Transcript of Craig Ellis Wills, Ph.D.

Date: June 17, 2025
Case: Home Depot U.S.A., Inc. -v- Ravenwhite Security, Inc. (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

Security Tech EX2012
Walmart v. Security Tech
IPR2025-00809

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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HOME DEPOT U.S.A., INC.,	:	Case IPR2024-01316
Petitioner	:	
v.	:	U.S. Patent No.
	:	10,594,823
RAVENWHITE SECURITY, INC.,	:	
	:	
Patent Owner.	:	

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DEPOSITION

DEPONENT: CRAIG ELLIS WILLS, Ph.D.

DATE: Tuesday, June 17, 2025

TIME: 9:00 a.m.

LOCATION: One Liberty Place
1650 Market Street
Suite 5000
Philadelphia, PA 19103

REPORTER: Lisa Claud Neal, RPR, CSR, CLI
Notary PA-NJ-DE

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APPEARANCES:

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-- Home Depot U.S.A., Inc.

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RICHARD M. BEMBEN, ESQUIRE (Director)
1101 K Street, NW, 10th Floor
Washington, DC 20005
202-371-2600

-- Ravenwhite Security, Inc.

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I N D E X

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RESPONDENT'S EVIDENCE

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- - -

E X H I B I T S

- - -

PATENT OWNER'S NUMBER	DESCRIPTION	MARKED
1	Abstract	26

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P R O C E E D I N G S

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CRAIG ELLIS WILLS, PH.D., having been duly sworn, was examined and testified as follows:

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EXAMINATION

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BY MR. PAPPAS:

Q. Good morning, Dr. Wills. How you are today?

A. I'm doing well, thank you.

Q. Would you please state your full legal name, for the record.

A. My full legal name is Craig Ellis Wills.

Q. You understand that you're having your deposition taken today in connection with a declaration you provided in IPR2024-01316?

A. I do.

Q. And this proceeding concerns U.S. Patent No. 10594823. Does that sound right?
A. Yes. 823 certainly sounds right.
Q. If I refer to the patent as the 823 patent, will you understand what I'm referring to?
A. Yes.
Q. I'm going to hand you Exhibit 1002 in this proceeding --
A. Okay.
Q. -- which is your declaration. You're welcome to use a different copy as long as it's clean.
A. This is just a clean copy of my declaration (indicating).
Q. Is that your signature on the cover page?
A. That is indeed my signature.
Q. Did you review your declaration in preparing for this deposition?
A. I did indeed.
Q. In your review did you come across

any errors in your declaration?

A. I did come across that in one place the word string appears when it should be storing, but otherwise, I don't -- I don't recall anything.

Q. Do you recall what paragraph of your declaration that error occurs?

A. As I sit here, no. But I believe if you search for the word "string," I don't think "string" otherwise comes up, but I'm sorry I didn't note that.

Q. That's all right. Are there any other errors that you're aware of?

A. No.

Q. Are there any opinions in your declaration that you would like to clarify before we get started?

A. There are no opinions that I would like to change or clarify. No.

Q. Do you understand that you are under oath today?

A. I do understand that. Yes.

Q. And you understand that you are here to give complete and accurate testimony?
A. I do understand that, yes.
Q. Is there any reason why you can't give complete and accurate testimony today?
A. There is not.
Q. You've been retained by the petitioner in this proceeding Home Depot; is that correct?
A. Yes.
Q. Are you aware that the 823 is involved in a parallel district court litigation involving the parties to this IPR proceeding?
A. I am aware that there are other proceedings, yes.
Q. Have you been retained by Home Depot to assist with the parallel district court proceeding?
MR. WOLFE: Objection.
THE WITNESS: As of right now,

no.
BY MR. PAPPAS:
Q. Have you been deposed before?
A. I have.
Q. Approximately how many times have you been deposed?
A. I've probably been deposed 10, 12 sessions, I'll say.
Q. And approximately how many of those depositions were for proceedings in front of the United States Patent Trademark Office?
A. I think the majority of them would be.
Q. When you say the majority, more than half of those proceedings?
A. Yes.
Q. And the other proceedings, were those proceedings in Federal District Court?
A. There were one -- there was also -- so some did not involve patent infringement, some involved class action

lawsuits.

Q. What did the class action lawsuits generally relate to?

A. Privacy concerns. I remember there was one involving Hulu that tied in directly to some of the research that I had done.

Q. And when you say privacy concerns, that's privacy for users on the Internet?

A. Yes.

Q. So I know you've been deposed before, but I just want to go over a few basic ground rules. Everything you say today will be written down by the court reporter so please try to give verbal answers so the transcript is clear. Is that fair?

A. That's clear, yes.

Q. If you don't understand any part of a question today, will you let me know so I can clarify?

A. Yes, I will.

Q. And if you answer my question, I'm going to assume that you understood it. Is that fair?

A. That is fair, yes.

Q. From time to time your counsel may object to questions, but do you understand that you still need to answer the question unless your counsel instructs you not to?

A. I do understand that, yes. I expect to take breaks every hour or so, but if you need a break at a different time, just let me know.

A. Okay.

Q. And I would just ask that you answer any pending question before we take the break. Is that fair?

A. Understood.

Q. Let's talk a little bit about your preparation in writing the declaration. If you can turn to your declaration, I won't point you to anything specific yet, but generally, did you write the declaration

yourself?

A. Yes, I drafted initial drafts of it, and then had assistance with editing, and bringing it to its final version.

Q. Did you draft the entire initial version of your declaration?

A. I drafted substantial portions of it, yes.

Q. Approximately how much time did you spend preparing your declaration?

A. Many, many hours. Tens, hundreds, hours. I don't know. I can't -- that was back last fall. I don't remember the specifics.

Q. Do you think it was more than a hundred hours?

A. It may have been, it may have been.

Q. At least close to a hundred hours?

A. Sure.

Q. Did you talk to anyone outside of counsel for Home Depot in the process of

preparing your declaration?
A. No, I did not.
Q. Can you please turn to paragraph 30 of your declaration?
A. Yes.
Q. So here you say you reviewed and/or considered at least the documents cited in the list of exhibits in the documents referenced in this declaration. Do you see that?
A. Where are we? I'm not sure I'm in the same spot as you. I'm on page 30?
Q. I'm sorry, paragraph 30, page 15.
A. Okay. I'm not sure I misheard or -- materials considered, yes.
Q. So again in the first sentence you say, "I have reviewed and/or considered at least the documents cited in the list of exhibits and the documents referenced in this declaration." Do you see that?
A. Yes.
Q. Does the list of exhibits refer to

the index of exhibits at the beginning of your declaration?

A. Yes, it does.

Q. Did you review any other materials that are not cited in your declaration?

A. I believe as part of background work I would have reviewed other documents, materials I found on line, but ultimately decided that were they were not useful to include here. So there were certainly other materials that I looked at that ultimately did not end up cited in here.

Q. Did you review the Home Depot's petition in preparing your declaration?

A. The Home Depot's petition, I did not.

Q. Did you review Home Depot's petition at any point after writing your declaration?

A. I have not.

Q. Did you review Home Depot's petition in preparation for this deposition?

A. I did not.
Q. So, let's talk a little bit about today's deposition. What did you do to prepare for the deposition today?
A. I looked at and reviewed and read my own declaration. I looked again at the 823 patent. I looked at the Hinton patent and Vargahse patent. I think those are the primary materials that I reviewed.
Q. Who did you meet with in preparing for your deposition today?
A. I met with Jennifer and Joe.
Q. Anyone else?
A. No.
Q. Were those meetings in person?
A. We had meetings both virtually and in person.
Q. Approximately how many -- how long did you spend preparing for your deposition?
A. You mean -- when are you -- when are you counting? Do you mean since I wrote the declaration, since I -- in the last

week?

Q. Let's start with approximately how many hours did you spend meeting with counsel in preparation for your deposition?

A. Maybe 15, give or take.

Q. And approximately how much time did you spend reviewing documents in preparation for your deposition?

A. You mean my -- me, myself reviewing documents?

Q. Yes, aside from the meetings with counsel.

A. Probably 15 to 20 hours.

Q. Did you talk to anyone outside of counsel for Home Depot in preparing for your deposition today?

A. I did not.

Q. All right. Let's turn to paragraph 3 of your declaration.

And that would be on page 1.

A. Page what?

Q. One.

A. Okay. Thank you.
Q. I can refer to these any way that's easy for you.
A. Paragraph number is fine and good.
Q. So I just want to talk a little bit about your background. You are currently a professor at Worcester Polytechnic Institute; is that correct?
A. Yes.
Q. Did I pronounce that correctly because I have no idea how to pronounce it.
A. It was perfect.
Q. Thank you. That will be my --
A. WPI will work very well.
Q. We'll call it WPI. That will probably be my greatest accomplishment today, pronouncing that correctly. So you've been a -- how long have you have been a professor there?
A. I have been at WPI over 30 years.
Q. And what courses do you currently teach at WPI?

A. I typically teach courses on operating systems, networks, distributed systems. At one point I taught a course on web privacy. So those are kind of -- I would consider myself a systems and networks guy within the realm of computer science.

Q. You mentioned web privacy, in what time frame did you teach courses on web privacy?

A. I think it was in like the early 2010s.

Q. Okay. What was the prompting to teach courses on web privacy?

A. If you look at my record, so I'll step back, if I may.

So I did my Ph.D. work in what I'll call distributed systems, okay, distributed computing. When the World Wide Web came along in the latter part of the 1990 -- mid to late 1990s, I and a lot of other faculty -- people in computer science started looking at it for various aspects of

research. For me, I looked at the web as a really large distributed system, and studied it as such. And if you look at my publication record, you will see in the late 1990 and the early 2000s, I did a lot of work on performance, how well did things perform, web performance, web caching, stuff like that, all right -- content distribution networks, we published one of the very first papers looking at performance of content distribution networks.

About 2004, 2005, one of the things I and a colleague that I did a lot of work with kind of started noticing and trying to understand is when my web browser, I'd go to a site like CNN, my web browser was going to lots of other servers out there besides CNN, okay, in terms of pulling in objects, and so we began to study what indeed these other sites were doing and why my browser was going there.

Social networking sites were

coming along at this time, and so we started studying the implications of, you know: Oh, my goodness, my Facebook I.D. is getting passed to Google. And so that is a privacy concern, we were publishing papers along this line, what could we do about it. And so a period from 2004, probably 2005, in terms of publication since, in terms of looking at doing a lot of research in web privacy, and it's not unusual at a university that when you have some expertise that you teach it. So this was a special topics graduate course on web privacy that I taught. I don't know -- I definitely taught it once, whether -- I can't remember whether I taught it a second time, but it was not an unusual kind of course to offer for a particular level of, you know, focusing on one's level of expert -- you know, area of expertise.

Q. So that when you were talking about the -- you go to a website, and it

was, your browser was going to other websites, that was the website passing information to other third parties. Is that what you were referring to?

A. Well, passing information to other third parties is one of the things that happened. Sometimes it could be going to third parties and, you know, quote, identifying information might not be passed, but in other cases and we identified -- or found and illustrated that in some cases identifying information was being passed.

Q. In other cases was it information that might be downloaded into the user's cache from another website?

A. Well, if -- if my browser contacted a third-party site then that third party site could, in responding back to me, set -- information set cookies that my browser then stores in its cache.

Q. And that was one of the things you were seeing in the 2004, 2005 time frame?

A. Yes, that was something that we were observing that third parties were -- were gaining information maybe through the URL that was being sent to them and through things like a referrer header, which is something as part of HTTP, that that refer header had information and whether that was intentional or whether that was inadvertent that identifying information was sent, I -- I don't know but we clearly identified and published that this indeed was happening. And that ended up in conferences, ended up, as I said, for a while there was a reporter at The Wall Street Journal I had regular conversations with and things like that.

Q. Got it. Do you still conduct research in the area of web privacy?

A. I do still conduct research, not at the same pace as I was doing in, say, 2005 to 2015, but yes, I still have projects that are ongoing in that direction.

Q. What aspects of web privacy does

your research involve today?

A. One of the things that I've had projects of looking at, at ad blockers, how effective are they or how effective are they not. One of the things -- and also not just looking at quote, web and web browser, but also mobile applications and what kind of privacy concerns is happening there, so that would be a couple of examples.

Q. Do you still conduct research in distributed systems?

A. Yes, although most of the work is either web or more broadly Internet related.

Q. What else does your research today focus on?

A. So I also have done -- sometimes I do related to interface, user interface type projects. Certainly with some of the projects that I involve are kind of more related to what I would call data science in terms of trying to have data that may be interdisciplinary, and analyzing that data

for what it says, and understanding how to visualize the results. One of the things of having done a lot of Internet performance and a lot of measurement has always been an issue of how to best an -- so collecting a lot of data, of understanding what is happening on the Internet, but that then leading to the followup question of how to best analyze that data and how to best visualize it. So some of what I have learned and done there applying to other kinds of data that might be interdisciplinary in nature.

Q. Let's turn to paragraph 9 of your declaration. Yes, paragraph 9. This paragraph goes on through page 4.

A. Yes.

Q. In the middle of page 4 you discuss an article or mention an article entitled "A Personalized Approach to Web Privacy Awareness Attitudes and Actions," do you see that"?

A. I do see that. Yes.
Q. When was that article written or published?
A. Well, as it shows here it looks like it was published in 2011.
Q. Do you recall when you were writing that article?
A. In that time frame.
Q. What was the article generally about?
A. I remember -- so the coauthor there was a graduate student who I worked with that we -- that -- the premise of the project, the article, was to try to demonstrate to users that they could come to a website and understand what third parties might be tracking them. The way we did that is we used the CSS or stylesheet history base cookies that we had a list of popular websites that we wrote or, in this case the graduate student wrote some, I believe, JavaScript to go ahead and see whether or

not we could find in a user's history whether or not they had visited a site, had they visited CNN, is that a site that they went to. And then combine that with knowledge of what third parties those sites again, such as CNN, might expose their traffic to, so as it says here, awareness of then reporting that information to users who came to our sites, and then from that I believe we had a -- if I recall a bit of a survey aspect after we showed them this and about potential actions that they could take.

Q. And those potential actions were to reduce the information that was shared with third parties?

A. Reduce the information that was shared, control, you know, cookies, perhaps block third parties that -- from being -- blocking third-party cookies, sure. I can't -- I can't remember all of the specific actions.

But the idea was to -- the basic premise that we could go ahead and use the CSS history based cookies and be able to, if a user came to our site, we could essentially read their history of specific URLs that we were looking for that we would know. So if we had a hundred URLs that we were looking for, we could say 37 of these URLs, CNN, New York Times, Washington Post, whatever, we could say okay, this browser has gone there because we were looking in the browser cache through these history based cookies.

Q. Can you explain just a little how the CSS based history cookie would work?

A. So, it's -- so the history based cookie, so you could run some code that you could determine whether or not a URL has been previously visited. And this is a feature that browsers provide because -- well, browsers maintain history, so one of the things that happens with browsers is

when you or I our browsers goes and there's a number of links on the page, browsers use this history information in order to they will show links in two different colors of whether this is a link you've never visited or oh, this is a link in your history, and therefore you have previously visited this link. So, browsers maintain this information. There are ways, as I said, like JavaScript code that can get at this information.

Q. So it can essentially analyze the CSS code that would be on the page to see if a link has been visited or not visited?

A. So the Javascript code can ask a question about any URL, has this URL previously been visited.

Q. You said that information would be stored in the browser cache?

A. That information is yes, part of the browser cache, part of the history cache of the browser.

Q. I want to hand you an exhibit. We can mark this as Exhibit 1 to his deposition.

("A Personalized Approach to Web Privacy - Awareness, Attitudes and Actions," abstract, marked Respondent's Exhibit No. Wills 1, for identification.)

BY MR. PAPPAS:

Q. Dr. Wills, do you recognize the document that you've been handed?

A. So it looks like the paper we just discussed.

Q. So I think you said earlier as part of this article you surveyed users regarding their attitudes toward tracking; is that correct?

A. That's my recollection of what we did with the -- what we did after we made users aware of tracking that had happened, yes.

Q. And what did you find in your

survey results? And feel free to look in the article if that's helpful.

A. So we certainly found that users indicate that they are concerned about third-party tracking. Looks like we broke it down by different demographics, and things like that, that we would have gathered.

Q. So on the first page in the findings paragraph, do you see it says we found that 63 percent of users agreed with a statement of concern for third parties monitoring activities?

A. I do see that.

Q. So is it fair to say that users were concerned with third parties monitoring their online activities?

A. Yes, that is -- that they are concerned about that, yes.

Q. And I think if you turn to page 10 --

A. 10, okay.

Q. -- you provide some results of your survey here.

A. Yes, I see that in the middle of the page there.

Q. The questions were concerned with user attitudes toward tracking online activity, monitoring location, and demographics; is that right?

A. That appears to be correct, yes.

Q. And users were most concerned with having their online activity monitored as compared to location or demographics?

A. That appears that there's the highest percentage agreeing with that first one there, yes.

Q. Why do you think that was?

A. I don't know. I know the results we have here are consistent with other studies of -- showing that people were concerned about third-party tracking. Why that one was higher than the other two, I don't know whether we said in here. I

certainly without -- and I can't remember if we even offered a comparison between those two here in the paper.

Q. Are there ways that users can opt out of having their online activity monitored?

A. There are, and I think if I leafed ahead here there are different kinds of actions that I believe, in just leafing through here on page 14, I see a table that has -- that has some results in the first column of that table here, table, what is that, here showing two different actions.

Q. Table 5 are you referring to?

A. Table 5, yes. Thank you.

Q. Do you think it is important for users to have a choice of whether their online activity is monitored?

A. It is, and this is having a choice about what gets done with one's private information, yes, that -- of having users having control of that, I do think is

important.

Q. Do you think it's important then for third parties to say respect user's preferences if they opt out of having their online activity monitored?

A. I'm sorry. Can you repeat?

Q. Sure. Do you think if a user opts out of having their online activity monitored, that it's important that third parties respect that preference?

A. I certainly think it is desirable, yes.

Q. Are you aware of any privacy laws that govern activity monitoring by third parties?

A. I think the most specific ones are from Europe, over in Europe, and there there's much more concern and much broader scope in terms of the use of cookies.

Q. Is that GDPR that you're referring to?

A. I think that yes, that's the

result of GDPR, yes.

Q. Just for the record, Exhibit 1 to your deposition that we've been discussing is the article that you coauthored called, A Personalized Approach to Web Privacy Awareness, Attitudes and Actions; is that correct?

A. I'm sorry, are you asking is this exhibit the one that I referred to in my declaration?

Q. Yes, that's correct.

A. Yes. That's -- yes.

Q. And that exhibit, which we've marked Exhibit 1 to your deposition is titled A Personalized Approach to Web Privacy Awareness, Attitudes and Actions, correct?

A. Correct.

Q. And is this a complete and accurate copy of that article that you wrote?

MR. WOLFE: Objection.

THE WITNESS: It certainly appears to be.

MR. PAPPAS: You have no reason to think that this is not an accurate copy of the article you wrote?

MR. WOLFE: Objection.

THE WITNESS: I have no reason to think otherwise.

BY MR. PAPPAS:

Q. You can put that away for now, if you would like. Let's turn to paragraph 11 of your declaration, The start of technology background and let me know when you get there.

A. Yes, I'm there.

Q. Here in paragraph 11 you discuss different types of cookies; Is that right?

A. I believe in paragraph 11 I begin to discuss different types of cookies.

Q. That's fair. You talk about a browser cache in that paragraph?

A. Yes.

Q. Can you explain, generally, what a browser cache is?

A. So a browser cache is or browser storage area is somewhere where information data are stored that can be accessed by the browser that is running.

Q. And do browser applications designate some particular storage area on the local computer for that cache?

A. There is not one singular location on the computer that would necessarily encompass all of the browser storage area, basically anything that can -- that the browser can access while it is running would be a browser storage or a browser cache.

Q. So, we'll come back to that, but are you familiar with Google's chrome browser?

A. I -- I use it occasionally.

Q. Chrome makes use of a browser cache; is that correct?

A. All browsers have that, to the

extent that all browsers have a cache, yes.

Q. Are you aware of any details of how Google chrome's browser cache is implemented?

A. I'm not familiar with the specifics of how its browser cache is implemented.

Q. Do you know whether -- do you know where Google chrome stores data that would be directed to its disk cache, for example?

MR. WOLFE: Objection. Foundation.

THE WITNESS: It may store things in memory, it may store things that it wants to retain long term out somewhere in the file system around a disk, but -- out in the file system, but I don't know the specifics of where.

BY MR. PAPPAS:

Q. Do you know where cookies are stored as it relates to google chrome's browser?

A. Not specifically.
Q. But cookies would normally be stored in a browser cache. Is that fair?
A. Cookies would be stored in a browser cache, yes.
Q. What else would be stored in a browser cache?
A. For example, we just -- in the exhibit here we talked about history, so history would be stored as part of a browser cache. Browsers store and remember contents of objects that have been previously downloaded, so if the user immediately comes back to a same page that they were before, there could be content that is already in the part of the browser cache so that it, so that your browser doesn't have to go back to the server to re-retrieve that object.
Q. That content that is stored as part of the browser cache, are those temporary Internet files?
A. I believe -- yes, that would --

temporary Internet files in the vernacular of A23 would be yes, the same.

Q. And the history you were talking about or you spoke about, does that refer to the user's browser history, browsing history?

A. Right. This particular browser history. So, just to be clear, it's browser history for a user with one particular browser, if I use Chrome for a while and then decide to go use Internet Explorer, those would be -- those two browsers would have -- each their own browser cache.

Q. Does each browser application have a directory structure on the file system where it can store data relating to the browser cache?

A. Each browser has places in the file system where it is storing and storing content, whether they be cookies or temporary Internet files or browsing history.

Q. Do you know whether those places in the file system are specifically associated with the browser application?

A. Well, there are places in the file system that the -- that the browser can access, and it has -- and the browser has been configured that this is where it puts particular kinds of cache content.

Q. So for example, I'll stick with the Goggle chrome example. Does Google chrome have a specific location where it stores browsing history?

MR. WOLFE: Objection. Foundation.

THE WITNESS: Again, without knowing the specifics of the internals of how Chrome works, it is likely the case that, yes, there is a standard place that if I install Chrome on my machine, that Chrome is going to put particular kinds of cache content in particular locations in my file system.

BY MR. PAPPAS:

Q. And the same would hold true for temporary Internet files?

A. Yes, the temporary Internet files would have some place within the file system that they are -- that Google chrome, when that when Chrome is running, that is where it is going to go to access those files.

Q. Is there any particular browser application that you have familiarity with in terms of the locations that it stores these types of files?

A. In my report I -- I know, I think I list a specific location from an article where Flash cookies are stored, but beyond that, I don't think I have, as we sit here I don't believe it's in my report or do I know specific file system location for other browser cache information.

Q. For example, you don't know where Mozilla Firefox would store browser cache data on the user's file system; is that

right?

A. As I sit here, I don't know the specific place in the file system in which that is stored, no.

Q. And you don't know whether Mozilla Firefox would store browser cache data within a directory associated with Mozilla Firefox?

MR. WOLFE: Objection. Foundation.

THE WITNESS: I would expect Firefox to store different aspects of a browser cache in standard places as it is configured relative to its installation. But I don't know -- I don't know the specifics of how that file structure is set up.

BY MR. PAPPAS:

Q. What aspects of a browser cache would you expect to be stored in standard places?

A. Some of the things that -- so

cookies that persist over long periods of time, temporary Internet files, I believe history cache is in the file -- yeah, that would be in the file system because we would want that when the browser comes back. That's not intended to be an exhaustive list. It's a sampling of things.

Q. And those standard places you're referring to, would be set by the configuration of the installed browser application?

A. Yes, I believe that -- where those are installed are places that the browser would expect to be able to access to put and then subsequently access that information, yes.

Q. So let's turn to paragraph 16 of your declaration, paragraph 16.

A. Yep.

Q. And if you'd turn over to page 9, here you mention cache cookies. Do you see that?

A. I do that -- I do see that, yes.
Q. What are cache cookies?
A. Well, as I say here, it is a new type of cookie which is a file. So reading from the bottom of page 8, Such as MH being written into the browser cache without knowledge of the user.
Q. That would be different than a standard cookie?
A. So again, when you say standard cookie and I think I address this in here that there's many phrases standard, traditional, normal, whatever to refer to cookies. So the cookies -- so this is different than what I will call a standard cookie or traditional cookie or normal cookie. So, just that we have different qualifiers on --
Q. Sure.
A. -- that I consider all the same.
Q. I'll clarify a little bit. So at the beginning of paragraph 16, toward the

beginning.

A. Paragraph 16, yes.

Q. Yes, on page 8 now.

A. Yes.

Q. It says Felton and Snyder introduced a new type of cookie. Do you see that?

A. Yes.

Q. I'm asking what is the difference between the cache cookie that you're referencing and what was -- what you were referring to that was before that?

A. So, what is that Felton and Snyder here, this cache cookie, is -- that these cache cookies are, I say here by forcing a client to receive or to retrieve a specific URL, the server can effectively write entries into the client's cache, thus storing the cookie. So, they're indicating by, you know, having the client retrieve this, and because there are temporary Internet files, this is being -- this image

that was retrieved as part of loading the page gets stored somewhere in the browser's cache.

Q. So temporary Internet files would be a piece of data that could be relied on for a cache cookie?

A. So, yes a temporary Internet file is a kind of cache cookie by this -- yes.

Q. Is there other data that a cache cookie would rely on?

A. I don't know. Certainly here the temporary Internet files would be one.

Q. And you say that cache cookies are stored in the form of entries in the client's web cache. Do you see that?

A. Cache cookies are stored in the form of entries in the client's web cache, yes. I see that.

Q. Is the web cache you're referring to there the same as the browser cache we have been discussing?

A. Yes, that web cache there would be

part of the browser cache.

Q. Let's go to paragraph 18. Here you talk about Flash cookies; is that correct?

A. I do. I reference a piece of prior art, yes.

Q. And Flash cookies are different from cache cookies?

A. Flash cookies are another type of cookie separate from cache cookies, yes.

Q. Can you generally explain what a Flash cookie is and how it operates?

A. So Flash is a technology that in the 2000 time frame -- 2005 time frame, was a wildly popular application that pretty much every browser had loaded as an add-on. Okay. Flash allowed software to be executed within the user's browser, which allowed for some very nice graphics and user interaction, and things like that. Flash also allowed files, okay, they called them local shared objects, to be stored on the

client's device accessible to the browser, okay, that when Flash software was running in the -- in the browser would have available to it, and when the Flash software interacted and made requests to a back-end server, that Flash information, these local shared objects, that information would be passed back to the server similar to what standard cookies are done.

Q. You said in your testimony these local shared objects were accessible to the browser. Can you elaborate on what you mean by that?

A. So wherever these local shared objects were stored, they could be, as the Flash software is running in the browser, these local shared objects were accessible in the same way that browser cookies or temporary Internet files, or browser history are accessible to the browser.

Q. So you said that there's Flash software running in the browser; is that

correct?

A. Yes, the Flash software is running in the browser.

Q. That Flash software is installed as an application on the user's computer?

A. That Flash software is installed as an add-on to the browser. So browsers at that time allowed applications or add-ons to be installed and Flash, as I said, was at that point, in that 2005, 2010 time frame, was probably the most popular application because it allowed enhancements in terms of the kind of interfaces and kind of websites that could be built using it. So, to the user, the user is not in accessing the website is not even aware of that there's a separate application. It is all the browser.

Q. I'm going to hand you Exhibit 1014 in this proceeding. Do you recognize this document?

A. Yes, I do.

Q. At the bottom of the introduction on page 1, there's sentence that says According to macro media, 9 8 percent of computer have some version of Flash on their computers. Do you see that?

A. I do see that, yes.

Q. Is Flash its own application program?

A. I know that it can and was installed as an add-on specifically to a browser. Whether it has -- and I think it has its own application, but I'm less certain. It could have a separate application, but I'm less certain of that.

Q. If it were installed as an add-on to the browser, would that still install the Flash application on the user's computer?

A. Yes, because there would need to be a lot of software, and again, how the file system is set up for storing things as well.

Q. So in that example, on Windows,

let's take as an example, would there be a directory within the program files of the user's computer?

A. Yes, I would expect that somewhere there is indeed in the same way that the browser has standard places it expects to put different kinds of information, so would a Flash add-on here.

Q. So, just to be clear here, the Flash software is not part of the browser's software itself, right?

A. So, the, and as I believe as part of the running software your could say it perhaps is not, it is not out of the box. As it comes, it may not have been there, but as I said, 98 percent of the computers had it there because people were running it. So, for practical purposes, it is part of the browser in this -- in that particular time frame. If we are talking about today and you asked me in 2025, is Flash application part of the browser, I would say

not.

Q. Why would you say not today?

A. Because at later times, not in the time frame that we're talking -- in the two-thousand-teens, for various reasons there were concerns with Flash, and Flash grew out of practice of being widely used. But again, in the time frame that we're talking about here in the 2000s, Flash was wildly popular.

Q. And you say for practical purposes it's part of the browser, but from a technical level is Flash its own application, aside from the browser application?

A. Once Flash is installed as an add-on, it is part of the browser.

Q. Is the Flash application code executed inside the browser application code?

A. Yes, the Flash application code is executed, as part of the -- along with the

browser native code.

Q. So is it your opinion that the browser native code then is modified when Flash application is installed?

A. When the Flash application is installed, the software of the browser is enhanced.

Q. When you say enhanced?

A. It's extended.

Q. I'm asking from a technical standpoint, is the browser code modified to include and execute the Flash application code?

A. The browser, the native browser code is written to allow add-ons such as Flash to be installed and executed. Flash is not the -- Flash was the most popular, but Flash is not the only add-on that would have been available at that time.

Q. So the native browser code is not actually modified when the Flash application is installed. Correct?

A. I don't believe that -- no, that the browser code would have been modified.

Q. Do you know how the Flash application software and the browser application software communicate?

A. So, once the Flash application is installed, if the browser code encounters Flash software that needs to be executed, then it calls within the browser the Flash -- the Flash software that has been installed.

Q. And how does the Flash software communicate information to the browser application, if at all?

A. There would be a mechanism set up so that the two can communicate, but I don't know the specifics of it. Obviously, there's a way for the browser to invoke the Flash execution and there would be a way for the Flash execution to return back to the browser doing other stuff.

Q. Would they communicate via an API,

an application programming interface?

MR. PAPPAS: Counsel, just to let you know --

A. Again, I don't know the specifics, and API may -- that's a reasonable -- reasonable guess, but I don't know. I don't know the specifics of how that mechanism works.

BY MR. PAPPAS:

Q. So you don't know specifically how the Flash application and the browser application communicate with each other?

A. I know that the two of them are running in the same browser process. The specifics of how they're communicating, I don't know.

MS. NALL: We've been going for more than an hour. I think it's a good time to take a break.

MR. PAPPAS: There's a couple more questions, if that's okay.

MS. NALL: Dr. Wills, do you

need a break?

THE WITNESS: I could -- a couple more I can take.

BY MR. PAPPAS:

Q. Just to round that out, you said they are running, the two of them are running in the same browser process. Would there be a separate process for the Flash application when it's executing on the user's computer?

A. If there was a Flash application that was executing independent of the browser, then I guess that would be completely independent, and that would be a separate process.

Q. If it's not independent of the browser, do you know whether there would be a separate process for Flash running on the user's computer?

A. Can you restate that one? Sorry.

Q. Sure. So, on the user's computer, there would be a number of processes that

would be executed at a particular time, right?

A. Okay. There would be a number of processes that would be executing.

Q. If the Flash application were running in a browser, would there be a process associated with Flash?

A. I don't believe that there would be, that Flash would be running as part of that -- as part of the browser.

Q. In your opinion, there would be no separate process for the Flash application that would be executing on the user's computer aside from the browser application process?

A. When we have a Flash application as part of the browser, it would all be in one process.

MR. PAPPAS: Okay. I'm happy to take a break now. How long do you think you need, ten minutes?

THE WITNESS: Sure.

- - -

(Recess.)

- - -

BY MR. PAPPAS:

Q. Welcome back, Dr. Wills. During the break did you discuss any of the substance of your testimony with counsel?

A. I did not.

Q. So, I just wanted to go back something we were talking about earlier just to clarify. We were talking about browsers storing different aspects of a browser cache in standard places on the user's computer. Do you recall that?

A. I do recall it, yes.

Q. When we were talking about standard places, we are talking about locations on the file system. Is that right?

A. So certainly when browser cache information is stored in the file system, there is typically configured places where

those files are stored, yes.

Q. And the configured places you're talking about, that essentially is referring to logical memory, not the physical bits on disk?

A. Can you ask your question again?

Q. I guess I'm trying to clarify, we're talking about, for instance, directories and folders on the file system and not necessarily the physical structure of the memory underlying that. Is that fair?

A. We're talking, we are talking about files in the file system, yes. I will agree there.

Q. Okay. Let's stick with Exhibit 1014 that you have in front of you. So in the middle of page one, do you see where it says Flash cookies provide the only method by which a Flash movie can store information on a user's computer?

A. Yes, I do see that.

Q. Can you explain that a bit?
A. Well, reading it as-is, it says if we have a Flash movie, the way it is stored on a user's computer is as a Flash cookie. And by the way let me make clear, a Flash cookie and local stored objects or local shared objects are indeed the same.
Q. So, when Flash is running inside a browser application, is a Flash movie being executed?
A. If a -- if the Flash software is -- not necessarily. I mean one of the things that can be done with Flash is to play a movie.
Q. And the movie refers to an SWF file; is that correct?
A. Where are you getting the SWF file?
Q. How would a Flash movie be stored?
A. How would a Flash movie be stored. In some -- in some format that Flash defines. I don't know the specifics.

Q. In Exhibit 1014, is this saying that the Flash movie when executed is what stores the information on the user's computer?

A. The Flash movie is being shown. The Flash movie is not being executed. Maybe I misheard your question.

Q. So I guess my question then is what is the relevance of the Flash movie in this article?

A. A Flash movie is a kind of Flash data, and it also indicates that Flash data or Flash cookie can store it looking at the next sentence, a user's name, favorite color, progress in a game, things like that. So a Flash movie is just -- it's just data. It could be larger amount of data than the user's name, but it is data that is stored in one of these LSOs.

Q. So is the Flash movie then the cookie that is -- the Flash cookie that is being stored?

A. Right. Here it is showing -- it is saying the Flash movie is a way of storing -- Flash cookie is a way of storing Flash movie content. A Flash cookie stores content, it stores data.

Q. Are you saying that the Flash movie is storing the Flash cookie data?

A. No, I'm saying the Flash movie is Flash cookie data.

Q. So as part of the Flash cookie data, that can include Flash movies within it?

A. One of the type of Flash cookie data is a Flash movie in the same way it could be a user's name.

Q. And when the Flash software is running within a browser, is it the Flash software that saves the Flash cookie data?

A. Yes, it would be that Flash software within the browser that is either reading or writing data in one of these Flash cookies.

Q. So the Flash player software would write the data to the location where the Flash cookie is stored?

A. If it wanted to update or create such data, yes, it would be that software doing it.

Q. So it's not the browser application software itself that would be writing the Flash cookie data, it would be the Flash software running within the browser. Is that fair?

A. It is the software that is running in the browser process that is writing that data.

Q. That software that you're referring to is the Flash software, correct?

A. Yes, the Flash software.

Q. And then if you go to page 2 of Exhibit 1014 there's a section called Where are Flash Cookies Stored? Do you see that?

A. I do see that.

Q. And where are they stored?

A. It says, it gives three bullets on where Windows, where Macintosh OSX, and where GNU Linux stores things, which apparently it looks like in the file system in all three cases.

Q. And those file system locations are directories that are configured as part of the Flash player software?

A. Right. So what my expectation when the Flash software is added to the browser, these are probably standard places that that software would go to look for, for either reading or writing these Flash cookies.

Q. So, in practice, a Flash cookie might be retrieved when a user visits a web page, right?

A. Yes, the browser would retrieve in the same way it -- the browser is going to retrieve normal cookies, it's going to retrieve Flash cookies if there is Flash software that's being executed in the

browser.

Q. And so in that case the Flash software would retrieve the Flash cookie from its storage location and transmit that to the server; is that right?

A. That would be -- yes, when -- if the Flash software goes ahead and on the browser or in the client device communicates with the server, it would send along appropriate Flash cookies.

Q. Do you know whether there are any restrictions on what applications can access local shared objects?

A. What do you mean by what applications?

Q. So, for instance, if the web browser was not running Flash software as part of its process, could the web browser itself access the data in local shared objects?

A. So -- sorry. Can you repeat?

Q. Sure. For instance, if the web

browser was not running Flash software, could the web browser itself access the data in a local shared object?

A. So, if the web browser was displaying a page that had nothing to do with Flash, okay, the Flash add-on has been added to the browser, but there are many pages that the browser would access that it's not -- that had nothing to do with Flash. The browser would have file system permissions to access these files, okay, but that -- the browser may not be aware that the, you know, the Flash portion of the browser is the one that knows exactly where these files are stored.

Q. Do you know that the browser has file system permissions to access the data within the Flash directory?

A. It has to because when the browser then goes and is executing within -- the browser process is executing the Flash code, that Flash code has permissions and file

system permissions are granted on a process basis.

Q. So it's your opinion those file system permissions exist even if the Flash code is not executing?

A. Yes, all files have permission. So when these were -- when these are created, a browser -- by "these" I mean when these directory folders are created as shown here in the exhibit, the browser software would need to have access to these.

Q. A user can't clear Flash cookies through the browser application; is that right?

A. Flash cookies cannot be cleared through the regular browser cookie interface.

COURT REPORTER: I'm sorry. I'm sorry Could you start over again?

A. Flash cookies cannot be cleared -- apologies.

Q. No problem.

COURT REPORTER: I'm sorry, Counsel. I just lost that one. Cannot be cleared --

A. Cannot be cleared through the same mechanism that the browser clears traditional cookies. That's not exactly what you were asking. I believe, and this is from memory, I believe that there is a separate mechanism outside the browser for clearing Flash cookies, but I don't -- that's from memory and I don't think that's explicitly addressed in here.

Q. When you say separate mechanism, that would be through a different application?

A. I believe through a separate application, yes.

Q. When a user clears cookies in a browser, that would clear the cookies in the browser cache; is that right?

A. That would -- yes. The cookies that are cleared from within the browser,

whether that's all cookies or some cookies, would come from the browser cache, yes.

Q. Let's turn to the patent for a moment. I'm handling you Exhibit 1001, the 823 patent. I'm sure you're very excited at this point.

Let's turn to paragraph 57 of your declaration.

A. My declaration you want me to go to --

Q. Paragraph 57, please.

A. Yes, I am at paragraph 57.

Q. This is mostly to orient you. This is where you begin discussing the 823 patent, correct?

A. That is overview of the 823 patent, yes.

Q. I know, very tough question. If you turn to paragraph 61.

A. Sixty-one. Okay.

Q. Here you say 823 Patent discloses these two types of cache cookies stored in

different areas of the browser storage area. Do you see that?

A. Paragraph 60?

Q. 61.

A. Sixty-one, okay. Yes, I do see that.

Q. One of the cache cookies relates to the user's browsing history; is that right?

A. Yes. It's Figure 2 from 823. Yes, one is a history cache, and one is temporary Internet file. Yes.

Q. So you just answered the next question, which is the other one relates to temporary Internet files, right?

A. Sorry. Sorry.

Q. You don't have to be sorry. Just putting it clear for the record. Those cookies then would be stored in the browser cache; is that right?

A. Well, as shown in the 823, they are stored in the browser storage area,

although I believe the 823 says browser cache is essentially the same as a browser storage area.

Q. And the browser cache would correspond to some designated storage locations on the user's file system; is that right?

A. Well, it would be a designated location where it is stored in likely the file system, but not solely the file system.

Q. When you say not solely the file system, what do you mean by that?

A. Well, a portion of what the browser stores, it also stores some cache data in memory, in RAM.

Q. So that the portion that is stored on disk and not in memory, that would be stored in some designated storage area for use by the browser on the user's file system?

A. I think, and I don't -- I know I quote this in my report somewhere and it's

somewhere in the 823. I think the key thing for the browser storage area is one, it doesn't need to be an explicit feature of the browser, and it needs to be stored somewhere that it can be provided to -- the data can be provided to the server. I think that that is my recollection of how the 823 defines a browser storage area.

Q. But when the browser application is installed, there at least is a configured location for the browser's cache associated with that browser, right?

A. Correct. There would be a configured or -- a place that the browser expects to and does find that information.

Q. Can you turn in the 823 patent to Claim One, which is all the way in column 15, starting at line 33. Do you see the first element that begins with receive a network resource request from a client device? It starts at column 15, line 35, and goes to line 54.

A. I do see that rather long claim element, yes.

Q. All right. We're making progress. I just want to clarify a few aspects of your interpretation of this claim element. So the claim first says -- this element first says Receive a network resource request from a client device, correct?

A. It does.

Q. And then it says wherein the network resource request corresponds to a first cookie of a first type that was caused to be stored to the client device during a first previous network session. Do you see that?

A. I do.

Q. Does that mean that the first cookie must have been stored during a previous network session that occurred before the network request is received?

A. Yes, that is my understanding, that we're going backwards in time here.

Q. And then later within that same long element, the claim says Wherein a second cookie of a second type, different from the first type, was caused to be stored at the client device during a second previous network session. Do you see that?

A. I know it's in here. I'm just trying to find it.

Q. Begins at line 47, I believe.

A. Thank you. Thank you. That is helpful. There you go. Yes, I do see that.

Q. So similarly, does that mean that the second cookie must have also been stored during a previous network session that occurred before the claimed network resource request is received?

A. It does, that is my understanding, yes.

Q. Then at the bottom of that long element, the claim recites a browser storage area. Do you see that?

A. Line 53 here...

Q. Yes, I believe line 51 and 53 you recite the term.

A. Okay. The first client device browser storage area and a second client device browser storage area, yes, I do see those.

Q. So we've been talking a little bit about this before. Is it your opinion that any storage area on the client device that is accessible to the browser application would be a browser storage area?

A. Well, I think in terms of -- in light of the 823 patent, the 823 patent also indicates not only is it accessible to the browser, but it is data that is communicated and can be communicated the server.

Q. To any server?

A. To the web server.

Q. Do you see the term as more limiting than that definition in any way?

A. I don't follow your question.

Q. So, I'm trying to sort of put the

bounds around a browser storage area and what might be considered not to be a browser storage area to orient you. So let's take a simple example of a browser based email application. So are you familiar with Gmail?

A. Sure.

Q. And you can choose any example that you would like in your head for these questions. So in a browser based email application, a user can download attachments from an email, right?

A. Sure. Yes.

Q. And those attachments could be saved to essentially any location on the user's computer, right?

A. I believe applications, yes. They say where do you want to put this.

Q. And then in another email a user could upload that same document it downloaded as an attachment to a new email, right?

A. Yes. Typically, by explicitly indicating where in the file system that that document resides.

Q. So in that case to save or retrieve the document from that file location, the browser would presumably access that file location, correct?

A. It could access that file location, because, yes, it is being told by the user that's where to put it or that's where to get it.

Q. So, for example, the file location could be the "My Documents" folder on Windows. Is that a fair example?

A. Sure, that seems to be a fair example.

Q. So in that case that a user downloads an attachment to the My Documents folder, do you consider that My Documents folder a browser storage area?

A. It doesn't seem that it is in the same way because again, based upon the 823

patent, 823 patent indicates that what is in a browser storage area on the client is shared with the server and available to the server. So in this case the fact that I'm attaching a file from somewhere in the file system to pass along, that's part of the Gmail web application.

Q. When you attach that file to an email, does it not upload that attachment to a Gmail associated server?

A. It does. It does upload it to the Gmail server.

Q. So -- I think in view of your previous answer would you agree that the term browser storage area is at least more limiting than a storage location that is merely accessible to a browser application?

A. Well, a browser, the browser storage area certainly needs to be accessible to the browser, and I believe needs to be shared with the server without any explicit user intervention, which -- so

I will say user intervention in your Gmail of adding an attachment is a user intervention.

Q. So then to be clear, your understanding of the term browser storage area would be a storage area accessible to the browser that is also shared with a server without any explicit user intervention?

A. My interpretation is what is in the 823 patent. If you want, I can go look for it. I don't know the specific phrase that is there, but I do know it's in my report here and in the 823 patent.

Q. Sure. You're happy to look. My question is really getting at what are the bounds around the term browser storage area and what are the requirements of it. So, if you would like to go look, you are more than welcome to.

A. So in the 823 patent, column 5 -- where am I -- about line 13 as described in

more detail below the cache cookie is not an explicit browser feature, but rather a form of persistent state in the browser that the server can access. So that is a -- what a browser storage area should be. So there needs to be persistent state, okay. It doesn't need to be an explicit browser feature that the server can access. So, that is what I am -- when I see browser storage area, that is what I'm looking at as described by the 823 patent.

Q. Just to be clear, you're pointing to column 5, starting at line 13; is that right, of the 823 patent?

A. Yes. I believe that that column is 13 there, right there.

Q. And you say there needs to be a persistent state. Is that persistent state referring to the cache cookie or the browser storage area?

A. Well, that is -- so, a cache cookie is an example of something that is in

a browser storage area, so a browser storage area has a persistent state.

Q. I think I'm just a little confused. You said a cache cookie is an example of something that is in a browser storage area, but the cache cookie is not the browser storage area itself, right?

A. No, but it is representative of -- a cache cookie is representative of what is stored in a browser storage area.

Q. So again, it's the cache cookie that has to have -- be a persistent state, according to your testimony; is that right?

A. Yes. And given that it is an example, of something that is stored in a browser storage area, I am using what is here in terms of what the 823 intends as a browser storage area, how it specifies.

Q. And looking at that sentence that you are pointing to, it says the cache cookie is not an explicit browser feature, correct?

A. Correct, it does say that.
Q. But it doesn't say the browser storage area is not an explicit browser feature, does it?
A. Correct. So my interpretation is that something in the browser storage area does not need to be an explicit browser feature. So if you want to go back to Flash cookies and say, Oh Flash cookies are an add-on, well, okay, it says right here that we don't need to have an explicit browser feature.
Q. But just to be clear, that sentence about not needing to be an explicit browser feature relates to the cache cookie not being an explicit browser feature, right?
A. But again, in this sentence is giving an indication of what -- something, the qualities of something in a browser storage area. So if a cache cookie in a browser storage area has these qualities,

then I would expect that other information in the browser storage area has the same qualities and characteristics.

Q. So, if I can try to roll some of that up, is it your opinion that a browser storage area would be a storage area accessible by a browser that includes data representing persistent state?

A. Yes, that is -- that is, I think, consistent with what is said here, yes. That that persistent state is being retained in some way by the browser and that persistent state is then accessible by in this case the -- that the server can access.

Q. Are there browser storage areas that would not include data representing persistent state?

A. There are storage areas that I would say would be less persistent and more persistent, but there's some degree of persistence in browser storage areas.

Q. Does everything that a browser

stores on the user's device relate to persistent state?

A. I don't know everything that a browser maintains, but again, by this kind of -- as specified here, it needs to be state that the server can access. So if there's something that a browser is storing that is not shared or not accessible by the server, then by the definition here then that would not be a browser storage area.

Q. Does the browser storage area need to be managed in some way by the browser application?

A. What do you mean managed?

Q. How would you understand the term managed?

A. I don't know. Can you -- are you asking can I modify it? Can I change it? Can I add to it? Can I remove it? I am not -- I mean manage, the word manage can entail a whole -- a number of things and so I'm not quite sure what you're asking when

you say manage.

Q. I'm still trying to get at what are the limitations off a browser storage area. And so I'll step back from that for a minute. It sounds like a browser storage area needs to be accessible by the browser application and needs to store a particular type of data. Is that what you are saying?

A. Well, there needs to be -- it needs to store data with some persistence, and it needs to be able to share or share that with the server that the server can access that data.

Q. And when you say with some persistence, does that simply mean that the data would persist when the browser application is closed, for example?

A. Well, there's different kinds of persistence that that we can define. So, storing stuff in the file system is always attractive to a browser or other things because when the browser process goes away

or the -- the machine on which the browser is running is shut down, anything stored on the file system persists, and when we return, when the machine comes back up, when the browser reboots or when the browser gets started up again, what is stored there in the file system can be accessed again, assuming that the user hasn't separately done something that -- to somehow remove that.

We also have "shorter term persistence" so if we store stuff in the computer's memory, okay, then that is -- in RAM, then there is some persistence there for that data, but when the browser goes away or the machine shuts down, anything stored in RAM, in memory, that data, that data, is lost. So then that is a -- so it is attractive to store things in memory because it is faster to access than storing things out on disk, but the downside is that that -- what is stored in memory does not

persist forever.

Q. So could data stored in memory then still be considered a browser storage area --

MR. WOLFE: Objection. Vague.

MR. PAPPAS: -- the location of the data stored in memory.

THE WITNESS: So, storing -- storing data in memory, could certainly be a browser storage area, and there are types of cookies that are only stored in memory and not stored in disks.

BY MR. PAPPAS:

Q. So then it sounds like the only restriction aside from the storage area being accessible at the browser is that a server would have access to the data in the storage location without user intervention. Is that fair?

A. That the browser, yes, shares or makes available that data with again some amount of persistence to the server.

Q. So, what makes it a browser storage area is that there's not user intervention to make that data available to the server?

MR. WOLFE: Objection. Vague.

THE WITNESS: Sorry, ask your question again.

BY MR. PAPPAS:

Q. Is it what makes a storage area a browser storage area that user intervention is not required to make the data in that storage area available to the server?

MR. WOLFE: Objection. Form.

THE WITNESS: I cannot immediately recall a kind of data that would require user intervention. I guess when I think of -- when I think of different kinds of cookies, that they -- they happen without intervention, but I would have to go and look at all types of cookies and browser storage areas to say with a hundred percent certainty.

BY MR. PAPPAS:

Q. If a browser application stores data as part of its operation, does it matter what that data is to make the storage location a browser storage area?

A. Well, I could certainly -- I could certainly believe and would expect that a browser would store data, even store data with some persistence out on, but that data is never accessible to the web server that the browser is communicating with.

Q. And so in that case you would not consider that a browser storage area?

A. Again, by the -- as laid out in the 823 patent that is if the data never can be accessed by the web server, then we do not have an example of a browser storage area.

Q. So in the context of the 823 patent, if the storage area is not accessed by a web server, then you would not consider it a browser storage area, correct?

A. A browser storage area as defined by 823, the data contained in there needs to be accessible by the web server.

Q. What parts of the 823 patent are you relying on for that definition?

A. I'm looking at here how -- what the characteristics of a cache cookie where a cache cookie is something that is stored in a browser storage area. With those characteristics I would expect anything stored in a browser storage area have those characteristics.

Q. So your definition is based upon the examples of data from the 823 patent that are stored in the storage locations?

A. Certainly in trying to understand the claims of the 823, I'm using the specification as guidance.

Q. Would all local storage on the client's device be accessible by a server?

MR. WOLFE: Objection. Vague.

THE WITNESS: Do you mean all --

everything on the file system? What do you mean by local storage?

BY MR. PAPPAS:

Q. Well, we'll say everything on the file system.

A. I would expect not because everything on the file system -- one, everything on the file system may not be accessible to the browser. There may be files that are owned by other users on this same computer. There may be stuff that -- there may be data that the browser has access to and can read and write, but it doesn't -- it's not accessible to the web server.

Q. What are examples of storage locations that you would not consider a browser storage location?

A. Anything where the data stored there is not accessible by the web server.

Q. When you say the web server, that would be the server associated with the

website that the user is browsing?

A. Yes. As first server, second server, in the -- in Figure 1A of the 823 patent.

Q. How does the web server get access to the client browser storage area?

A. Software in the browser as part of a request to the web server passes that information along or that's one way it does, I guess in the cache cookies, the -- basically, the browser sends, in some way it sends that information to the server.

Q. Are there restrictions on what locations the browser can send to the server?

A. It is what data that the software the browser is written to send to the server.

Q. And so then it's the browser application would define the storage areas that the web server could access?

A. I think it is known or understood

the kind of areas such as cookies, such as temporary Internet files, such as history that is generally available that browsers make available, whether dealing with Chrome or Firefox or whatever.

Q. So still in that case it's the browser application that would define and send the storage areas to the web server to make them accessible to the web server, correct?

A. Right. I guess what I would say there are kind of standards or expectations of what browsers are expected to send to the web server.

Q. But those expectations don't necessarily need to be cookies, correct?

A. Well, in -- do you mean traditional cookies?

Q. Sure.

A. It doesn't need to just be traditional cookies.

Q. You can have an add-on to a

browser that might have a storage location for data unrelated to cookies. Is that fair?

A. Unrelated to traditional cookies?

Q. Unrelated to any form of cookie.

A. You can have -- it could be sending other types of cookies. We have Flash cookies being sent.

Q. Could they be sending other types of data aside from cookies?

A. They're sending out these local shared objects which have come to be known as Flash cookies in the same way that what the 823 describes is a kind of -- what is characterized as the phrase cache cookies even though they're not cookies in the same way that traditional cookies are.

Q. Could there be an add-on aside from Flash where other types of data are accessed and sent to the web server?

A. I'm not sure I immediately know of any, but I believe yes, there could be other

add-ons that are added to the features of the browser that do so.

Q. And if that were the case, then the storage area storing that data would still be a browser storage area, correct?

Q. If that was the case, then that seems like that would be another type of cookie.

Q. It would have to be considered a cookie to meet the browser storage area limitation?

A. If we had such a thing it would probably be given reference to, but it would not have to be explicitly called a cookie. It just seems that the different types of data that are accessible by server have been coined -- to coin the phrase of different kinds of cookies, but it could be that there's data that are shared and they're not, quote, explicitly called cookies.

Q. What about something like a locally stored configuration file? Would

you consider that to be a cookie?

A. You mean a locally stored configuration file on --

Q. The user's computer.

A. -- the user's computer?

I don't know that that would be accessible to the server. I don't know of any browser software that would share that or send that to a computer, or to the server.

Q. If it were sent to the web server, would that make it storage area, browser storage area?

MR. WOLFE: Objection. Form.

THE WITNESS: I don't know. You seem to be getting into the well, we're going to have a different kind of software that gets added on, and I'm not really sure what that software is doing or not doing, so it's kind of hard for me to really speculate or even answer your question here because now we're getting

into something that doesn't exist, and I don't know what those characteristics of that something are or aren't.

BY MR. PAPPAS:

Q. So whether it's considered a browser storage area then depends on the type of data and whether that data is transmitted from the user's client base to a web server, correct?

A. It needs to be accessible to the server. It needs to have persistence. It needs to be available to the browser.

Q. When you say it needs that persistence, the data inside the storage area needs to have persistence; is that right?

A. Yes. That is what the 823 indicates is important.

Q. Or do you mean that when it needs to have persistence that the storage location itself needs to allow the data to persist?

A. Persist for how long? What do you mean by persist? What is your -- persist forever, persist for a period of time? I'm -- I'm asking you to clarify your question.

Q. Well, that's what I'm trying to get at when you say it needs persistence, I'm trying clarify does that relate to the storage area and how it allows the data to persist for a certain amount of time?

A. So where data are stored on a user's computer factors into the duration of the persistence of that data. So if I store -- if the browser stores something in memory, in RAM, okay, then the duration of that data is only as long as that browser process is running. And once the browser process stops running, that data is gone. So it persists for the duration of the browser session. If I store -- if we have browser storage area that is stored on disk or longer term storage, then the expectation

is it continues to stay there unless something like a user comes along or another application comes along and removes that. Or traditional cookies typically have -- can have an expiration attached to them, and they self destruct based upon that expiration. That's just a feature of traditional cookies.

Q. All those would be a type of persistence, correct?

A. Yes. So that's why even storing something on disk doesn't mean that it's going to persist forever. It could get removed explicitly. It could have an expiration attached to it that says in 24 hours this goes away. And so even though it's on disk, it doesn't stay there forever. So that's why I say there is some amount of persistence.

MR. WOLFE: We've been on the record for a little over an hour now. Just letting you know. When would you

like to break for lunch?

MR. PAPPAS: In the next five minutes. Is that okay?

BY MR. PAPPAS:

Q. So is there any storage location on the user's device that does not have some form of persistence?

A. I think all storage areas, irrespective of a browser, have some amount of persistence. So memory has -- what is in RAM has some amount of persistence. What is on disk has typically some longer amount of persistence.

MR. PAPPAS: We can take a break.

MS. NALL: Want to have lunch?

(Discussion off the record.)

LUNCH RECESS 12:15.

- - -

(At 11:39 a.m., a recess was taken until 12:15 p.m., of the same day.)

- - -

BY MR. PAPPAS:

Q. Welcome back, Dr. Wills.

A. Thank you.

Q. How was your lunch on record?

A. On the record it was good.

Q. That's great. During the break, did you discuss the substance of your testimony with counsel?

A. I did not.

Q. All right. So I promise we won't spend too much time on this. But I want to wrap up what we talked about before the break.

So, I just want to reiterate the boundaries of, in your opinion what defines a browser storage area. And feel free to correct me if I mischaracterize anything that you've said.

So the first is that the browser storage area must be accessible to the web server with which the browser is

communicating; is that right?

A. Content in the browser storage area needs to be accessible to the server, yes.

Q. And by saying content is accessible, the web server would be able to access the storage area where that content is stored, right?

A. Not directly, but it is given data by the browser.

Q. Okay. So, the storage area doesn't itself need to be accessible to the web server, but it needs to -- the web server needs to be able to access data within that storage location?

A. The web server needs to be able to -- it needs to access that data meaning it is shared by the web browser in some way, shared with the web -- with the server in some way.

Q. Does all the data in that storage location need to be shared with the web

server in some way?

A. It seems that it needs to be potentially shareable. There could be data that are in the browser storage area for which the browser never goes back to that website and so that data are never shared with the web server again. But -- so...

Q. So to reiterate then, the storage area needs to contain data that is shared with and accessible by the web server with which the browser is communicating. Is that fair?

A. The browser storage area needs to have -- the data in the browser storage area needs to be able to be or needs to be able to be shared with the appropriate web server.

Q. And the browser would direct the storage area that is shared with an accessible by the web server?

A. What do you mean by direct?

Q. The browser would define it for

the web server?

A. Browser software or part of the installation would define where that data is stored on the client device.

Q. And the data stored in the browser storage area has persistent state. Is that fair?

A. The data has yes, persistent to some degree state, yes.

Q. And then finally, the data in the browser storage area can be shared with the web server without the user's intervention. Is that fair?

A. It is certainly that is a byproduct of user interactions that data from the browser storage area may be sent or accessible by the web server.

Q. Is it required to be considered a browser storage area that the data stored in the browser storage area may be sent or accessible to the web server without the user's intervention?

A. Can you say that one again? Sorry.

Q. To be considered a browser storage area, is it a requirement in your opinion that the data stored in the storage area may be sent to the server without the user's intervention?

MR. WOLFE: Objection. Vague.

THE WITNESS: Their user has initiated -- the user would have had to initiate an interaction, a request to a server, okay. The user may not be explicitly involved in every or even aware of every network resource request that happens as a result of the initial user request.

BY MR. PAPPAS:

Q. But we talked about earlier the example of a mail program where a user would upload an attachment in an email which would then send that attachment to the server, right?

A. Yes, we did talk about that.
Q. And that's not enough for that storage area to be considered a browser storage area, right?
A. I'd have to think about that more, but that does not strike me as a browser storage area, no, where that -- an arbitrary My Documents folder on my computer.
Q. So is what differentiates that storage location from a browser storage location that the data can be accessed by the web sever without the user explicitly directing that data?
A. Again, and I think I answered this similarly before, it certainly seems that when I immediately think of browser storage areas, that happens without direct request of the user, but I would have to -- I would have to look at other -- if -- so in the case you have, that doesn't seem like that that is a browser storage area.
Q. Okay. But sitting here today,

then, is it fair to say you haven't formed an opinion on whether that location would be considered a browser storage area?

A. I think that's correct. That's not something that I considered as part of writing my report. It's not a scenario that I explicitly considered.

Q. So the requirements we just talked about then, are there any additional requirements in your opinion that would make a storage location be considered a browser storage location?

Let me just rephrase the question because I used location instead of area, just to be clear. So, aside from the requirements we just talked about, are there any additional requirements in your opinion to make a storage location be considered -- a storage area be considered a browser storage area?

A. Well, so, there needs to be persistent state out the browser, okay, and

there needs to be accessibility of that state to the server, okay, via the browser.

Q. And that's what makes a storage area a browser storage area, in your opinion?

A. Yes, based upon what is my reading of what is considered here for cache cookies in the 823, which is consistent with what happens with traditional cookies, that they have persistent state, that they are accessible to the server, so...

Q. Let's move away from that for a few moments, and I want to hand you the Hinton reference which is Exhibit 1005. I want to just start talking, generally, about Hinton. You reviewed Hinton as part of your preparation for this deposition?

A. Certainly.

Q. Is it your opinion that Hinton discloses use of two cookies a domain identity cookie and an E-community cookie?

A. Hinton certainly has both of those

cookies for domains, yes.

Q. And you are relying on those two cookies in your analysis in this proceeding?

A. Yes, those are the two cookies for different domains that I'm relying upon.

Q. Can you turn to paragraph 132 of Hinton, and just let me know when you've read the paragraph.

A. I did review the paragraph. Thank you. 132, correct?

Q. Okay. I'll read it -- part of it into the record for clarity. The first sentence says Only the one instance within a DNS domain that authenticates the user or first receives an authentication vouch for message sets an E-community cookie at the user's browser. Do you see that?

A. I do.

Q. Then it says, As such, a user has one E-community cookie set for each domain at which it has a current authenticated or vouched for session. Did I read that

correctly?

A. I think so.

Q. So in this paragraph is Hinton saying that by setting an E-community cookie for a domain, the user has an active session corresponding to that domain?

A. It has a current authenticated session.

Q. Corresponding to the domain?

A. Corresponding to the domain, yes, sir.

Q. And then the active -- sorry, I'll use your words. The current authenticated session provides the user access across that domain; is that right?

A. Right. Once a user has authenticated with that domain, it may go on and perform other actions.

Q. And those other actions might be communicating with another server in that domain?

A. I can't immediately remember

whether that means communicating with a single server in the domain or other servers within the domain.

Q. Let's go to paragraph 232 of Hinton.

A. 232. I got that on page 10. Starts out, The E-community memory cookies?

Q. Yeah, that's right.

A. Okay.

Q. So it says, The community memory cookies contain security relevant information such that possession of an E-community cookie may provide access to a particular session. Do you see that?

A. I do.

Q. When a user has an E-community cookie set for a domain, the E-community cookie would provide the user access to the current session so the user can access resources within that domain; is that right?

A. It can make subsequent requests to that domain. Yes.

Q. Okay. Let's turn to paragraph 134, and this is all related.

A. This is the Acme.com paragraph?

Q. That's correct. So, I'll give you have a moment to read it, and then we can talk about it.

A. (Reading). Okay. I have now had a chance to look at it. Sorry.

Q. Not a problem at all. So, in paragraph 134 there's an example provided for the domain www.acme.com, right?

A. There is.

Q. And in the middle of this paragraph Hinton says, The user has a domain-wide E-community cookie set, right?

A. It does say that, yes.

Q. So then in this example, when the user goes to the accounting server in that domain, the E-community cookie would indicate that the user has current authenticated session and that the accounting server does not need

reauthenticate the user. Is that what Hinton is saying?

A. That is what Hinton says there.

Q. So, then because the user already has an active session with the domain, the user can use that session to access the accounting server in this example?

A. That seems to be what it is saying, yes.

Q. Okay. Thanks. I just wanted to clarify that paragraph. You can put away Hinton for the moment. And I want to provide you, Varheese. I'm not sure how to pronounce it. I was saying Var-gese [ph].

A. I don't know.

Q. We'll go with Var-gee-see [ph] because it seems to be more -- I trust you more than myself.

A. No, no. I have no idea. You have can say that's on the record.

Q. I'm handing you Exhibit 1004 in this proceeding, Varghese you can keep that

along with your declaration. But I wanted to start at paragraph 166 of your declaration.

A. 166?

Q. Yes. In this paragraph you're discussing the Varghese reference, correct?

A. I am indeed.

Q. Is it your opinion that Varghese describes using both secure cookies and Flash cookies to identify user devices?

A. It is -- that is indeed my opinion. They are both secure and Flash cookies.

Q. In the middle of paragraph 166, you say Varghese further discloses that cookies are routinely replaced with each login, i.e., new network session. Do you see that?

A. I do.

Q. Can you explain what you mean by that? And feel free to look at Varghese, if it's helpful.

A. So Varghese has the notion of being able to log in as I describe earlier and given that we're asking about a network session, we're now talking about network session coming from the 823.

So, in paragraph 166, we're talking about a second previous network session. So there was a first network previous session in which some -- a page was requested, maybe a Flash object was downloaded as well. And now, we're in a situation here that the Flash software, as indicated just above here, has run and Flash cookies have been created and stored onto the device.

At the end of the authentication, which would have consisted of the first and the second previous network sessions, okay, it's simply saying in Varghese discloses that at the end of that, the cookies are replaced, they're updated, their values in terms of what is the device, what is the

time, the login, things like that. So, that is -- and it says the word replaced and that is indeed what Varghese does. It basically updates the values at the end of what would be the end of the login.

Q. Okay. And when you say that it replaces the cookies, are you referring to both the secure cookies and the Flash cookies?

A. In -- and this is a matter of trying to understand Varghese, and I -- let me consult our P.C. here.

Q. If it helps, I believe you are pointing to column 26, lines -- starting at line 13.

A. Okay. Column 26, You suggested?

Q. Yes. In your paragraph, in your declaration, it points to column 26, lines 13 to 14.

A. Yes. Okay. In this sense of yes, I found it in Varghese.

Q. I can re-ask the question, if that

helps.

A. Okay. I think I completely lost the question. Sorry.

Q. So in column 26, the first sentence starting at line 13, the first sentence says a feature of the invention relates to the replacement of the cookie on the user's machine upon each login. Do you see that?

A. I do.

Q. So when Varghese is talking about the replacement of the cookie on the user's machine, is that referring to both Varghese's secure cookies and Flash cookies?

A. I don't believe Varghese is as clear on this, and I can't say with a hundred percent certainty, but it appears that it is both, okay. And this is not my patent, and it's -- clarity there is not -- it's not certain.

Q. Reading this as a person of ordinary skill in the art, is it your

opinion that Varghese would be talking about both secure cookies and Flash cookies in that paragraph?

A. I think it is talking about at least secure cookies. Unfortunately, it is -- yeah.

Q. Why do you say at least secure cookies, but not Flash cookies?

A. Because that single sentence talks about the cookie, and there's not a clear cookie immediately preceding that that is there. The previous paragraph talks about device I.D. token, so -- and given the I.D., I would say it would be likely that it would be both, but again, just from an English language here, it's just the cookie. There was not a singular cookie that was previously referenced to get the cookie.

Q. The paragraph above that starts at line 4, where it talks about standard cookie or Flash cookie, does that indicate that the cookie in the next paragraph could be either

one?

A. I mean, it's an "or" there, and then we have a "the cookie." So there wasn't a single cookie in the previous paragraph. So, I mean this is a little bit of -- this is conjecture. I don't think that -- I don't think Varghese provides clarity on that.

Q. Let's look at the next sentence in the paragraph starting at line 13, and it says, This provides further security so that even if a user's machine information is improperly acquired by a third party, even including that embodied in a previous cookie, the authentication system can identify that the user is not authorized and deny access to the system. Do you see that?

A. I do see that.

Q. So, is the replacement then of cookies upon login due to security concerns?

A. That is what that sentence seems to indicate, yes.

Q. So based on those security concerns, would it then make sense to you for Varghese to replace whatever previous cookies existed?

A. I think that that would be the most likely, that it would be replacing both of them. That's a reasonable expectation from what is written there.

Q. Okay.

MR. PAPPAS: Is it okay to take a ten-minute break?

THE WITNESS: Sure.

MR. WOLFE: 1:00?

MR. PAPPAS: Or a little after that works.

- - -

(Recess.)

- - -

BY MR. PAPPAS:

Q. Welcome back again, Dr. Wills. During the break did you discuss the substance of your testimony with counsel?

A. I did not.
Q. Dr. Wills, I appreciate you being here today and I have no further questions for you. I'll pass the witness.
MS. NALL: We'll take a break.
THE COURT: How long do you want?
MS. NALL: Twenty minutes.
- - -
(Recess.)
- - -
MS. NALL: Dr. Wills, are you ready?
- - -
EXAMINATION
- - -
BY MR. WOLFE:
Q. Dr. Wills, do you recall being asked about the definition of a browser storage area in the 823 patent?
A. I do.
Q. Did you use the plain and ordinary

meaning in light of the 823 specification of the term "browser storage area" when drafting your opinion?

MR. PAPPAS: Objection. Leading.

THE WITNESS: I did.

BY MR. WOLFE:

Q. What is your opinion using that definition as to whether Hinton's DIDC is stored in a browser storage area?

A. The DIDC cookie is stored in a browser storage area.

Q. What is your opinion using that definition as to whether Hinton --

MR. PAPPAS: Objection. Scope.

THE WITNESS: It is my opinion that the EEC cookie is stored in a browser storage area.

BY MR. WOLFE:

Q. What is your opinion using that definition as to whether Varghese's secure cookie is stored in a browser storage area?

A. It is my opinion that the secured cookie is stored in a browser storage area.

Q. What is your opinion using that definition as to whether Varghese's Flash cookie is stored in a browser storage area?

MR. PAPPAS: Objection. Form.

THE WITNESS: It is my opinion that Varghese's Flash cookie is stored in a browser storage area.

BY MR. WOLFE:

Q. Dr. Wills, do you recall being asked about paragraph 132 of Hinton's disclosure regarding the vouch for process?

A. I do.

Q. I'm going to read part of element 1B of the 823 patent to you. B recites the network resource request corresponds to the first cookie of a first type that was caused to be stored to the client device during a first previous network session. In Hinton, what is the disclosure you rely on for the first previous network session?

MR. PAPPAS: Objection. Scope.

THE WITNESS: The first previous network session is when a user device or user goes to the home domain -- home domain sever. That server directs the user's computer to the other affiliated domains in the electronic community, so that at the end of the network session, there will be -- and in each case placing a DIDC cookie in the domain restoring a DIDC cookie for the domain or that DIDC cookie identifies the home domain for each of the affiliated domains.

BY MR. WOLFE:

Q. Referring back to element 1B of the 823 patent, the element 1B further recites a second cookie of a second type different from the first type was caused to be stored at the client device during a second previous network session. In Hinton, what is the disclosure you rely on for that element?

MR. PAPPAS: Objection to scope.

THE WITNESS: So, when the user's computer goes to and seeks to access one of the affiliated domains, it goes to the server of that affiliated domain. There is a DIDC cookie for that domain. That cookie identifies the home domain. At that point, the affiliated domain causes a vouch for request for the client to make a vouch for request to the home domain where the user is authenticated. The response, the result of that vouch for request is a redirection back to the -- back to the affiliated domain at which point the affiliated domain uses that successful authentication to generate an ECC cookie, which is then sent to the client device so now, the client device has both a DIDC cookie and an EEC cookie for that affiliated domain.

BY MR. WOLFE:

Q. Referring back to element 1B,

element 1B further recites receiving network resource request from a client device. In Hinton what is the disclosure you rely on for that element?

A. So, Hinton discloses multiple affiliated domains. So, another affiliated domain, a -- the client's browser generates a network resource request to another affiliated domain. That request would contain the DIDC cookie for that -- another affiliated domain, and that is the -- that would ultimately lead to another vouch for request of the home domain, but that is the network resource request.

Q. Turning to Varghese, do you recall being asked about Varghese with respect to each login session replacing the cookies?

A. I do.

Q. What was your opinion related to whether the secure cookie is generated in a different session than the Flash cookie?

MS. NALL: Strike that.

MR. PAPPAS: Strike that.

BY MR. WOLFE:

Q. What was your opinion related to whether the secure cookie is generated in a different network session than the Flash cookie?

A. It is my opinion that the secure cookie and the Flash cookie are generated in separate network sessions.

Q. Can you turn to figure 4B of Varghese, please.

A. Four B. Yes.

Q. In -- is 4B, does 4B represent a network session or a login session?

MR. PAPPAS: Objection to scope.

THE WITNESS: Figure 4B represents a login session in Varghese, which consists of two network sessions as defined in the -- in the 823 patent.

MR. WOLFE: Pass the witness.

MR. PAPPAS: Can you give us a couple minutes?

MS. NALL: Sure. You know how long you need?

THE WITNESS: How long would you like?

MS. NALL: We'll just wait.

MR. PAPPAS: Yeah. It won't be too long.

- - -

EXAMINATION

- - -

BY MR. PAPPAS:

Q. Welcome back, Dr. Wills. So we took a recess of about an hour approximately between cross-examination and redirect. What did you do during that hour?

MR. WOLFE: Objection. Attorney work product. You can answer to the extent it doesn't disclose anything we discussed.

THE WITNESS: Talked about what to do about redirect.

BY MR. PAPPAS:

Q. Did you talk with counsel during that hour?

A. Yes.

Q. Who did you speak with specifically?

A. Joe and Jennifer.

Q. Did you prepare testimony alongside counsel during that hour?

MR. WOLFE: Objection. Instruct him not to answer the question.

BY MR. PAPPAS:

Q. Are you going to follow your counsel's instruction?

A. Yes.

MR. PAPPAS: Counsel, what basis are you providing for instructing your witness not to answer the question?

MR. WOLFE: Oh, work product.

BY MR. PAPPAS:

Q. Work, okay. How long did you prepare with counsel your redirect

testimony?

A. I don't know. I wasn't -- I wasn't keeping track of time.

Q. Was it for approximately the whole hour?

A. It was certainly some amount of it.

Q. Did you do anything else during that hour?

A. Used the restroom. Got a drink, just collected myself.

Q. Did you review any documents during that hour in preparation for your redirect testimony?

A. I don't recall reviewing any documents.

Q. During your redirect I noticed that you didn't consult any documents. Did you prepare your answers for redirect testimony before the testimony occurred?

MR. WOLFE: Objection. Calls for attorney work product.

MR. PAPPAS: I'm asking if he prepared his answers before he gave the testimony.

MR. WOLFE: Same objection. Instruct the witness not to answer.

MR. PAPPAS: You going to follow your counsel's instruction?

THE WITNESS: Yes.

BY MR. PAPPAS:

Q. Where any of the answers you gave during redirect provided by counsel?

A. The answers provided by me are mine.

Q. So you formed your answers to those questions without the assistance of counsel during that hour?

MR. WOLFE: Objection. Calls for attorney work product. Instruct the witness not to answer.

MR. PAPPAS: Are you going to follow your counsel's instructions?

THE WITNESS: Yes.

BY MR. PAPPAS:

Q. Do you recall being asked questions about Varghese's Figure 4B during redirect?

A. I do.

Q. And you did not consult Varghese when you answered those questions; is that correct?

A. I think I had it open here.

Q. Did you have an answer prepared for the questions about Varghese's figures 4B before you looked to Varghese during your redirect testimony?

MR. WOLFE: Objection. Attorney work product. Instruct the witness not to answer.

MR. PAPPAS: You going to follow your counsel's instruction?

THE WITNESS: Yes.

BY MR. PAPPAS:

Q. Did you memorize any answers to questions on redirect before you gave your

redirect testimony?
A. I did not.
Q. Were you aware of the questions that were going to be asked on redirect before you gave your redirect testimony?
MR. WOLFE: Objection. Attorney work product. Instruct the witness not to answer.
MR. PAPPAS: Dr. Wills, are you going to follow your counsel's instruction?
THE WITNESS: Yes.
BY MR. PAPPAS:
Q. Do you recall your testimony during redirect discussing element 1BI, which relates to receiving a network resource request from a client device?
MR. WOLFE: Objection. Vague.
THE WITNESS: Yes, I recall being asked about that.
BY MR. PAPPAS:
Q. And you discussed during redirect

your opinion of how Hinton teaches this claim element, correct?

A. I recall questions about that, yes.

Q. And you said that the client's browser generates a network resource request to another affiliated domain. Do you recall that?

A. Something to that effect.

Q. And when you were referring to another affiliated domain, is that a different domain than you are relying on for element 1B4? And you are welcome to consult your declaration.

A. I'm sorry. I will. Can you ask again? Only I'm now here, and I just needed to refresh my memory of what 1B4 is.

Q. Sure. So when you were referring to another affiliated domain for element 1B1, is that a different domain than you were relying on for element 1B4?

MR. WOLFE: Objection. Vague.

THE WITNESS: So the resource request for 1.B.1 is for a different affiliated domain than the second previous network -- than the domain affiliated domain for the second previous network session in 1.B.4.

BY MR. PAPPAS:

Q. And where in your declaration do you say that?

A. So in my declaration in paragraph 84 of my declaration I talk about the -- that the network resource request triggers a vouch-for process. And so this relates to Hinton. Hinton has multiple affiliated domains. Access to any of the affiliated domains causes a vouch-for process to be triggered if there is not already an ECC cookie for that domain. So given that this is a network 1B.I, a network resource request that triggers a vouch-for process, we know this has to be separate and distinct from the second previous network session

because the second previous network session for an affiliated domain resulted in an ECC cookie for that domain.

Q. Do you say that in your declaration?

A. It follows from the fact that at this network resource request that I call that a triggering -- a vouch-for process.

Q. Would Hinton ever check for a DIDC if an ECC existed?

MR. WOLFE: Objection. Vague.

THE WITNESS: Clearly, if we go -- if the user's browser goes to an affiliated domain, it is going to check for an ECC cookie. If the ECC cookie is present, I don't recall whether Hinton explicitly says that it looks for the DIDC cookie or doesn't look for the DIDC cookie. Obviously, if the ECC cookie is not present, it absolutely makes use of the DIDC cookie. But if you'r asking the opposite of -- if both are present does it

go and look, I would have to go back to Hinton to give you an answer.

BY MR. PAPPAS:

Q. Okay. So Hinton, is it fair to say Hinton does not say if an ECC exists whether it would also look for the existence of a DIDC. Is that fair?

MR. WOLFE: Objection.

THE WITNESS: I didn't say that. I didn't say that Hinton does or doesn't say it. I'm saying I don't recall whether or not it does or doesn't say.

BY MR. PAPPAS:

Q. So you're not relying on whether it does or doesn't for your opinions in these paragraphs, correct, with respect to element 1B1?

A. Well, in 1B1, I know it use DIDC cookie because in 1B1, the network resource request triggers a vouch-for process and the vouch-for process is only triggered if the ECC cookie is not present for that

affiliated domain.

Q. For your answers to these questions related to Hinton, did you discuss your answers with counsel during the break?

MR. WOLFE: Objection.

THE WITNESS: No, I did not.

BY MR. PAPPAS:

Q. So you did not prepare for the questions about Hinton with counsel during the break?

MR. WOLFE: Objection. Work product.

MR. PAPPAS: Are you instructing the witness not to answer?

MR. WOLFE: Sure. You don't have to answer.

MR. PAPPAS: Counsel, before we close, can you explain the basis for your objection and why you believe the conversations between witness and counsel between cross-examination and redirect are covered by attorney work product?

MR. WOLFE: There is a case, I believe we are able to communicate with the witness between direct and redirect.

MR. PAPPAS: Do you know what that case is?

MR. WOLFE: I don't recall off the top of my head what the case is.

MR. PAPPAS: I guess my question is why is the communication, the ability to communicate with the witness covered by work product if there's no materials produced?

MR. WOLFE: I don't believe that was what our objection was about.

MR. PAPPAS: What was the objection about?

MR. WOLFE: It seems like the questioning got to what was communicated, not whether we communicated with the witness.

MR. PAPPAS: That's correct. And I understand there's a case that says that you are -- you may communicate with the

witness, but does that case say that -- that was communications are not discoverable?

MR. WOLFE: They weren't discoverable in that case.

MR. PAPPAS: Does the case say that?

MR. WOLFE: They weren't discovered in the case. I would have to reference the opinion again.

MR. PAPPAS: So, just confirming for the record then that the basis for you instructing the witness not to answer these questions is the work product doctrine?

MR. WOLFE: And privilege, sure. Yes.

MR. PAPPAS: And privilege, but you didn't assert privilege for the previous questions, correct?

MR. WOLFE: That's correct. We said work product.

MR. PAPPAS: Okay. I think with

that, we can wrap up and let you go wherever you would like to go.

MR. WOLFE: We reserve the right to have the witness review the transcript.

MR. PAPPAS: Sure.

MR. WOLFE: No further questions.

(At 2:56 p.m., proceedings were concluded.)

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C E R T I F I C A T E

I, Lisa Claud Neal, Certified Reporter and Notary Public do hereby certify:

That CRAIG ELLIS WILLS, Ph.D., the witness whose deposition is hereinbefore set forth, was duly sworn by me before the commencement of such deposition and that such deposition was taken before me and is a true record of the testimony given by such witness.

I further certify that the adverse party, RAVENWHITE SECURITY, INC., was represented by counsel at the deposition.

I further certify that the deposition of CRAIG ELLIS WILLS, Ph.D., occurred at the offices of DLA PIPER One Liberty Place 1650 Market Street Suite 5000 Philadelphia, PA 19103 on Tuesday June 17, 2025 commencing at 9:00 a.m. to 2:56 p.m.

I further certify that I am not related to any of the parties to this action by blood or marriage, I am not employed by or an attorney to any of the parties to this action, and that I am in no way interested, financially or otherwise, in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand this 20th day of June, 2025.

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Lisa Claud Neal, RPR,

CSR, CLI Notary PA-NJ-DE

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