the following block is going to receive a different compression algorithm, then the Hsu system will change the algorithm and apply that algorithm to the next block. Correct? 12:16:31 12:16:33 12:16:36 12:16:38

A. That's correct. 12:16:40

Q. So what I meant by "serially" is that the data stream, the uncompressed data stream, will be compressed with the first compression algorithm being applied to the first set of blocks that is going to receive that compression algorithm, then the next set of blocks that will receive the second compression algorithm, et cetera. Correct? 12:16:40 12:16:45 12:16:54 12:16:59 12:17:03 12:17:07 12:17:12

A. So Hsu will compress the blocks in the order that they appear, perhaps changing algorithm as it goes along. 12:17:14 12:17:17 12:17:21

Q. Right. But it -- but Hsu, for example, doesn't disassemble the data stream and apply ten different compression algorithms in parallel. Correct? 12:17:22 12:17:24 12:17:32

A. That's certainly not taught, yeah. 12:17:37

Q. So if Option 3 is the correct understanding of Claim 4, then with respect to content-dependent data compression, the teaching of Hsu is that for at least the first set of blocks that will receive the first compression algorithm, that set of blocks will have been analyzed and compressed before analysis and compression occurs for the next set of blocks in order. Correct? 12:17:41 12:17:45 12:17:53 12:18:00 12:18:03 12:18:11 12:18:15

MR. MUTSCHELKNAUS: Object to form. 12:18:27

THE WITNESS: First of all, let me just restate that I don't agree at all with Option 3. I don't think that's what it means in the context of this patent, but -- so we have a hypothetical now. And I need to understand these parameters better. 12:18:30 12:18:31 12:18:35 12:18:38 12:18:41

So let's see. I'm sorry. I got a little confused because I thought you were sort of, you know, following the language of Claim 4, but I think you asked me something slightly different. Is that correct? Or maybe I lost the question. 12:18:44 12:19:03 12:19:06 12:19:09 12:19:12

BY MR. LANTIER: 12:19:13

Q. So I didn't intend to do so, so if I did, we should clarify it. So Option 3 -- which I understand you disagree with. Okay? 12:19:14 12:19:17 12:19:22

A. Yes. 12:19:25

Q. -- is that Claim 4 requires that the analysis 12:19:25

and the compression of a data block that will receive content-dependent data compression is -- fully occurs before compression -- before analysis and compression of a plurality of data blocks that will receive content-independent data compression fully occurs? 12:19:34 12:19:38 12:19:47 12:19:53 12:19:57

MR. MUTSCHELKNAUS: Object to form. 12:20:03

THE WITNESS: And by "fully" -- by "fully occurs" you mean completed. 12:20:04 12:20:04

BY MR. LANTIER: 12:20:05

Q. That's right. 12:20:06

A. Okay. I understand the premise. 12:20:07

Q. So both could be -- okay. Good. 12:20:08

Then the question is, solely with respect to applying different content-dependent data compression techniques in Hsu, in the Hsu reference, the application of the first content-dependent data technique will be completed before the analysis and compression of the next content-dependent compression algorithm. Correct? 12:20:12 12:20:23 12:20:29 12:20:37 12:20:46 12:20:55

A. I see. Okay. Now I understand the question. So just for my own sake, let me restate what I'm understanding. You're basically asking something very similar to Claim 4 except instead -- Claim 4 has content-dependent occurring before content-independent, and you're changing that to content-dependent before content-dependent again in the context of Hsu under this 12:21:03 12:21:05 12:21:09 12:21:12 12:21:16 12:21:19 12:21:21

hypothetical of the third logic where "occurs" means completely finished. 12:21:26 12:21:29

Okay. Under -- under those set of restrictions, which again is not what's happening in Claim 4, that -- that sounds reasonable. 12:21:32 12:21:34 12:21:43

Q. Now, if we turn to Claim 18 in the '513 patent, which is Exhibit 7, do you see that Claim 18 requires that the content-independent and content-dependent algorithms are applied serially? 12:22:03 12:22:23 12:22:32 12:22:37

A. Yes, I do. 12:22:41

Q. Now, I understand that, in your opinion, Hsu does not disclose content-independent algorithms. Correct? 12:22:43 12:22:45 12:22:49

A. That's correct. 12:22:50

Q. But you -- you agree that in Hsu the content-dependent algorithms, the different ones, are applied serially to the data. Correct? 12:22:51 12:22:54 12:22:59

A. So the -- you know, again, Claim 18 depends from Claim 15. So when we're talking about the language of Claim 18, it's always in the context of everything else from Claim 15. So if we just kind of ignore Claim 15 and just focus on the content-dependent compression that occurs in Hsu, since there is only content-dependent compression in Hsu, in my opinion, it -- the compression does compress one block after another block. So in that 12:23:56 12:24:03 12:24:05 12:24:09 12:24:13 12:24:16 12:24:21 12:24:32

sense, in terms of compressing content-dependent compressing block to block, you know, each -- there's a serial order there, I would say. 12:24:50 12:24:56 12:25:00

MR. MUTSCHELKNAUS: Counsel, it's almost 12:30. Do you want to break for lunch or -- 12:25:03 12:25:04

MR. LANTIER: Yes. 12:25:08

MR. MUTSCHELKNAUS: Okay. 12:25:09

MR. LANTIER: We can break for lunch. 12:25:09

THE VIDEOGRAPHER: This ends Media No. 2 in the deposition of Dr. Kenneth Zeger. We're off the record. The time is 12:25 p.m. 12:25:10 12:25:13 12:25:17

(Off record) 12:25:22

THE VIDEOGRAPHER: This begins Media No. 3 in the deposition of Dr. Kenneth Zeger. We are back on the record. The time is 1:29 p.m. 13:29:56 13:29:58 13:30:02

BY MR. LANTIER: 13:30:10

Q. Dr. Zeger, I had a couple of questions about your opinions on claim construction, which are around page 35, Paragraph 85 and following in your declaration. 13:30:11 13:30:13 13:30:19

A. Exhibit 2? 13:30:24

Q. Exhibit 2, right, your '513 declaration. 13:30:26

A. I'm sorry. Page 35 or -- 13:30:30

Q. I think it's page 35 -- 13:30:33

A. Okay. 13:30:33

Q. -- Paragraph 85. 13:30:35

A. Okay. Got it. 13:30:45

Q. And this is the issue of what is required for content-independent data compression. And it may help -- I think I'll ask the question based on Paragraph 88. But why don't you read pages 35 through 37 just to remember what we're talking about. I'm sorry, through -- through the end of 36. 13:30:46 13:30:49 13:31:12 13:31:16 13:31:21 13:31:22

A. Okay. 13:31:26

Okay. I finished that. 13:32:29

Q. Okay. So if we look at Paragraph 88, you offer the opinion that a person of ordinary skill in the art would have understood that in the context of the '513 patent a -- excuse me -- a compression algorithm needs to be applied, quote, without regard to the encoder's or encoders' ability to effectively encode the data type or content of the data block to be content-independent as claimed. Do you see that? 13:32:31 13:32:35 13:32:39 13:32:42 13:32:46 13:32:50 13:32:52 13:32:56

A. Yes. 13:32:58

Q. When -- when you say that the algorithm needs to be applied without regard to the encoder's ability to effectively encode the data type or content, what do you mean by that? 13:32:59 13:33:04 13:33:07 13:33:13

A. I think it kind of speaks for itself. 13:33:28

Q. Okay. Let me maybe confirm what I -- I think you don't mean, and I'm just trying to make sure I 13:33:32 13:33:35

understand your -- your construction. 13:33:38
If you could turn to Column 18 of the '513 13:33:43
patent -- 13:33:49
A. Okay. 13:33:57
Q. -- and review beginning at approximately line 17 13:33:57
with the sentence that says, "If the data stream content 13:34:01
is not recognized," and just go ahead and read down to 13:34:05
the end of that column to the extent you need to. If 13:34:09
you remember this section, don't bother to reread it. 13:34:14
A. Okay. 13:34:45
Q. So that portion of Column 18 is describing one 13:34:46
embodiment of content-independent data compression. 13:34:48
Correct? 13:34:56
A. Yes. 13:34:57
Q. Okay. And what it's -- and I'm paraphrasing. 13:34:57
But what it's describing is that if the content of the 13:34:59
data is not recognized, that that block of data will be 13:35:04
compressed using multiple different encoders or encoding 13:35:09
algorithms, and a compression ratio will be calculated 13:35:14
for each of those different encoders. Correct? 13:35:21
A. That's basically correct. 13:35:24
Q. Yeah, and that after that's performed, then the 13:35:26
encoder that provided the highest compression ratio, 13:35:30
assuming that it exceeded a preset threshold, would be 13:35:34
used to encode that data block. Correct? 13:35:39

A. I believe that's -- that's basically what's 13:35:45
going on. 13:35:48
Q. Okay. So in some -- if that -- if that 13:35:48
embodiment is utilized, then in some sense the -- the 13:35:49
particular compression algorithm that's applied is being 13:35:57
applied based on its ability to encode the data block. 13:36:03
Correct? 13:36:08
A. Your question needs clarification because 13:36:08
there's different -- you said the data compression 13:36:11
algorithm is applied. Okay. Let's be specific. Can 13:36:14
you show me exactly the line number in Column 18 that 13:36:18
you're referring to? 13:36:22
Q. Yes. So it's, I think, line 60 through 64 is 13:36:33
where they describe using the -- the highest compression 13:36:37
ratio encoder? 13:36:43
A. Well, it says a -- the data block having the 13:36:46
high -- the greatest compression ratio is selected. You 13:36:51
were talking about applying compression. Right? That's 13:36:56
the words you used in your question. 13:36:59
Q. Yeah, I was just using the words from your 13:37:03
construction. 13:37:04
A. Okay. 13:37:06
Q. So -- okay. So am I then understanding 13:37:08
correctly that the distinction you're drawing is that 13:37:11
the -- all of the different encoding algorithms would 13:37:15

have been applied to that data block? 13:37:19
A. Well, if you go up to line 20 in Column 18 of 13:37:24
this '513 patent, it says -- let me just back up a 13:37:27
little bit to line 17. If the data stream content is 13:37:32
not recognized utilizing the recognition lists or 13:37:36
algorithm's module, the data is routed to the 13:37:40
content-independent encoder Module 30 and compressed by 13:37:44
each enabled encoder E1 dot, dot, dot up to EN. That 13:37:49
compression right there is without regard -- it's using 13:37:55
that "without regard" language. So that's where I'm 13:37:59
talking about. 13:38:02
Q. I see. Okay. So you weren't trying, though, to 13:38:03
exclude from your definition of content-independent data 13:38:06
compression the embodiment that's described at Column 18 13:38:09
of '513 -- of the '513 patent. Correct? 13:38:14
A. When I construe things, I don't try to include 13:38:18
or exclude. What I try to do is understand the meaning 13:38:22
of the language in the claims in the context of the 13:38:25
claims and the patent. And what I gave -- I think it's 13:38:27
in my Paragraph 86, that construction is that -- let me 13:38:31
just read it for the record. It's compression is 13:38:40
applied using one or more encoders without regard to the 13:38:42
encoder's or encoders', plural, ability to effectively 13:38:45
encode. So that's my understanding of what this meaning 13:38:51
is in the claims and in the context of the patent, and 13:38:55

in particular it's supported by Column 18, like I was 13:38:59
just reading around line 20, and I think I gave some 13:39:05
other references in my declaration, because it 13:39:08
encodes -- it compresses each of these E1 to EN, all 13:39:11
that compression happens without regard to the encoder's 13:39:16
ability to effectively encode. 13:39:20
Q. And what's your understanding as a person of 13:39:26
skill in the art as to what happens to the encoded data 13:39:28
blocks that are not selected in the process described in 13:39:34
Column 18 because they have a lower compression ratio 13:39:39
than the -- the compressed data block with the highest 13:39:42
compression ratio? 13:39:47
A. Well, those blocks were -- you mean -- you're 13:39:47
referring to encoders that were not selected? 13:39:50
Q. I don't think so. I thought -- I understood 13:39:54
your testimony to say that all of the encoders are 13:39:57
selected but that only one of the resulting compressed 13:40:01
data blocks will be selected, and that would be the one 13:40:06
with the highest compression ratio. 13:40:11
A. Well -- 13:40:13
Q. If I'm misunderstanding you, please correct me. 13:40:13
A. Okay. Let me -- let me -- I'm not sure if 13:40:15
there's a misunderstanding, so let me just reclarify. 13:40:16
Column 18, line 20 -- I'll just jump in the middle of 13:40:17
the sentence. It says "Module 30 and compressed by 13:40:20

each," emphasis on the word "each," "enabled encoder E1 to EN." Okay. So that says that every one of those encoders E1 to EN is compressing the data. The word "the data" is in line 19. And it hasn't -- it doesn't decide whether to compress it based on the encoder's ability to effectively encode. It just does it automatically. So that -- that's where I get the language. That's supportive of my construction where it has the phrase "without regard to the encoder's ability to effectively encode." 13:40:24 13:40:30 13:40:34 13:40:40 13:40:42 13:40:44 13:40:47 13:40:50 13:40:54 13:40:57

Q. Yes, and if you continue to read down, there's a select process. Correct? 13:41:02 13:41:05

A. Correct. 13:41:07

Q. And at the end it says, and this is at Column 18, line 60, "If one or more of the encoded data blocks possess a compression ratio greater than the compression ratio threshold limit, then the encoded data block having the greatest compression ratio is selected." That's Step 1422. See that? 13:41:08 13:41:12 13:41:15 13:41:17 13:41:21 13:41:25

A. Yes. 13:41:31

Q. And my question is, what's your understanding as to what happens to the other compressed data blocks, the ones that were encoded with the other encoders? 13:41:32 13:41:34 13:41:39

A. I don't know if the patent discusses that. Presumably they're not used. But that doesn't really 13:41:46 13:41:48

affect the construction. 13:41:58

Q. And so in your opinion, if the compression algorithm is applied before it's known whether it will compress the data well or not, that's always a content-independent compression algorithm? 13:42:20 13:42:23 13:42:30 13:42:38

A. Well, I -- I think my construction kind of speaks for itself, that if your -- if compression is applied with one or more encoders and it does it sort of blindly without regard to whether it would be good or not, that's -- that's what's going on here in Column 18 line 20, roughly. It doesn't say anything about having to use that ultimately as the output of some useful system. It just says that's what it does. 13:42:45 13:42:47 13:42:50 13:42:55 13:42:58 13:43:02 13:43:05 13:43:10

Q. And in the -- in the Column 18 discussion, if all of the encoders, which are E1 through EN as you discussed, resulted in expanding the size of the data block, would that still be content-independent data compression? 13:43:13 13:43:21 13:43:27 13:43:37 13:43:42

A. Well, I think the point of this is to compress. So I guess if we look at the claim, I think generally content-independent compression algorithm is supposed to compress. 13:43:50 13:44:00 13:44:30 13:44:34

Q. But your -- I had understood your opinion to be you're going to apply the -- the algorithm, the content-independent data compression algorithm, before 13:44:37 13:44:41 13:44:45

you know whether it will compress or not. 13:44:52

A. Well, generally you would get compression; it's just a question of how much. 13:44:57 13:45:03

Q. Well, sometimes applying a compression algorithm results in data expansion. Correct? 13:45:07 13:45:10

A. Generally compression is supposed to compress. But, you know, we haven't exactly construed the exact meaning. But, yeah, sometimes you get rare events when they -- they could expand. 13:45:13 13:45:15 13:45:20 13:45:23

Q. And so if -- if E1 through EN were applied and each one of them expanded the data block, would that be content-independent data compression or not? 13:45:25 13:45:29 13:45:32

A. Well, I think to answer that question, a simpler question which really has the roots of the same issue is whether any compression algorithm, if it expanded a particular block of data, would you still call it a compression algorithm? And I think generally if something compresses in general, if that's what it's designed for, and, you know, every once in a while maybe it doesn't work or expands, I think it's still generally called a compression algorithm, certainly in the context of the patent. 13:45:35 13:45:39 13:45:43 13:45:46 13:45:49 13:45:52 13:45:57 13:45:59 13:46:02 13:46:02

So I think the same logic applies to your question regarding Column 18, line 20, if generally you have compression algorithms, a set of encoders E1 to EN, 13:46:03 13:46:07 13:46:11

and generally they would compress. So I think the premise there is that they are compression algorithms. Then the only question is, when do they decide to do the compression? Is it decided with or without regard to how well they're going to do? And the claim language content-independent compression algorithm -- I don't know if I got the exact terminology right, but -- yeah, whether that -- it's a decision of whether those compressors or encoders do their compression with or without regard to something. It's a separate question whether they're compressors in the first place. So premised on the fact that you assume that they're compressors, then it's just an issue of, do they check out how well they do? So you're asking me a question about whether or not they're even compressors. 13:46:16 13:46:20 13:46:24 13:46:28 13:46:30 13:46:34 13:46:37 13:46:40 13:46:45 13:46:50 13:46:55 13:46:58 13:47:00 13:47:03 13:47:05

Q. Well, I think I'm -- I'm really trying to understand what the -- what the bounds are of your opinion regarding what content-independent data compression is. 13:47:06 13:47:08 13:47:17 13:47:20

In Column 18 there's a discussion of comparing the encoded data blocks, the compressed data blocks, against a compression threshold. Correct? 13:47:22 13:47:29 13:47:34

A. Which line number is that? 13:47:36

Q. One instance would be line 45. 13:47:45

A. Okay. Right. So there it's pointing out that 13:47:49

there may be an unusual circumstance where none of these content-independent compressors is good enough, so don't even bother compressing. But that's -- I mean, that is what it is. It's a separate issue from this construction that we've been asking me about.

Q. Well, I was -- I'm not sure if it is. So in Column 18, lines 48 and following, do you see that it says, "If there are no encoded data blocks having a compression ratio that exceeds the compression ratio threshold limit," parentheses, "negative determination in step 1420," close parentheses, "then the original unencoded input data block is selected for output and a null data compression type descriptor is appended thereto." You see that?

A. Yes.

Q. So in that instance has content-independent data compression been performed?

A. Well, I don't -- see, I think in the construction -- I'm not construing whether content-independent compression has been performed. I'm construing the noun "content-independent data compression." Okay. And that's a different nuance there. So question is, what is a content-independent compression algorithm and all the variants that are sort of synonyms with that? And I'm construing that noun, as

given in my report in Paragraph 86. So you're asking me kind of a different question about whether -- I think your question is, in my mind -- my understanding, is that you're asking once I have such a content-independent type of compression, am I using it in a certain circumstance? And I don't think the claim speaks to when you have to use it. It just says -- I mean, it says what it says.

Q. Well, the claim term is a content-independent compression algorithm. Right?

A. That's -- that's right. That's a four-word phrase in the claim.

Q. Right. And your construction is compression that is applied using one or more encoders without regard to the encoder or encoder's ability to effectively encode the data type or content of the data block. Correct?

A. Yes.

Q. So in your construction, then, is "compression" a noun?

A. Yes.

Q. Okay. And if the result is that the data expands, is it still compression?

A. Well, this goes back kind of to the previous thing I was saying, that now we have to talk about a

compressor -- well, I guess we can talk about compression. A compression algorithm, that's the terminology used here. So a compression algorithm is -- generally speaking, it's an algorithm whose purpose is to compress and generally compresses. The fact that it may not compress a hundred percent of the time doesn't exclude it from being a compression algorithm. And I think that's kind of where you're going, because you're pointing to a very special case describing Column 18 in like on line 45 where -- or maybe line 50, where it's saying what to do in a oddball circumstance. And you don't exclude something from being a compression algorithm just because it occasionally fails. The main purpose of it is to compress, and we assume it does compress.

Q. And you agree that the same -- the same algorithm could be both a content-dependent data compression algorithm and a content-independent data compression algorithm. Correct?

A. Well, I don't think an algorithm is inherently a content-independent or content-dependent entity. It depends on how you use it. So if I name an algorithm, you know -- like, for example, Lempel-Ziv comes up in this case. I don't think you can say by itself it is content-dependent or content-independent. It depends

how it's used. So the context of its use sheds light on -- you know, that claim terminology.

Q. But let's take Lempel-Ziv as an example. As of 2001, there had been numerous instances in which persons of skill in the art had used Lempel-Ziv to encode data when they didn't know whether Lempel-Ziv would effectively encode that data. Correct?

A. I've seen no evidence provided by Oracle in this case saying that. I don't really -- I can't think of numerous cases where people didn't know that ahead of time. I think people generally have a good idea.

Q. What was the algorithm that was used in the UNIX operating system in the late 1990s for compression?

A. Are you stalking about compress?

Q. Yes.

A. I think that was a Lempel-Ziv-based thing.

Q. And that Lempel-Ziv algorithm was applied -- or compression technique was applied to all of the data in the operating system, correct, in the file system? Correct?

A. I have no idea what that question means.

Q. Okay.

A. When you say "applied to all the data," what data are you talking about?

Q. The Lempel -- the version of Lempel-Ziv that was

used in UNIX compress was always running in the background. Correct? 13:54:33 13:54:37

A. No. That's false. 13:54:38

Q. That's false? You don't understand that? 13:54:39

A. I understand and it's false. 13:54:42

Q. Okay. 13:54:47

A. Yeah. 13:54:48

Q. Let's -- 13:54:48

A. In fact, let me just clarify that I -- I often use UNIX, and I'm certainly not running that in the background. 13:54:49 13:54:52 13:54:56

Q. So is it your opinion that prior to 2001 it was not known to use a compression algorithm before you knew whether that data was likely to be compressible using that algorithm? 13:54:59 13:55:02 13:55:08 13:55:14

A. I'm not sure what data you're referring to. 13:55:16

Q. I'm just -- I'm asking just generally speaking. 13:55:20

A. But you said using a compression algorithm, not knowing whether the data is compressible. I'm -- I just -- I'm not trying to nitpick. I just don't know -- 13:55:25 13:55:30 13:55:34

Q. Sure. 13:55:36

A. -- you're referring to. 13:55:36

Q. Are you familiar with the PK ZIP product? 13:55:36

A. Yes. 13:55:43

Q. How did that work? 13:55:43

A. It's, again, a Lempel-Ziv-type thing. 13:55:45

Q. But how -- what was the PK ZIP product? 13:55:47

A. What do you mean, what was it? 13:55:51

Q. What was it? How was it used? 13:55:53

A. I don't know all the details off the top of my head. I need to review. I know the general idea. 13:55:53 13:55:55

Q. What -- what's the general idea? 13:55:56

A. It's a Lempel-Ziv-based compression algorithm. 13:55:57

Q. And was there any analysis of the content of uncompressed data applied prior to compression being applied in the PK ZIP product? 13:56:01 13:56:04 13:56:10

A. So one thing I don't remember off the top of my head which I would need to know is whether they used Huffman coding in there as well. If you could stipulate that one way or the other, it would help me give you a good answer. 13:56:20 13:56:23 13:56:26 13:56:30 13:56:31

Q. Because why? What about Huffman coding? 13:56:32

A. That would affect my answer. 13:56:36

Q. Are there instances you know of where Huffman coding was used prior to 2001 to encode data prior to any analysis being performed to know whether Huffman would effectively encode that data? 13:56:39 13:56:42 13:56:45 13:56:50

A. Yes. 13:56:53

Q. And what were some of those instances? 13:56:54

A. I've used Huffman codes myself. I've written 13:56:58

code to code things, and I apply it to data, and I don't know ahead of time whether it's going to work or not. 13:57:02 13:57:06

Q. So that would be an instance of content-independent data compression under your definition. Correct? 13:57:10 13:57:12 13:57:14

A. Not in the context of this patent. I mean, content-independent data compression is -- I mean, it's tied to the -- to the claim. So it's using one or more encoders without regard to the encoder's ability to effectively encode. I mean, we're kind of taking it out of the context of the whole claim itself. It's buried in with all of the other words here. It's superficially close to it, yes. 13:57:14 13:57:18 13:57:22 13:57:24 13:57:27 13:57:31 13:57:35 13:57:39

Q. Why would the instance in which you wrote a program that applies Huffman encoding to data, before you know whether Huffman will effectively encode the data or not, fall outside of your claim construction of content-independent data compression? 13:57:41 13:57:45 13:57:48 13:57:51 13:57:56

A. Well, I guess I was considering it in the context of, you know, the analyzing steps. I guess, okay, if you just focus on the applying step only in this method -- I mean, because, you know, the applying step is referring back to appropriate content-independent data compression algorithm, which was deduced by analyzing in the first step. But if we 13:58:02 13:58:05 13:58:07 13:58:12 13:58:15 13:58:17 13:58:21

just kind of take it out of context there, then using a -- yeah, if I wrote a program to use -- to do Huffman coding and then I just gave it something to compress and didn't think about it, that could fit into this definition. 13:58:24 13:58:27 13:58:32 13:58:39 13:58:41

Q. And that's something you had actually done before 2001. Correct? 13:58:42 13:58:44

A. Yes. 13:58:46

Q. Let's turn to your claim construction of append, which is only in Claim 6 of the '513 patent. And your opinions are set forth at page 101 and following of the '513 patent IPR declaration. 13:58:46 13:58:49 13:58:55 13:59:00

A. You said page 101? Is that what you meant? 13:59:12

Q. I think I meant page 101. 13:59:18

A. Okay. Yes. 13:59:20

Q. No. You are -- so we may be both right. You may prefer to refer to page 37, beginning at Paragraph 89, which is the claim construction portion of -- 13:59:21 13:59:28 13:59:32

A. Okay. 13:59:36

Q. -- your declaration as opposed to the application section. 13:59:36 13:59:39

A. I've got both of them open here. 13:59:41

Q. Okay. Did you have a chance to review that Paragraph 89? 13:59:44 14:00:04

A. Yeah, I looked at that. 14:00:06

Q. Okay. Your -- you have opined that a person of skill in the art would have understood "appending" as adding to the end of. Correct? 14:00:07 14:00:13 14:00:22

A. Well, specifically, I mean, I say a little more than that, but that's basically the idea. 14:00:26 14:00:28

Q. Okay. I had excluded -- your construction in full is, quote, appending a recognizable data token to, close quote, means, quote, adding a recognizable data token to the end of, close quote. Right? 14:00:30 14:00:30 14:00:34 14:00:37

A. That's correct. 14:00:42

Q. Okay. And I'd like to focus particularly on the appending portion of that opinion, which I understand you to be interpreting to mean adding to the end of. Is that right? 14:00:42 14:00:45 14:00:50 14:00:56

A. That's basically right. 14:00:57

Q. Okay. And specifically, if I understand you correctly, your opinion is that appending means adding data to the back or trailing end of something. Correct? 14:00:59 14:01:00 14:01:05

A. Well, I didn't say adding data. You just added that in there. 14:01:11 14:01:14

Q. Oh, sorry. In Paragraph 90 you did say adding data. 14:01:14 14:01:19

A. Oh. Let me see. 14:01:21

Q. But if you'd like to amend that, that's okay too. 14:01:26 14:01:29

A. That's fine. Okay. I'm sorry. So what was your question? 14:01:30 14:01:32

Q. That what your -- what you are interpreting your construction to mean is that appending is adding data to the back or the trailing end of something else. Correct? 14:01:34 14:01:37 14:01:43 14:01:46

A. End of is -- I mean, I think -- are you trying to make a distinction between end of and trailing? 14:01:46 14:01:50

Q. Well, the distinction I'm trying to make is that there could be a front end, there could be a back end, there could be a side end of something. 14:01:53 14:01:55 14:01:58

A. Okay. End is end. Trailing behind. End. I don't know how else to say it. 14:02:00 14:02:05

Q. But just so we're clear on this, your -- your -- your construction of append excludes anything that is not attached to the back end of something else. Correct? 14:02:07 14:02:11 14:02:15 14:02:21

A. As opposed to the front. It can't be attached to the front -- 14:02:21 14:02:26

Q. Okay. So -- 14:02:26

A. -- or in the middle. Yeah, I mean, you could have like -- you know, you can have, say, a block of data. You could attach something -- I can't use hand motions. You can attach something immediately after it, or you can have several layers of appendices. It might 14:02:27 14:02:29 14:02:30 14:02:33 14:02:36

not be literally touching the last thing, but it's at the end. It's attached to the end of the thing you're appending to. 14:02:42 14:02:44 14:02:44

Q. So for a recognizable data token to be appended to the compressed data block, do you agree that it needs to be attached to that data block? 14:02:46 14:02:53 14:02:58

A. Attached either directly or indirectly. Like I said, you could have a data block followed by multiple appendices, things that are appended. You could let's say have a data block called X. I could append something called A and another thing called B and another thing called C. So I could append three things to it, let's say in the order A, B, C. So C is still appended to the data block X even though the other appendages A and B are between them. But all three of these -- A, B, and C -- I would consider as appended to X. 14:03:01 14:03:04 14:03:08 14:03:11 14:03:15 14:03:17 14:03:21 14:03:24 14:03:28 14:03:31 14:03:33

Q. And so there could be a thousand things in between the compressed data block and the recognizable data token, and in your opinion, it would still -- that recognizable data token would still be appended to the data block? 14:03:33 14:03:38 14:03:42 14:03:45 14:03:50

A. Well, it -- I mean, that's not really the spirit of the patent. But generally speaking, if you have a data block and then the patent teaches appending 14:03:51 14:03:53 14:03:56

specific things to the data block, there can be more than one. I don't think there can be a thousand. But, you know, generally speaking, you could have more than one. 14:03:59 14:04:02 14:04:05 14:04:09

Q. But your opinion is that if it's -- if the recognizable data token is attached to the front end of the compressed data block, that it's not appended. Correct? 14:04:10 14:04:13 14:04:20 14:04:25

A. That's correct. 14:04:29

Q. Is there a particular part of the word "appended" or "append" that you believe signifies "at the back"? 14:04:33 14:04:35 14:04:41

A. Well, I don't think it's a question of breaking down the syntax of the word itself from a word to letters, if that's what you're getting at, or full names or syllables. It's a issue of, what does that word mean in the context of this patent? How is it used, you know, and how is it normally used? And I think my opinions are written down here, starting around these paragraphs you pointed to. And I have some -- some supporting dictionaries that are consistent with my opinion, and some other evidence. So it's not just based on like looking at the letters in the word or anything. 14:04:42 14:04:45 14:04:49 14:04:54 14:04:57 14:05:00 14:05:04 14:05:05 14:05:11 14:05:15 14:05:19 14:05:22

Q. And do you know what -- well, strike that. 14:05:22

You do admit that in Paragraph 90 of your report, your declaration, that the '513 patent does not explicitly define the term "append." Correct? 14:05:27 14:05:32 14:05:38

A. That's correct. 14:05:43

Q. And you then cited a series of dictionaries in between Paragraphs 91 and 92 of your declaration. Right? 14:05:51 14:05:55 14:05:59

A. That's correct. 14:06:02

Q. Are there other dictionaries that you looked at in addition to the ones you cited here? 14:06:04 14:06:07

A. Yes. 14:06:09

Q. Which other ones did you look at? 14:06:10

A. I don't remember. I -- I looked at a couple that just didn't have the word in there at all. I don't remember offhand which they were. 14:06:13 14:06:15 14:06:18

Q. Did you look at some dictionaries that had definitions of append that you didn't think would be supportive of your opinion? 14:06:21 14:06:24 14:06:27

A. I didn't see any. 14:06:29

Q. And how did you obtain the dictionaries that you looked at for this? 14:06:30 14:06:36

A. I've got a collection in my house, and the law firm has some dictionaries, and together we looked at them. 14:06:37 14:06:41 14:06:46

Q. All right. So for the Microsoft computer 14:06:46

dictionary that you cited, was that definition first identified by you or by Sterne Kessler? 14:06:49 14:06:52

A. I don't know. 14:06:59

Q. And for the Webster's New World Dictionary of Computer Terms that you cited, was that definition first identified by you or by Sterne Kessler? 14:06:59 14:07:01 14:07:01

A. In general I don't remember for any of these who got it first. 14:07:05 14:07:08

Q. And do you know how Sterne -- what other dictionaries Sterne Kessler looked at? 14:07:11 14:07:14

A. I don't know. 14:07:18

Q. Do you know if they provided you with all the definitions for append that they saw? 14:07:18 14:07:21

A. I have no idea what they did. 14:07:23

Q. Did anyone inform you that in prior litigation Realtime took the position that the specification of -- the specification that is common to the '513 patent and other patents was not limited to attaching data to the back of something? 14:07:26 14:07:33 14:07:38 14:07:42 14:07:47

A. Nobody informed me of that. 14:07:48

Q. Is that something you would liked to have known before you offered your opinion on this? 14:07:49 14:07:53

A. I don't think that's relevant in performing claim construction. 14:07:56 14:07:59

Q. So you wouldn't have taken that into account. 14:08:01

Is that right? 14:08:02

A. No. That's, as far as I know -- I mean, I'm not a lawyer, but I don't think that's part of the intrinsic evidence or anything else I should consider. 14:08:03 14:08:04 14:08:07

Q. Are you familiar with the word "appendage"? 14:08:16

A. In ordinary use, yes. 14:08:19

Q. Yeah. So my arm is an appendage to my body. Right? 14:08:21 14:08:25

A. Seems that's a good use of it, yes. 14:08:26

Q. Now, with respect to Claim 6 of the '513 patent, in your opinion, Claim 6 could not be infringed by any system in which a recognizable data token was attached directly or indirectly to something other than the end of the compressed data block. Correct? 14:08:31 14:08:35 14:08:40 14:08:48 14:08:53

A. It doesn't exclude that possibility. It just requires affirmatively that there be a data token appended. So conceivably you could have one in the beginning, one in the end. That's okay. It just -- you asked it, does it exclude it? 14:08:56 14:08:58 14:09:02 14:09:05 14:09:07

Q. That's a fair point, so let me reask the question. 14:09:11 14:09:13

With respect to Claim 6 of the '513 patent, in your opinion, that claim would not be infringed by any system which did not attach, directly or indirectly, a recognizable data token to the back end of the 14:09:14 14:09:19 14:09:26 14:09:31

compressed data block. Correct? 14:09:35

A. Well, I'm a little concerned about a legal issue here which is, first I'm not a lawyer, so let me clarify that. You asked me about infringement. I'm studying validity. And my understanding is that we use different claim construction standards. We use the BRI standard here, broadest reasonable interpretation. Infringement happens in district court where there's some other infringe -- some other claim construction criteria that's used. So I really can't speak to infringement. I can speak to validity. 14:09:47 14:09:52 14:09:56 14:09:59 14:10:03 14:10:07 14:10:08 14:10:10 14:10:13 14:10:15

Q. Use the broadest reasonable interpretation standard. Under that standard a system that did not attach, directly or indirectly, a recognizable data token to the back end of the compressed data block would not meet the requirements of Claim 6 of the '513 patent. Correct? 14:10:18 14:10:32 14:10:38 14:10:42 14:10:47 14:10:52

A. I don't think that would fall within the scope of Claim 6. 14:10:52 14:10:55

Q. Now, you point out in Paragraph 92 of your declaration that a person of skill in the art would have understood that an example of file type descriptors would be file extensions like .doc or .exe. Correct? 14:11:16 14:11:22 14:11:27 14:11:32

A. Yes. 14:11:43

Q. And that was well known in advance of 2001. 14:11:44

Correct? 14:11:46
A. Yes. 14:11:47
Q. So attaching -- or a descriptor to the back end of data, a data block, was known prior to 2001. Correct? 14:11:47 14:11:54 14:12:02
A. Attaching a file type, like doc or exe, to the end of the name of a file was known at that time. 14:12:07 14:12:14
Q. And .doc is, in your opinion, a descriptor. Correct? 14:12:15 14:12:17
A. That's an example, yes. 14:12:18
Q. That's an example of a descriptor appended to a block of data. Correct? 14:12:20 14:12:24
A. Yes. 14:12:27
Q. If you could turn to Paragraph 151 of your declaration in the '513 IPR proceeding, I wanted to ask a few questions about that. 14:12:35 14:13:01 14:13:10
A. Paragraph 115? 14:13:10
Q. 151, which is on page 72. 14:13:12
A. Okay. 14:13:13
Q. All right. So you offer in this paragraph and the following paragraphs an opinion that Oracle's rationale that a person of skill in the art would have combined Hsu and Franaszek because they are similar as generic, and it's insufficient to explain why a person of skill in the art would have combined the specific 14:13:14 14:13:21 14:13:26 14:13:28 14:13:30 14:13:33

portions of Hsu and Franaszek to arrive at the claimed invention. Right? 14:13:37 14:13:40
A. Yes. 14:13:42
Q. And then in Paragraph 151 you've identified some of the similarities that Oracle identified in its petition between the Hsu and Franaszek references. Right? 14:13:43 14:13:47 14:13:56 14:13:59
A. Yes. 14:14:01
Q. You -- looking at those, you agree that Hsu and Franaszek both concern the field of data compression. Correct? 14:14:01 14:14:05 14:14:09
A. Yes. 14:14:11
Q. And you agree that both Hsu and Franaszek teach systems that analyze and compress data in the form of data blocks. Correct? 14:14:11 14:14:14 14:14:17
A. Yes. 14:14:17
Q. You agree that Hsu and Franaszek both recognize that certain compression methods optimally compress certain but not all types of data. Correct? 14:14:18 14:14:21 14:14:28
A. Well, I'm not sure I agree with that. I would have to go check if that's the case. 14:14:32 14:14:33
Q. Okay. As you sit here, do you have any disagreement with that statement? 14:14:37 14:14:40
A. I don't know one way or the other whether both of those are -- Hsu and Franaszek recognize or don't 14:14:42 14:14:45

recognize. I'd have to seed what they say. 14:14:50
Q. So you just don't know? 14:14:53
A. I don't remember. 14:14:54
Q. Okay. You agree that Hsu and Franaszek are both directed at the problem of optimally compressing a collection of data blocks containing different types of data. Correct? 14:14:55 14:14:57 14:14:57 14:15:01
A. Again, I would have -- I don't remember off the top of my head. It also depends what you mean by "optimally." 14:15:02 14:15:04 14:15:07
Q. Do you agree that Hsu and Franaszek both recognize the significance of analyzing data blocks to determine their data type? 14:15:09 14:15:11 14:15:15
A. Again, it kind of depends on these -- what these words mean, recognizing the significance of it. I would have to go check that, and show me -- show me where. 14:15:17 14:15:20 14:15:23
Q. In your declarations you haven't contested that both Hsu and Franaszek recognize the significance of analyzing data blocks to determine their data type. Correct? 14:15:30 14:15:35 14:15:39 14:15:42
A. I don't remember if I contested that or not. 14:15:43
Q. Do you want to check? 14:15:48
A. Sure. Is this No. 3 on the list? 14:15:50
Q. Number 4. 14:16:01
A. Oh, No. 4? 14:16:03

I don't think -- I'm pretty sure I didn't actually contest these. I'm taking these as assertions by Oracle, and then I'm describing my opinions based on those assertions. 14:16:43 14:16:45 14:16:45 14:16:45
Q. Okay. Number 6 is that both Franaszek and Hsu teach the use of dictionary use -- dictionary-based universal lossless compression algorithms. Do you see that? 14:16:46 14:16:47 14:16:50 14:16:54
A. Yes, I do. 14:16:56
Q. You may have touched on this before. But what is a lossless compression algorithm? 14:16:56 14:16:59
A. A lossless compression algorithm is a compression algorithm for which the original input data can be completely recovered without any errors, given only knowledge of the output of the algorithm. 14:17:03 14:17:07 14:17:11 14:17:17
Q. And if there is a one-bit difference in the reconstructed or decompressed data, is the -- is the compression algorithm still a lossless compression algorithm? 14:17:21 14:17:26 14:17:31 14:17:37
A. If -- if that 1-bit error is just due to the algorithm itself and there's no external issues like channel noise or anything, then generally that would not be lossless. 14:17:39 14:17:42 14:17:46 14:17:49
Q. When you say "generally that would not be lossless," is there any instance in which that would be 14:17:51 14:17:54

considered lossless? 14:17:57
A. You know, I didn't actually have to construe 14:18:13
lossless compression algorithm here, and I don't think I 14:18:18
have an opinion regarding that. But generally speaking, 14:18:20
that would not be lossless unless I'm not considering 14:18:20
some, you know, special case I'm just not thinking of 14:18:24
right now or remembering. Maybe there's some weird 14:18:27
situation, for some reason I'm not -- it's not coming 14:18:30
into my head. But my instinct would be to say, no, 14:18:32
that's not lossless. 14:18:35
Q. And just, I think, just one or two more 14:18:38
questions. Can we go back in your declaration for the 14:18:40
'513 patent to page 16 and Paragraph 46? This is 14:18:46
Exhibit 2. 14:18:51
A. I'm sorry. What page? 14:19:01
Q. I used a lot of numbers there. It's page 16 -- 14:19:04
A. Okay. 14:19:08
Q. -- of Exhibit 2. 14:19:09
A. Oh, wait. Yeah. Okay. Yep. I'm there. 14:19:11
Q. And you're just describing a portion of the 14:19:14
written description of the '513 patent in the preceding 14:19:18
paragraphs there. Feel free to review them. 14:19:24
A. You're talking about 47 to 49? 14:19:30
Q. I think I'm talking about, yeah, maybe 44 to 46. 14:19:34
A. Oh, that's not on 16, then. 14:19:39

Q. Sorry. Yeah, starting on page 15 -- 14:20:02
A. Okay. 14:20:04
Q. -- page -- Paragraph 46 is on page 16. 14:20:05
A. Okay. 14:20:06
Q. And in Paragraph 46 you say, "In this way a 14:20:06
person of skill in the art would have understood that 14:20:08
while content-dependent compression may provide benefits 14:20:11
for some data types, it has limitation when applied to a 14:20:17
variety of content." Correct? 14:20:19
A. Yes. 14:20:20
Q. And that's something that a person of skill in 14:20:20
the art would have understood as of 2001. Correct? 14:20:23
A. Yes. 14:20:26
Q. Can we take a short break? 14:20:29
A. Sure. 14:20:31
Q. Thanks. 14:20:33
THE VIDEOGRAPHER: We're off the record. The 14:20:34
time is 220 p.m. 14:20:36
(Off record) 14:20:38
THE VIDEOGRAPHER: We're back on the record. 14:39:37
The time is 2:39 p.m. 14:39:38
BY MR. LANTIER: 14:39:41
Q. Dr. Zeger, could you explain how the 14:39:42
Lempel-Ziv-Welch algorithm works? 14:39:47
A. In -- I mean, in broad terms it's string 14:39:54

matching dictionary-type algorithm. There's a whole 14:39:56
family of Lempel-Ziv algorithms. And the LZW basically 14:39:57
builds up a dictionary of strings based on strings that 14:40:06
it has encountered already. And then when it encounters 14:40:14
new strings, it adds those to the dictionary and then 14:40:18
just kind of keeps recuring on that theme. There's a 14:40:22
lot more details to it, but that's the basically idea. 14:40:26
Q. And what distinguishes the Lempel-Ziv-Welch 14:40:27
algorithm from the preexisting Lempel-Ziv algorithm? 14:40:34
A. So, let's see, I -- I don't remember all the 14:40:43
details of all the algorithms exactly right now, but 14:40:44
generally the -- what people call LZ77 is -- the main 14:40:48
idea is to look at a previous block of data and have 14:40:52
pointers that refer back to known string matches within 14:40:56
that block; whereas, LZ78 is slightly different. It 14:41:00
builds up a dictionary on the fly, and there's not like 14:41:07
a block that it has to look at. It just looks back to 14:41:11
whatever it's encountered before, and then it keeps 14:41:14
adding new strings to a dictionary. And then the LZW -- 14:41:18
I forgot the exact distinction. I think it has -- if I 14:41:23
remember right, it's got two dictionaries. And one of 14:41:26
them is filling up, and when it fills up, I think it 14:41:30
swaps with the other dictionary. So I don't remember 14:41:33
all the details off the top of my head. I have to 14:41:36
periodically review that. 14:41:39

Q. Are you more familiar with the LZ77 and LZ78 14:41:40
algorithms than you are with the LZW? 14:41:45
A. Well, I think I'm familiar with all of them. I 14:41:49
just, you know, when I actually have to make decisions 14:41:51
or opinions based on them and I go and, you know, get 14:41:53
the exact details and review them, and there's so many 14:41:56
different LZ variants. There's lots more than just 14:41:59
that, that it's hard to keep track of which one's which. 14:42:02
So when I need to make an opinion, I go in and I find 14:42:02
the exact details of each one. 14:42:06
Q. Now, we talked a little bit about the disclosure 14:42:08
in the '513 patent of trying a number of encoding 14:42:11
algorithms and then determining which one had the best 14:42:19
compression. Do you remember that? 14:42:25
A. Yes. 14:42:29
Q. I want to ask you a question about trying -- 14:42:29
about an operation in which one compression algorithm is 14:42:34
applied. And a -- the result is analyzed to determine 14:42:39
whether it -- it succeeded in compressing the data. Do 14:42:47
you understand that hypothetical? 14:42:55
A. I think so, but go ahead. I'll let you know if 14:42:57
I don't. 14:43:00
Q. Is the -- is the operation of trying a 14:43:01
compression algorithm to see if it will compress a data 14:43:08
block a form of analyzing the content of that data 14:43:14

block? 14:43:21
A. So when you're -- you're asking me about whether 14:43:26
something is a form of analyzing the content, are you 14:43:29
referring to in the context of the claim, the '513 14:43:32
patent? 14:43:35
Q. Yes. 14:43:37
A. So, well, let's try to be more specific so I 14:43:39
really get it right. Can we look at Claim 1 in '513? 14:43:42
Q. Sure. 14:43:48
A. So there's two different analyzing steps within 14:43:48
that method. Should I look at -- does it matter which 14:43:51
one you want me to look at? 14:43:54
Q. I don't think it should matter, but if your 14:43:56
answer would be different for the two steps, let me 14:44:00
know. 14:44:03
A. Okay. So the -- in let's say the first one, 14:44:03
it's analyzing a plurality of data blocks to recognize 14:44:05
when an appropriate content-independent compression 14:44:10
algorithm is to be applied to the plurality of data 14:44:13
blocks. And you're asking me if -- if this method looks 14:44:18
at a data block and just returns a Boolean answer, yes 14:44:21
or no, does it compress it or not, is that a form of 14:44:25
analyzing? Is that what you're asking me? 14:44:28
Q. Yeah. Is that a form of analyzing the content 14:44:32
of that data block? 14:44:35

A. Well, the claim language doesn't say analyze the 14:44:37
content. It just says analyzing the blocks themselves. 14:44:42
Q. Have you reviewed the Markman decision in the 14:44:47
litigation between Oracle and Realtime? 14:44:55
A. I probably have, but I'm not sure what the 14:44:59
relevance is. 14:45:02
Q. Okay. Well, then, is trying a compression 14:45:04
algorithm to see if it will compress the data block a 14:45:09
form of analyzing the data blocks to recognize when an 14:45:16
appropriate content-independent compression algorithm is 14:45:22
to be applied? 14:45:26
A. I didn't have to specifically give an opinion on 14:45:51
that in my report, and I don't think I have. But at 14:45:55
this moment I don't particularly see a reason to exclude 14:46:01
that. But I don't -- I haven't really thought about 14:46:04
that carefully. 14:46:08
Q. And with respect to the other analyzing step 14:46:18
that you referred to, would trying a compression 14:46:24
algorithm to see if it compressed the data block be a 14:46:29
form of analyzing a data block for recognition of any 14:46:37
characteristic, attribute, or parameter that is 14:46:43
indicative of an appropriate content-dependent algorithm 14:46:47
to apply to the data block? 14:46:51
A. So the same kind of thing, I didn't -- that 14:46:53
really didn't come up in my analysis, and I didn't offer 14:46:55

an opinion in these reports, so I can't really give you 14:46:59
a definitive answer. But I -- you know, I don't see 14:47:03
offhand a reason why I would exclude that, but I'm just 14:47:07
not sure. I didn't do a full analysis. 14:47:11
MR. LANTIER: Okay. I think we're finished. 14:47:15
Thank you very much, Dr. Zeger. 14:47:17
MR. MUTSCHELKNAUS: Just one second. 14:47:29
THE VIDEOGRAPHER: We're off the record. The 14:47:33
time is 2:47 p.m. 14:47:34
(Off record) 14:47:35
THE VIDEOGRAPHER: We're back on the record. 14:50:22
The time is 2:50 p.m. 14:50:23
MR. MUTSCHELKNAUS: Just a handful of questions 14:50:26
for redirect. 14:50:28
14:50:29
EXAMINATION 14:50:29
BY MR. MUTSCHELKNAUS: 14:50:30
Q. Dr. Zeger, can you turn to Deposition Exhibit 2. 14:50:30
That's the '513 -- your '513 declaration. Take a quick 14:50:37
look at Paragraphs 44 through 47 again. Let me know 14:50:41
when you're done. Forty-four through 46, sorry. Let me 14:50:45
know when you're done. 14:50:50
A. Okay. 14:51:15
Q. So here you describe some drawbacks of applying 14:51:15
content-dependent compression algorithms to a variety of 14:51:18

data types. Is that correct? 14:51:22
A. Are you talking about on page 16, those three 14:51:25
items listed? 14:51:27
Q. Yep. 14:51:29
A. Yes, I see those. 14:51:30
Q. What do you cite to for the teaching of the 14:51:31
drawbacks of applying content-dependent compression 14:51:34
algorithms to a variety of data types -- of the 14:51:38
drawbacks of applying content-dependent compression 14:51:41
algorithms to a variety of data types? 14:51:45
A. Let's see. I got trace it back. I believe it's 14:51:49
Exhibit 11001, which is probably the '513 patent. I 14:51:52
think it's Exhibit 7 in this proceedings now, in this 14:51:57
deposition. 14:52:01
Q. Other than the '513 patent, are you aware of any 14:52:02
other teachings in the record for these three drawbacks 14:52:06
listed on page 16? 14:52:10
A. Sure. Yeah. You mean in terms -- 14:52:13
Q. Other -- other than the '513 patent, are there 14:52:20
any -- do you cite to any other teachings in the record 14:52:22
for these drawbacks? 14:52:26
A. For these three drawbacks, you mean? 14:52:27
Q. Yeah. 14:52:29
A. Oh. For these three drawbacks, I think that's 14:52:30
the only thing I cite to. 14:52:32

Q. Okay. 14:52:34
A. Yeah. 14:52:35
Q. Can you turn to Deposition Exhibit 3, which 14:52:35
is -- which is Hsu? 14:52:43
A. Yes, I got that. 14:52:45
Q. On the face of the document, do you see a date 14:52:48
listed under -- underneath the title? 14:52:50
A. Do you mean on the cover -- 14:52:54
Q. The cover page, yep. 14:52:55
A. Yes. It says "October 1995." 14:52:57
Q. Did you offer any opinion as to whether Hsu was 14:53:00
actually publicly available as of October 1995? 14:53:04
A. No. I have no idea. 14:53:08
Q. Have you offered any opinion as to whether Hsu 14:53:09
was publicly available at all before the effective dates 14:53:12
of the '513 or '992 patents? 14:53:17
A. I really don't know. I have no idea. 14:53:20
MR. MUTSCHELKNAUS: Okay. We have no further 14:53:23
questions. 14:53:24
MR. LANTIER: Okay. Just two questions. 14:53:25
14:53:27
FURTHER EXAMINATION 14:53:27
BY MR. LANTIER: 14:53:27
Q. Staying on Hsu, counsel for Realtime just 14:53:28
pointed you to a date on the front of the document that 14:53:39

says "October 1995." Right? 14:53:44
A. That's correct. 14:53:47
Q. And that's the date that is on the face of this 14:53:47
journal titled "Software Practice and Experience." 14:53:53
Correct? 14:53:56
A. Assuming that's called a face. I'm just looking 14:53:56
at the very first page on Exhibit 3. If that's called 14:54:00
the face, then yes. 14:54:04
Q. And if you look down towards the bottom of the 14:54:05
document, do you see that there's a -- another instance 14:54:09
in which the year 1995 is set forth next to the SPEXBL 14:54:14
number? 14:54:22
A. I see that in parentheses it says "1995." 14:54:22
Q. And on page 2 do you see that there's a copy 14:54:28
right date of 1995 in the third paragraph from the 14:54:36
bottom? 14:54:42
A. Yes. I -- I see all these 1995s, but really 14:54:43
don't know exactly when these things are available. I 14:54:47
mean, I can read the text. 14:54:49
Q. Looking at this document, do you have any reason 14:54:52
to question whether the document was available to the 14:54:54
public beginning in 1995? 14:54:57
A. Yes, I do. 14:54:59
Q. What's that? 14:55:01
A. I've been involved in journal publications as an 14:55:01

editor and various other -- you know, as an 14:55:05
author/editor/reviewer, and a lot of times journals 14:55:09
don't come out when they're printed, when they say they 14:55:13
are. 14:55:17
Q. Do you have any reason to doubt that this 14:55:17
journal came out before the year 2000? 14:55:20
A. I -- I just don't know. 14:55:23
Q. So it's your opinion that -- that there's reason 14:55:25
to doubt whether the -- the Hsu article was published 14:55:32
before the year 2000? Is that correct? 14:55:37
A. I just don't know. 14:55:39
Q. But is that your opinion? 14:55:41
A. My opinion is -- I mean, I can read the dates on 14:55:42
here. But, you know, whether it came out or not, I have 14:55:45
no evidence, nobody's shown that to me, nobody's asked 14:55:47
me about that until right at this very moment now. So I 14:55:51
just -- I just don't know. I'd be -- if I said one way 14:55:54
or the other, I'd be offering information I don't really 14:55:57
have. 14:55:59
Q. There's no evidence that you see to suggest that 14:56:00
the dates on the -- on the Hsu article are incorrect. 14:56:03
Right? 14:56:06
A. There's no evidence either way. I don't see 14:56:08
any. 14:56:10
MR. LANTIER: No further questions. 14:56:12

THE VIDEOGRAPHER: This concludes today's 14:56:19
deposition of Dr. Kenneth Zeger. Total number of media 14:56:20
used was three. We're off the record. The time is 14:56:25
2:56 p.m. 14:56:29
(The deposition was concluded at 2:56 p.m.)

DECLARATION UNDER PENALTY OF PERJURY

I, KENNETH A. ZEGER, Ph.D., the witness herein, declare under penalty of perjury that I have read the foregoing in its entirety; and that the testimony contained therein, as corrected by me, is a true and accurate transcription of my testimony elicited at said time and place.

Executed this _____ day of _____ 2017, at _____, _____.
(City) (State)

_____
KENNETH A. ZEGER, Ph.D.

REPORTER'S CERTIFICATION

I, Denise Marlow, Certified Shorthand Reporter in and for the State of California, do hereby certify:

That the witness named in the foregoing deposition was, before the commencement of the deposition, duly administered an oath in accordance with the Code of Civil Procedure Section 2094; that the testimony and proceedings were reported stenographically by me and later transcribed through computer-aided transcription under my direction and supervision; that the foregoing is a true record of the testimony and proceedings taken at that time.

IN WITNESS WHEREOF, I have hereunto subscribed my name this 12th day of January, 2017.

<%signature%>
Denise Marlow, CSR No. 11631

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