VISA EXHIBIT - 1047
Visa Inc. v. Cortex MCP, Inc.
IPR2024-00488

**In the Matter Of:**

VISA, INC. vs CORTEX MCP, INC.

IPR2024-00488

---

**SAM MALEK, PH.D.**

*December 12, 2024*

---

ESQUIRE
DEPOSITION SOLUTIONS

*800.211.DEPO (3376)*
*EsquireSolutions.com*

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

| | | |
|---|---|---|
| VISA, INC., | ) | |
| | ) | |
| | ) | Case No. |
| Petitioner, | ) | |
| vs. | ) | IPR2024-00488 |
| | ) | |
| | ) | U.S. Patent No. |
| CORTEX MCP, INC., | ) | 9,954,854 |
| | ) | |
| | ) | |
| Patent Owner. | ) | |

---

REMOTE DEPOSITION OF SAM MALEK, Ph.D.

December 12, 2024

Witness Location: Irvine, California

Reported by:
Connie Recob, CCR, RMR, CRR
Washington CCR No. 2631
Oregon CCR No. 15-0436
Utah CCR No. 1133171-7801
Idaho CCR No. SRL-1220
Job No. J12100626

REMOTE APPEARANCES

For the Claimant:

MATTHEW A. ARGENTI
Wilson Sonsini
650 Page Mill Road
Palo Alto, California 94304-1050
(650) 354-4154
margenti@wsgr.com

WES DERRYBERRY
JOSEPH BAILLARGEON
Wilson Sonsini
1700 K Street NW, Fifth Floor
Washington, D.C. 20006-3814
(202) 973-8842
wderryberry@wsgr.com
jbaillargeon@wsgr.com

For the Patent Owner:

DOUGLAS R. WILSON
ARMOND WILSON LLP
13785 Research Blvd., Suite 125
Austin, Texas 78750
(512) 267-1663
doug.wilson@armondwilson.com

YUE HAN
ARMOND WILSON LLP
4685 MacArthur Place, Suite 390
Newport Beach, California 92660
(949) 386-7263
amy.han@armondwilson.com

EXAMINATION INDEX

EXAMINATION BY: PAGE NO.
BY MR. ARGENTI 4

EXHIBIT INDEX

EXHIBIT NO. DESCRIPTION PAGE NO.

(No exhibits marked for identification.)

WITNESS INSTRUCTED NOT TO ANSWER

(None)

INFORMATION REQUESTED

(None)

BE IT REMEMBERED that on Thursday, December 12, 2024, at Irvine, California, at 7:57 a.m., before Connie Recob, CCR, RMR, CRR, remotely appeared SAM MALEK, Ph.D., the witness herein;

WHEREUPON, the following proceedings were had, to wit:

<<<<<< >>>>>>

SAM MALEK, Ph.D., having been first duly sworn, deposed and testified as follows:

EXAMINATION

BY MR. ARGENTI:

Q. Good morning, Dr. Malek.

A. Good morning.

Q. Could you please state your full name for the record?

A. Sure. My first name is Sam, S-A-M, last name is Malek, M-A-L-E-K.

Q. Where are you currently located?

A. I'm in Irvine, California.

Q. Is there anyone else in the room with you today?

A. No.

Q. It's my understanding that you have printed copies of your

1 declarations and the cited exhibits available to you today;
2 is that correct?
3 A. Yes, that's right.
4 Q. Okay. And that being the case, my preference is for you to
5 use those printed copies as the exhibits in the deposition
6 since they're already of record in the proceeding rather than
7 going through the process of loading them into the chat and
8 having you download electronic copies.
9 But if at any point you don't have a copy and you need
10 to receive it electronically, just let me know, okay?
11 A. Sure. I also have the electronic copies of the documents on
12 my laptop.
13 Q. Okay. Are those printed copies of the documents that you
14 have clean copies?
15 A. Yes, they are.
16 Q. There's no notes on any of them?
17 A. No notes.
18 Q. Okay. This is not your first deposition, correct?
19 A. That's right.
20 Q. About how many times would you say you've been deposed?
21 A. I haven't counted it recently, but it is over 50 times. I
22 would estimate about 60, 70 times. 70 times.
23 Q. Approximately how many in the last year?
24 A. Maybe about -- I would have to estimate. Maybe about four or
25 five times.

Q. So it sounds like you're probably familiar with how things work here, but I'm going to go through the ground rules just to get them on the record.

Do you understand that you are providing your testimony under oath and you are expected to tell the truth?

A. Yes.

Q. Is there any reason you cannot provide complete and accurate testimony today?

A. No.

Q. Hopefully my questions are clear. If you do not understand any question, please let me know that it is unclear. Under the guidelines for this proceeding, you must ask me for any clarification. If you do not tell me otherwise, I will assume that you understand the question, okay?

A. Yes.

Q. Please provide verbal answers rather than nodding your head for the benefit of the record and we can take a break at any time that you'd like one as long as there's not a question pending. If there is a question pending, you must answer the question before we take a break.

Do you understand?

A. Yes.

Q. I will try and take breaks every hour or so, but if you'd like to take one before I suggest it, just let me know, okay?

A. Understood.

Q. You understand that you are here today with regard to four IPR proceedings, correct?
A. Yes.
Q. You've submitted declarations in each of those four IPRs, right?
A. Yes.
Q. Can you please pull out your copies of those four declarations.
A. Okay. I have them.
Q. I'll run through these in numerical order according to the IPR number.
One of your declarations was submitted in IPR2024-00486, which relates to U.S. Patent No. 9,251,531, right?
A. Yes.
Q. If I refer to that as the '531 patent, will you understand what I'm referring to?
A. Well, if you say '531 patent, I would assume you're talking about the patent itself, not the declaration, but I understand, yeah.
Q. Another one of the IPR proceedings is IPR2024-00488, correct?
A. Yes.
Q. And that IPR relates to U.S. Patent No. 9,954,854, correct?
A. Yes.
Q. And if I refer to that patent as the '854 patent, will you

1 understand what I'm referring to?
2 A. Yes.
3 Q. The third IPR that you submitted a declaration for is
4 IPR2024-00489, correct?
5 A. Yes.
6 Q. And that relates to the Patent No. 10,749,859, correct?
7 A. Yes.
8 Q. Is it okay if we refer to that patent as the '859 patent?
9 A. Yes.
10 Q. And the fourth declaration is for IPR2024-00489, which
11 involves U.S. Patent No. 11,329,973, right?
12 MR. WILSON: Objection. Form.
13 THE WITNESS: I think you may have
14 misspoke. I think that the IPR number is 00490 on that one.
15 BY MR. ARGENTI:
16 Q. I think you're probably right. So IPR2024-00490 involves
17 Patent No. 11,329,973, right?
18 A. Yes.
19 Q. Okay. And we can refer to that patent as the '973 patent
20 today, okay?
21 A. Yes.
22 Q. Let's take a look at your declaration for the '531 patent.
23 A. Okay.
24 Q. That is Exhibit 2009 in IPR2024-00486.
25 Can you turn to the end in Page 85 of your declaration?

A. Okay.
Q. Is that your signature?
A. Yes, it is.
Q. How was it entered in this declaration?
A. It was -- it was entered by me. I added it to the file.
Q. So it's an electronic signature that you copied in?
A. Yes.
Q. Did you sign your other three declarations in the same way?
A. I believe so, yes.
Q. Prior to signing your '531 declaration, did you carefully review it to ensure its accuracy?
A. Yes, I did.
Q. Is there anything in your '531 declaration that you would like to modify or correct today?
A. Yes, I do.
Q. What's that?
A. So if you turn to Page 46 of my declaration, Paragraph 105 -- this is in the 486 IPR, but I think the paragraph numbers are the same across all IPRs.

So at the bottom of that Paragraph 105, I say, "As I mention above, I have not found any disclosure or suggestion of Oborne in the use of multiple devices by a single user." Actually when I was preparing for my deposition, I was reading the exhibits more carefully and I was reading Oborne in detail. I did come across a disclosure in Oborne that, in

1 fact, talks about multiple devices for users, and I'm going
2 to try to find that here.
3 So it's in Paragraph 148 of Oborne, the second
4 sentence. It says, "A User's Table, 1519A, may include
5 fields such as, but not limited to, user_ID, token_ID, SSN,
6 DOB, first_name," and then there's -- there's some number of
7 other fields that are provided there. I'm not going to read
8 all of them, but then one of the other fields that is
9 mentioned, there is devices list, devices_list.
10 So this table tells me that a user can have multiple
11 devices in Oborne, and it also tells me that, in all those
12 devices, there's a single token ID that is used because it
13 has a token_ID singular and then it has a devices_list
14 plural.
15 Q. And I think you said that you would make that same correction
16 to Paragraph 105 in all four of your declarations; is that
17 right?
18 A. Yes. This is generally where I've made a statement that I
19 have not found any disclosure or suggestion in Oborne of the
20 use of multiple devices. I'm correcting that because when I
21 was reviewing Oborne in detail, I realized that, no, actually
22 Oborne does disclose multiple user devices and, in addition,
23 it discloses that a single token is used for all those
24 devices.
25 Q. You also mention as you were addressing that issue that the

1 paragraphs in your declarations largely match up, the
2 numbering from declaration to declaration. So just as a
3 preliminary matter, I think it would be helpful to address
4 that so that I don't have to spend time asking questions
5 about all four declarations. It looks to me reading through
6 that, yeah, if we ask questions about the '531 declaration,
7 then there are corresponding paragraphs in each of the other
8 declarations with the same numbering at least until we get to
9 some of the dependent claim issues.
10 Does that sound right?
11 A. My understanding is that the paragraph numbers are the same
12 across the different IPRs. Yeah, that's my understanding.
13 Q. Okay. In that case -- and I'm not trying to trip you up or
14 create a trap here on this issue. I think, like I said, just
15 to move things along, instead of asking questions about all
16 four IPRs, is it fair to say that if you give an answer about
17 the '531 declaration, it applies equally to the equivalent
18 testimony in the other declarations?
19 A. I think that's generally fair unless the claims are
20 materially different, meaning that the claims have different
21 limitations, but, for example, this correction that I made
22 to -- to this Paragraph 105, I think it applies to all the
23 IPRs.
24 Q. Fair enough. And if there are any issues where the claims
25 are materially different, I will try to be aware of that. If

I don't bring it up in the question, please feel free to make note of that where you think it's appropriate, okay?

A. Sure.

Q. Aside from that issue in Paragraph 105 that we just talked about, are there any other corrections you'd like to make to any of your four declarations?

A. Yes, there is another -- maybe more of a clarification just to make sure my opinion is fairly explained. Let me try to find that paragraph.

So Paragraph 144 in the '531 IPR, or the IPR for the '531 patent -- again, this is an opinion, I think, that applies to all IPRs, so it doesn't really matter. Paragraph 144, I say, "Stafford explains," in quotations, "next in Step 3 or in Step 232, the hash value of ID pad is created, called ID sig 1 and then using the user's private key."

I think the clarification that I want to provide here is that Stafford explains that ID pad is created using the user's private key. Stafford actually does not explain how the -- or what key is used for the hash value, so the clarification here is that the creation of ID sig 1 using the hash value, Stafford doesn't explain how that hash value is computed. It only says that the user's private key is used for creating the ID pad.

Q. About how many hours did you spend preparing your four

1 declarations addressing these patents?
2 A. In preparing them?
3 Q. Yes.
4 A. Again, I should have counted this before the deposition. I
5 am estimating -- I'm estimating about -- about 100 hours,
6 maybe more than that.
7 Q. You're being compensated for your testimony in these
8 proceedings, right?
9 A. Yes.
10 Q. What is your hourly rate?
11 A. 750.
12 Q. Is that the same rate for -- for all your work or do you have
13 different rates, for example, for live testimony?
14 A. It's flat rate.
15 Q. Okay. Who is paying your compensation?
16 A. My understanding is that Cortex is paying my invoices.
17 Q. If we look at Paragraph 4 of your declaration, right there on
18 the first page, in the last sentence, do you see where you
19 say, "I have no financial interest in Cortex, the '531 patent
20 or the owner of the '531 patent"?
21 A. Yes.
22 Q. Is it your understanding that someone other than Cortex owns
23 these patents?
24 A. I have no knowledge of that.
25 Q. So why is that phrased that way?

A. Because I don't know either way.
Q. Did you do anything to prepare for this deposition?
A. Yes, I did.
Q. What did you do?
A. So I reviewed my declarations, I reviewed the petition, the prior arts that have been asserted; Dr. Shamos's reports and deposition, so basically I reviewed the documents in the case.
Q. Did you review anything in preparing for this deposition that isn't cited in your declarations?
A. No.
Q. If we turn to Page 7 of your declaration in Paragraphs 21 through 23, you identify the materials you reviewed in preparing your declaration, correct?
A. Yes.
Q. Did you review anything else beyond what's identified here in these paragraphs?
A. Well, Paragraphs 21, 22 and 23, these are -- these also include the prior arts, yes, so -- yeah, I've reviewed what is in Section 3 of my declaration.
Q. Did you meet with anyone to prepare for this deposition?
A. I did, yes.
Q. Who did you meet with?
A. So the counsel, Mr. Wilson and Ms. Han.
Q. When did you meet with them?

A. I think we had a short meeting last week, I believe it was Thursday, and then I had meetings yesterday and the day before.
Q. How long were those meetings?
A. So the Thursday meeting was very short, maybe about an hour, hour and a half, and the meeting yesterday was about five hours and the meeting before that was about maybe seven hours.
Q. How much have you billed to date for your work in these IPRs?
A. I don't have the exact number, but I'm assuming it's about -- I mean. I'm estimating it to be about 150 to 200 hours.
Q. If we take a look at the background and qualifications section in your declaration, you mention in Paragraph 15 that one of the classes you taught at UCI was a course on internet applications engineering.
Do you see that?
A. What paragraph are you on?
Q. Paragraph 15.
A. Okay. Yeah.
Q. And you say that that class involved various ways in which customer payments can be processed in mobile and web E-commerce applications, right?
A. Yes.
Q. When did you teach that class?
A. Last time I taught it was -- again, I'm estimating to be

about three or four years ago.
Q. When was the first time you taught it?
A. Maybe about eight years ago or nine years ago.
Q. What are some of the various ways for processing payments that you covered in that class?
A. So can you be more specific in terms of, what do you mean, "various ways?"
Q. That's your language from your declaration. You say, you covered technologies for building E-commerce applications including various ways in which customer payments can be processed in mobile and web E-commerce applications?
A. Sure. So basically, we cover JavaScript APIs that are used by -- by, you know, third-party entities. I believe one of them is called Stripe -- that provide these APIs that could be used for processing, for example, credit cards.
Q. Any other examples?
A. Well, the different providers, I -- you know, I think one is PayPal, the other one is Stripe. I mean, there are different companies that provide these services. There's many of them.
Q. Did your class cover tokenized payments?
A. I think some of the APIs, the way they work is that they do provide security tokens to you that you can use for payment processing.
Q. What are "tokenized payments?"
A. I mean, it depends on the specific technology you're talking

about. It could take different forms.
Q. Is that something you addressed in your class?
A. Yes, as part of how to perform payment processing as part of how they would build their applications, yes.
Q. So what were the forms of tokenized payments that you talked about in your class?
A. As I said, it depends on the API and the technology you're using. So, you know, I think the students -- this is an upper division class, so I don't go through the level of details like, these are all different instances that you can use, but they would understand that they would have to provide support for payment processing.
Q. Do you have an understanding of when tokenized payments were first introduced?
A. I don't recall off the top of my head, no.
Q. Do you know whether tokenized payments were introduced prior to 2012?
A. I have to do research on that. I don't remember off the top of my head.
Q. Did you have an understanding of whether tokenized payments were introduced prior to 2012 when preparing your declarations?
MR. WILSON: Objection. Form.
THE WITNESS: Can you repeat the question?

BY MR. ARGENTI:

Q. Did you have an understanding of whether tokenized payments were introduced prior to 2012 when forming your -- when preparing your declarations?

MR. WILSON: Objection. Form.

THE WITNESS: Well, I mean, some of the references that Mr. -- that Dr. Shamos has used in his report and has opined about and I've opined about use the notion of token. So, for example, Oborne has a notion of token, and if that's what you mean by tokenized payment, then I think to that extent, I studied those references that he asserted.

BY MR. ARGENTI:

Q. In that same paragraph of your declaration in Paragraph 15, you go on to say that you taught a course in distributed software architecture. Do you see that?

A. Yes.

Q. What was the time frame when you taught that class?

A. Well, that class, I mean, I've been teaching software architecture in one form or another since I've been a professor in 2007, so pretty much I would say every year I've taught some form of software architecture class as a professor.

Q. And you say for that class, that you covered topics related to electronic credential management. Do you see that?

A. Yes.

Q. What does that mean?
A. So that basically relates to authentication and authorization and, you know, granting access to resources which could be computer resources or it could be data, and an example of data would be credentials.
Q. What types of electronic credentials did that class cover?
A. So the class covers the foundational technologies that could be used with all sorts of -- all types of credentials. There are different types of authentication and authorization techniques that it can use with different levels and degrees of protection that -- I mean, for the most part, they can all be used for different kinds of credentials. They present trade-offs in terms of performance, in terms of usability, in terms of the security that they provide.
Q. So when you say "credential," could that credential be a driver's license?
A. It could be any confidential information.
Q. It could also be a credit card number then?
A. It could be, yes.
Q. In the next paragraph of your declaration, that's Paragraph 16, you mention experience working at FieldCentrix in the late 1990s. Do you see that?
A. Yes.
Q. Now, in your CV, it looks like that was from August 1999 to November 2000. Does that sound right?

A. That sounds about right.
Q. Does that mean you were an undergrad in college at the time?
A. I believe at least part of that time I was undergrad, yes.
Q. So was that a full-time job at FieldCentrix?
A. Yes, part of it was full time. Some parts of it I was employed full time.
Q. Was it a summer job full time and then part time during the school year?
A. Possibly, yes. I don't remember the details, but I do remember I was full time at some point.
Q. You mention in that paragraph "developing mobile applications for utility company service personnel."
How many applications did you develop?
A. Well, I think the company had, if I remember correctly -- we're talking more than 20 years ago now, the company had one -- one essential mobile application or family of mobile applications.
Q. What type of device did the application run on?
A. I believe it was Windows CE, if I remember correctly. So Windows used to be a mobile platform before Android and iPhone came about, and I don't remember the specific device, but it was Windows programming. It was CC++ coding against Windows.
Q. Was part of your role at FieldCentrix developing software to collect payments?

A. I remember part of my work dealt with -- if I remember correctly, with invoicing and payment processing.
Q. Were those credit card payments?
A. I don't remember right now off the top of my head.
Q. Was this a utility company service personnel out in the field collecting payment from customers?
A. My understanding is that we were doing invoicing. So it was basically kind of an application suite that would allow you to dispatch technicians to someone's house. They would get there. They would be able to record the status of the job, what's going on. They would be able to do invoicing and, you know, collect -- collect and process payments.
Q. But you don't remember whether the collected form of payment was a credit card?
A. I forgot the details of how the payments were being collected and processed at that point.
Q. It would be pretty different, right, if you were processing a cash payment or a check payment versus a credit card payment?
A. There would be differences, yes.
Q. But you don't remember what you worked on?
A. The details of how the payment processing worked, this is 25 years ago, I don't remember the details of it, no, but I know that --
Q. Would that -- I haven't asked you the details of how it worked. I just asked you what kind of payment it was and it

1 sounds like you don't even remember that?
2 A. Well, I generally was not -- I'm not talking about just cash,
3 so this was some kind of a collection of -- either in the
4 form of -- I mean, it could have been cash as well, but it
5 would be check, credit card, if I remember correctly, but I
6 don't remember for certain right now.
7 Q. So then you also, I gather, don't remember if it was a credit
8 card payment, how the credit card information was received
9 from the customer?
10 A. I don't remember the details of it, no.
11 Q. Other than the FieldCentrix experience you describe in
12 Paragraph 16, do you have any other experience developing
13 electronic payment systems?
14 A. Yes.
15 Q. What experience do you have?
16 A. So when I was working at PricewaterhouseCoopers Consulting, I
17 was part of their consulting division, and as part of the
18 work that we were doing for different clients, we also
19 developed E-commerce -- I worked on projects where we
20 developed E-commerce applications and so I think all those
21 E-commerce applications had some form of payment processing
22 capability.
23 Q. Approximately what year was that employment at PwC?
24 A. I don't have my CV printed, but it would have been after I
25 got my bachelor's degree.

Q. Do those E-commerce applications at PricewaterhouseCoopers involve collecting credit card payments?
A. I believe so. So these were the E-commerce applications, so this is like how you typically do E-commerce business.
Q. Do you remember how the payment information was collected from a customer?
A. It would be -- it would be some kind of a form where they would enter their credit card information and then we would use -- we would use APIs to process them.
Q. So they would enter their credit card information in a web browser screen on their computer; is that right?
A. I believe back then it was -- yeah, it was mostly just web forms.
Q. And then the credit card number would be transmitted somewhere for payment processing; is that right?
A. The credit cards would either be collected for processing later on in kind of a batch fashion through some other means or it would be through some kind of web API.
Q. Did the applications you developed at PwC have any safeguards in place to protect customers' payment information?
A. Yes, so we would use HTTPS, you would use -- yeah, you would encrypt the data in transit.
Q. And would that deem sufficient for protecting the customer's credit card information?
MR. WILSON: Objection. Form.

THE WITNESS: I mean, it would be better than sending credit card information over HTTP, yes, so I think we would implement certain security features to protect the user's credit card information.

BY MR. ARGENTI:

Q. That approach of using HTTPS instead of HTTP, that wasn't something that was unique to your project at PricewaterhouseCoopers, was it?

A. No, I think HTTPS has been known for many years.

Q. Do you have any experience developing mobile applications involving QR codes?

A. I mean, yes. So, I mean, a good portion of my research has been on mobile application development and testing and also their security verification and validation. So, you know, among the hundreds of mobile apps that we have analyzed and tested, I'm sure many of them provide a QR processing. I just don't remember their names off the top of my head.

Q. Do you cover QR processing in any of your classes?

A. Not as a subject in the course, but as -- so, for example, I teach software project courses where I have teams of students that work on various projects, and in some of those projects, they end up using QR code for some feature or functionality.

But as a subject, you know, I don't teach -- I mean, I don't really know what it means to teach QR code. QR code is a technique, it's a technology that is out there and, you

1 know, in the courses that I teach, my students use that
2 technology.
3 Q. How long has QR code technology been out there?
4 A. When was it invented?
5 Q. How long has it been in widespread use?
6 MR. WILSON: Objection. Form.
7 THE WITNESS: Many years. I don't
8 remember off the top of my head exactly what year, but it's
9 been around for a while.
10 BY MR. ARGENTI:
11 Q. Was it in widespread use prior to 2012?
12 MR. WILSON: Objection. Form.
13 THE WITNESS: I'll have to check on that.
14 I don't recall.
15 BY MR. ARGENTI:
16 Q. In those projects that you mentioned that you and your
17 students have utilized QR code technology, why did QR codes
18 make sense in those applications?
19 A. That's a really broad question. It depends on the
20 application and it depends on what the students were doing
21 and what the application was used for. I can't give you a --
22 give you a complete answer, but I can give you some examples.
23 I mean, so generally, I think QR codes are used when
24 you will, like, users that come -- users that you don't know
25 of, you like to communicate something to them, right? So an

example, you might have a QR code in a magazine where people can take out their phones, use their camera to go to a URL or at a restaurant, everyone knows about that, right? At a restaurant, you can pull out your phone and you can use your camera to look at the menu at the restaurant.

So it's really more for the purpose of one-to-many communication where you really don't know who are the intended recipients, so anybody could just come and pull out their camera. And it's also typically for in person meaning that you have to physically be there to use your camera to use it to scan the QR code.

Q. I am familiar with the restaurant example that you gave, but I also think of using a QR code when I go to the movies and my movie ticket is in QR code form. Have you ever done that?

A. I don't go to movie theaters anymore. I have to be honest with you. I used to, but I -- but that's possible. I don't disagree with you.

Q. QR codes aren't limited to that one-to-many form of communication that you mentioned, right? It can also be used to communicate a particular piece of information on a one-to-one basis, right?

A. So I mean, again, like when you ask to explain when QR codes are used, I said, Well, that's a broad question, so I gave you some examples. I think it is possible to use QR codes for one-to-one communication, but in the movie theatre

example that you gave me, it's the movie theatre system, the web page or the web application that you went and you bought the movie ticket that gave you the QR code. It wasn't like you went and took your movie ticket and turned it into a QR code. But could QR code be used for one to one, yes. In certain situations it makes sense, but not in all situations.

Q. How long does it take to encode information as a QR code?

A. You mean by a user?

Q. I'm not sure what the distinction is there.

A. So let's say -- let's go -- I mean, so are you saying, for example, I get my movie ticket and it says, You're in Row C, Seat 14, and I want to take that information and encode it as a QR code as a user?

Q. Well, typically this is done automatically through software, right? I'm not suggesting that a user is sitting down with a pencil and paper and drawing up a QR code.

A. Well, that's what I'm asking. I don't know, when you say how long it takes to --

Q. So the server for the movie company ticketing system there has the user's -- the data for the user's ticket with a row and seat assignment, the date of the movie, the theatre number.

How long does it take the server to convert that into a QR code?

A. I mean, I wouldn't be able to give you an answer because I

1 don't know what server we're talking about. I don't know
2 what QR code we're creating, but in the -- in the context of
3 the opinions that I provided in this case, my understanding
4 is that the -- my understanding is that the Stafford
5 reference that Dr. Shamos has opined about, being able to
6 provide QR codes, my understanding is that Stafford doesn't
7 talk about creating QR codes. He doesn't have that
8 capability.
9 And my understanding is that what Dr. Shamos
10 essentially is opining is that a user would take the
11 information that comes from Stafford, the sig ID 1 and sig
12 ID 2, and would create those QR codes manually, and so I
13 would opine that that would be nonsensical to me.
14 Q. What do you mean by "create those QR codes manually?"
15 A. Well, I mean that the user would have to create them. So the
16 user would have to go figure out how to create a QR code.
17 They may have to download some software or they may have to
18 use -- find some web application, some kind of application
19 that would allow them to create the QR code because Stafford
20 doesn't talk about creating QR codes.
21 Q. Let's turn to Paragraph 42 of your declaration, please.
22 A. Okay.
23 Q. This is under the heading "Claim Construction," right?
24 A. Yes.
25 Q. And you say that you have not been asked to provide an

opinion on the construction of the following claim terms, correct?

A. Yes.

Q. And you go on to say that you have been asked to review the Board's constructions in the institution decisions and apply them in your analysis, right?

A. Yes.

Q. So you are not providing any opinion about the proper construction of the terms of the challenged patents. Do I have that right?

A. In this proceeding at this time, I'm just applying the Board's construction of those terms.

Q. And in your opinions, you have not applied any constructions beyond the Board's constructions that you identify in the claim construction section of the declaration.

Do I have that right?

A. I have not offered any constructions of the terms. I've just applied the Board's construction.

Q. You haven't offered any constructions nor have you applied any other constructions beyond the Board's constructions; is that right?

A. Yes. I have not applied any other construction beyond what the Board has construed.

Q. So you are not applying any constructions that have been provided by Cortex, correct?

A. Yes, I'm not.
Q. And you are also not applying any constructions that have been proposed by Visa beyond what the Board addressed in the institution decision, right?
A. Yes. As I say, I think clearly in this paragraph, I'm applying the Board's construction as to these terms.
Q. Let's take out the '531 patent, please. It's Exhibit 1001.
A. Okay.
Q. Turn to Claim 1.
A. Okay.
Q. Claim 1 recites a computer-implemented method comprising, and then it has a number of steps, right?
A. Yes.
Q. And it lists, if I count them, seven steps, correct?
A. Yes, it has seven elements.
Q. And if we look at the third step, that's the generating step. Do you see that?
A. I see the generating limitation, yes.
Q. Can you read that generating limitation for me, please.
A. Sure. It says, "Generating by a processor of the over engine, an over file comprising a virtual representation of the credential that has been verified by an issuing agency to be an official representation of the credential based on the information associated with the credential of the user."
Q. Do you have an understanding of what the term "comprising"

means in a patent claim?
A. Yes. I'm not an attorney, but I have an understanding.
Q. What is that understanding?
A. My understanding is that it needs to have that limitation, but it can have other -- it can have other features or elements as well.
Q. So when Claim 1 here recites, "Generating by a processor of the over engine an over file comprising a virtual representation," and then it goes on, is it your understanding that the over file is limited to the virtual representation?
A. I think, as the claim says, "An over file comprising," meaning that it needs to have, "a virtual representation of the credential that has been verified by an issuing agency to be an official representation of the credential."
Q. So the over file needs to have that virtual representation that has been verified, but that's -- the over file isn't limited to only having that virtual representation, right?
A. So again, I've applied the course construction, what these things mean, like over file, but my understanding is that an over file, you know, needs to have a virtual representation as we talked about of the credential, the rest of the limitation, but it can have other elements, other features as well.
Q. What's your understanding of what the term "virtual

1 representation" means in the context of these claims?
2 A. Well, I have applied the plain and ordinary meaning of that.
3 I don't think virtual representation itself was construed, so
4 I've applied the plain and ordinary meaning of it.
5 Q. And what does that mean when you're looking at that in the
6 context of the claims?
7 A. It's a representation that is virtual, that, you know, for
8 example, could be -- you know, it would be something that is,
9 for example, digital.
10 Q. I was going to ask you if you thought "virtual" meant
11 electronic, but it sounds like that's similar --
12 A. Yeah, electronic, sure. I mean, that would be at least one
13 aspect of it.
14 Q. And then the representation part of that term, are there any
15 particular requirements on what something needs to be a
16 representation of something else?
17 A. I -- you know, I haven't offered an opinion about that. I've
18 applied the plain and ordinary meaning of it.
19 Q. Does the representation in the claims have to depict the
20 credential?
21 A. I would have to think about it. This is not something that
22 I've offered an opinion about.
23 Q. So that's not something you considered when putting your
24 declaration together?
25 A. No, I didn't say that. I mean, I applied the plain and

ordinary meaning of it, but it sounds like you're asking me to now construe some of these terms and I haven't construed them, as I already said in my report. And so I'm not ready to offer a construction for some of these terms, you know, in real time without really thinking about them.

Q. I'm not asking for a construction, Dr. Malek. I'm asking for your understanding of what the claim term requires or does not require as you were performing your analysis.

So again, does the term "representation" require a depiction of the credential?

MR. WILSON: Objection. Form.

THE WITNESS: I think, you know, representation has a plain and ordinary meaning and that's what I've applied. I'm not ready to construe something on the fly without really thinking it through and it's not something that I've offered an opinion about in my report.

BY MR. ARGENTI:

Q. So you do not have an opinion whether a representation requires a depiction of the credential; is that correct?

A. As I said, I've applied the course construction for the terms that they construed, and for the remaining claim terms, I've applied the plain and ordinary meaning of it. I'm not ready to construe any terms on the fly today without really thinking it through.

Q. So you also don't have an opinion about whether the

representation must take any particular format in order to be a representation; is that right?

A. I'm not ready to construe that term without spending sufficient time thinking about it in light of the -- all the disclosures in the patent.

Q. And you also don't have an opinion about whether the virtual representation has to be derived from the user's credential; is that right?

MR. WILSON: Objection. Form.

THE WITNESS: Well, the claims required the over file that is generated to be generated based on the information associated with the credential of the user. That's a limitation of the claim.

BY MR. ARGENTI:

Q. So let's look at that limitation at the end of the generating step where it says, "Based on the information associated with the credential of the user."

What's your understanding of what has to be based on the information associated with the credential of the user?

A. My understanding is that the generation of the over file should be based on the information associated with the credential of the user.

Q. Would a POSA reading this claim understand that the virtual representation has to be based on the information associated with the credential of the user?

A. Well, the court construed the term "over file" to mean encompass -- the court construed that to encompass a virtual representation of one or more credentials to be used for verification of those credentials, and the claims require -- and the claim requires generating that over file, which encompasses a virtual representation of one or more credentials to be used for verification of those credentials, to be based on the information associated with the credential of the user.

Q. Right. And you've testified here today that the over file isn't limited to the virtual representation. It could have other things in the over file and still satisfy the claim.

So my question is: Does the virtual representation need to be based on the information associated with the credential of the user?

A. (Witness reviewing document.) Well, I think in light of the Board's construction, I think the Board construed over file to be a virtual representation of one or more credentials to be used for verification of those credentials. This limitation requires the -- the over file which is the virtual representation of one or more credentials to be used for verification of those credentials to be based on the information associated -- to be based -- yeah, to be generated and based on the information associated with the credential of the user.

Q. Dr. Malek, you just took almost five minutes to consider your response, but unfortunately I don't think you answered my question.

My question again is: Would a POSA understand that the virtual representation itself must be based on the recited information associated with the credential?

MR. WILSON: Objection. Form. And asked and answered.

THE WITNESS: I answered that. So as I said, the Board construed the term "over file" to be a virtual representation of one or more credentials to be used for verification of those credentials. So a POSA would understand that this limitation requires, in light of that construction, to generate a virtual representation of one or more credentials that is to be used for verification of those credentials based on the information associated with the credential of the user.

BY MR. ARGENTI:

Q. So then if I understand correctly, you're saying that yes, a POSA would understand that the claim requires to generate a virtual representation of one or more credentials that is to be used for verification of those credentials based on the information associated with the credential of the user; is that right?

A. That's what the court construed over file to be, yes.

Q. So it's your understanding that based on the PTAB's construction in the institution decision, this claim does require that the virtual representation itself be based on the information associated with the credential of the user?

A. Well, the claim requires the over file and the over file was construed to be a virtual representation of one or more credentials to be used for verification of those credentials. So under that construction, the limitation requires generating the virtual representation of one or more credentials to be used for verification of those credentials to be generated based on the information associated with the credential of the user.

MR. ARGENTI: We've been going a little over an hour. Is it a good time to take a break, Dr. Malek?

THE WITNESS: Sure.

MR. ARGENTI: Why don't we take ten minutes and come back. We could just say 9:10 Pacific Time. Does that work, seven minutes?

THE WITNESS: Sure.

(Recess 9:03-9:10.)

EXAMINATION (Continuing)

BY MR. ARGENTI:

Q. Let's turn now to Paragraph 62 of your declaration, please. And again specifically, I'm referring to the '531 declaration

as we've been looking at, but I think the same Paragraph 62 appears in all four of your declarations.

In the second sentence of Paragraph 62, you say, "Verification indicates some kind of formal approval or confirmation by the issuing agency that what has been issued will act in place of the credential in the issuer's eyes when presented instead of the credential."

Do you see that?

A. Yes.

Q. That's not just the plain and ordinary meaning of the word "verification," is it?

A. So this is -- this is not just understanding of what verification means. This is the limitation that says verified by an issuing agency to be an official representation of the credential.

Q. Right. And the claim doesn't require or recite -- strike that.

The claim does not recite formal approval or confirmation, does it?

A. It doesn't use those words, but it does say -- it does say that the issuing agency verifying the virtual representation of the credential to be an official representation of the credential.

Q. So where did the words "formal approval or confirmation" come from?

A. Well, I mean, the point that I'm making is that this is a limitation of this claim and Dr. Shamos basically glosses over it. He just really doesn't identify anything in Oborne that indicates any kind of verification by an issuing agency.

What I'm pointing out here is I know the claim actually requires verification by an issuing agency of the virtual representation of the credential to be an official representation of the credential and, you know, Dr. Shamos really points to nothing for that.

Q. And in making your distinction that Oborne doesn't disclose verification, you say, "the verification in the claims requires formal approval or confirmation," and my question is where do those words come from?

A. Well, I'm saying verification is something that can't be ignored. It requires some kind of a check, some kind of an approval, kind of a confirmation of something to be true. And here, I'm just basically explaining, you know, a limitation that has been essentially, like I said, glossed over by Dr. Shamos.

Q. So now you've expanded your definition to three things, it sounds like, based on your last answer. It could be some kind of a check, some kind of an approval or a confirmation.

Are those three distinct things in your mind?

A. No, those are all, you know, possible ways of, you know, understanding, you know, verification and what it means.

Q. So the verification could be checking. Checking what?
A. So the limitation requires a virtual representation of the credential that has been verified by an issuing agency to be an official representation of the credential, so there is an actual limitation there. There is -- you know, Dr. Shamos had to show that verification of the virtual representation of the credentials and he hasn't pointed to anything for that.
Q. Right. But when you say he hasn't pointed to anything, what you're saying he has not pointed to a formal approval or confirmation? That's what's right there in your declaration, right?
A. Well, he hasn't showed any formal verification, any kind of a check, any kind of a process where something is being evaluated, nothing really.
Q. Does the claim require a formal approval or confirmation?
A. The claim requires verification that the virtual representation of the credential is an official representation of the credential, so I think that's what the claim requires.
Q. It did not require formal approval or confirmation, correct?
A. The claim language does not use those words. I'm providing what I understand a POSA would understand that to mean, that a POSA would understand verification to require some kind of a check, some kind of approval, something like that, right?

Dr. Shamos has pointed to nothing for that.

Q. When you refer to a formal approval or confirmation or a check by the issuing agency, does that need to be provided to someone to satisfy the claim?

A. I mean, I think the claim speaks for itself. The claim says, "Generating by a processor of the over engine an over file comprising a virtual representation of the credential that has been verified by an issuing agency to be an official representation of the credential," and I think Dr. Shamos is only pointing to some disclosures in Oborne regarding generation of a token. He's not pointing to anything in Oborne for the verification part of the limitation.

Q. There's nothing in the claim that requires sending a verification method to the user, is there?

A. The claim doesn't use the word "message" or "sending a message."

Q. So there's no requirement to send a message to the user or to the over engine, correct?

A. I mean, the claim could be met by potentially sending a message to perform verification, but, you know -- and I think the spec talks about that, but this limitation doesn't use the word "message" or "sending."

Q. In this portion of your declaration, you address Dr. Shamos's opinions regarding the embodiment of Oborne where an issuing agency like a bank generates the token, correct?

A. What part are you referring to?
Q. So specifically Paragraphs 60, 61 and 62 of your declaration.
A. Okay. I'm sorry. What is the question?
Q. In these paragraphs, you address Dr. Shamos's opinions regarding the embodiment in Oborne where an issuing agency like a bank generates the token, right?
A. I understand that that is the Oborne embodiment that Dr. Shamos is opining about, yes.
Q. And in your opinion, even when it's the user's bank that issues the token, that would not involve the claimed verification; is that right?
A. My understanding is that Dr. Shamos has identified this corner case in Oborne where he's saying that the bank and the token server are the same thing, so the bank is the one that operates the token server and then he's saying in this corner case, this limitation of the claim essentially doesn't matter. He doesn't point to anything for that. He just says it's met.
Q. And it's your opinion that it's not met in that embodiment of Oborne, right?
A. So yes, my understanding is that Oborne doesn't talk about verification, and Figure 5 of Oborne is -- I think is the place where it describes how the -- you know, the token is generated. And there is no disclosure in Oborne that that corner case that Dr. Shamos is talking about would not follow

the same process as described in Figure 5 of Oborne. And when you look at Figure 5, as I've already described in my report, clearly there is no verification happening.

Q. So then in your view, when Oborne talks about the bank issuing the token, the token hasn't been verified; is that right?

Actually, let me strike that one.

Is it your understanding then that Oborne is teaching an approach where the bank's token server issues the requested token without knowing whether the corresponding account is real?

MR. WILSON: Objection. Form.

THE WITNESS: I don't really know what you're asking me about. I mean, I don't think -- I don't know -- what part of my report are you questioning me about?

BY MR. ARGENTI:

Q. Paragraphs 60, 61 and 62 where you take issue with Dr. Shamos's citation to Oborne for this element.

A. Okay. I mean, in these sections, I don't think it talks about the user account. Where am I talking about an account at a bank?

Q. So you understand that the -- that Oborne discloses that the token corresponds to a source of funds, right?

A. I understand that a token may be provided by the credentials funding source which could be a bank that issued the credit

card.

Q. Right. And so my question is: Is it your understanding of this relevant part of Oborne that it's teaching an approach where the bank's token server issues the requested token without whether knowing whether that credit card account is real?

MR. WILSON: Objection. Form.

THE WITNESS: I think what I'm saying is that Dr. Shamos is basically pointing to nothing in Oborne that shows that the -- that shows that, as part of the process of generating a token, any kind of verification is done to show that the token is an official representation.

BY MR. ARGENTI:

Q. Would a POSA reading Oborne understand it to teach a bank issuing a token for a credit card account held at the bank without the bank knowing that the credit card account isn't real?

MR. WILSON: Objection. Form.

THE WITNESS: I mean, I don't think the words "real" or anything like that shows up in the claim language here. The claim requires a virtual representation of the credential to be verified by an issuing agency to be an official representation of the credential and Dr. Shamos is pointing to nothing for that limitation.

BY MR. ARGENTI:

Q. I understand that's your opinion that Dr. Shamos is pointing to nothing, and if that's your sole opinion, that's fine. We can just establish that and maybe we can move on. If you have no other opinions about how a POSA would interpret these teachings of Oborne, that's fine.

Do you have an opinion as to whether a POSA would interpret Oborne as teaching a bank issuing a credit card token without knowing whether the credit card is real?

A. I think a POSA would read Oborne, would look at Figure 5 and realize that Oborne does not do any verification of the token when it's being generated.

Q. So then a POSA, in your view, would understand OSA- -- or, sorry, Oborne as teaching that a bank gets a token request from an account holder, purportedly identifying an account at the bank and sends the token back whether -- regardless of whether the account actually exists?

MR. WILSON: Objection. Form.

THE WITNESS: Like I said, my opinion is that Dr. Shamos has pointed to nothing in Oborne that shows any verification of what he's pointing to for over file. He's pointing to the token and the token is not verified and, you know, he -- my understanding is that he has no basis for saying that Oborne meets the limitation of verification of the -- of the over file being verified by an issuing agency to be official representation of the credential.

BY MR. ARGENTI:

Q. So to be clear, you do not have an opinion as to whether a POSA would find this limitation in Oborne?

MR. WILSON: Objection. Form.

THE WITNESS: I mean, I have an opinion. My opinion is that Oborne does not disclose verification of the -- of the token, and a POSA would understand that from reading it and Dr. Shamos has pointed to nothing for that verification limitation.

BY MR. ARGENTI:

Q. So then it is your opinion that a POSA would understand Oborne to teach a bank issuing a token regardless of whether it knows that there's an underlying account?

MR. WILSON: Objection. Form.

THE WITNESS: As I said, Oborne, in my review of Oborne, there is no disclosure of any verification of the token that is generated and I said that Dr. Shamos has pointed to nothing for that.

BY MR. ARGENTI:

Q. So your interpretation of Oborne is that it does describe a bank issuing a token purportedly connected to a credit card without verifying whether that credit card account exists.

That's your understanding of Oborne?

MR. WILSON: Objection. Form.

THE WITNESS: My understanding of Oborne

is what I've laid out in my report. So looking at Figure 5 of Oborne, it shows the data flow diagram of how it works and, as I've highlighted here, you know, client provides certain inputs to token server. Token server extracts that data that -- those inputs and generates the token and there is no verification done anywhere in Oborne with respect to the process of generating a token.

BY MR. ARGENTI:

Q. And in your interpretation, does that mean that when the token server is maintained by a bank, the bank issues the token without knowledge of whether there's an underlying account?

MR. WILSON: Objection. Form.

THE WITNESS: I think your question is really broad. Now you're asking me about a bank. Like what bank are we talking about? I'm talking about Oborne.

So in Oborne, which is a prior art that Dr. Shamos has used in offering his opinions, there is no verification of the token that is generated.

BY MR. ARGENTI:

Q. If it helps, we can use the term "funding source" instead of bank. Would that help clarify my question?

A. I mean, I think it's better to use Oborne because that's the reference. A funding source or bank has meaning outside of Oborne, so now we don't know which bank or funding source.

Q. Well, Oborne uses the word "funding source," right, and it talks about a credit card. Do you have an understanding of whether that funding source is a bank?

A. I think -- yeah, I think even Oborne mentions bank, but in Oborne as a reference, from front to back you read it, there is no mention of verification of a token that is generated in Oborne.

Q. So again, in the embodiment that you understand Dr. Shamos is relying on where the token server is managed by the funding source, which can be a bank, it's your interpretation that Oborne describes the bank issuing a token without knowing whether there's a valid, underlying account.

That's your interpretation, right?

MR. WILSON: Objection. Form.

THE WITNESS: My understanding of Oborne, as I've laid out in my report, is that it generates a token without performing a verification on that token and Dr. Shamos has pointed to nothing for that limitation.

BY MR. ARGENTI:

Q. And you do not have any further understanding of Oborne as to whether the bank has knowledge of whether the token is connected to a valid underlying account when it issues the token; is that right?

A. I'm not offering new opinions on the fly. My opinion is that in Oborne, there is no disclosure of a verification of a

token that Dr. Shamos has pointed to.
Q. If a user is requesting a token from their bank, they would want assurances that the token the bank provides is properly linked to the user's account, right?
MR. WILSON: Objection. Form.
THE WITNESS: Are we talking about Oborne?
BY MR. ARGENTI:
Q. Yes.
A. I don't think Oborne talks about what a user wants in that sense.
Q. Does Oborne talk about the user obtaining a token for the purchase of making subsequent payments?
A. Oborne talks about using tokens for payment -- yes, for making payments.
Q. And in order to achieve that goal of Oborne, it would be desirable for the token that is provided to be properly linked to the user's payment account, correct?
MR. WILSON: Objection. Form.
THE WITNESS: I don't know what you mean by "linked" exactly.
BY MR. ARGENTI:
Q. Well, earlier today, you directed me to the database of tables that Oborne describes, right?
A. Yes.

Q. And in that database, a user's account, such as a credit card, is linked to a token, correct?
A. I'll have to look at the database structure again.
MR. WILSON: Form.
THE WITNESS: Would you like me to pull up Oborne and look at it?
BY MR. ARGENTI:
Q. Sure.
A. So the user's table doesn't have the credit card -- the credit card field.
Q. You're aware that Dr. Shamos cited an XML example for the token data structure, right?
A. Yes, I think I remember that.
Q. And the token data structure contains a funding source account number, right?
A. I'll have to check that.
Q. Sure.
A. So I think the token data structure that he has pointed to, there are multiple accounts.
Q. Okay. And so the token, you would agree, is linked to at least one funding source account, correct? That's how the token is used to make subsequent purchases, right?
A. I mean, token seems to be somehow associated with funding sources.
Q. So then I'll go back to my earlier question about, given that

it is a goal of Oborne to provide a token for the purchase of making subsequent payments, it would be desirable for the token that is provided to be properly associated to at least one user payment account, correct?

MR. WILSON: Objection. Form.

THE WITNESS: I haven't offered an opinion about that. I don't know. Possibly.

BY MR. ARGENTI:

Q. If the token wasn't properly associated with a user account, that could lead to customer frustration when the user later tries to use the token for a purchase, right?

A. I would have to look at Oborne to see all the different ways it talks about tokens. I don't recall right now off the top of my head if it talks about situations where you can have a token that hasn't been associated with an account yet.

It is possible in -- what I do remember is that it's possible in Oborne to have a token associated with an account that has no funds in it which, you know, would -- I guess would -- is one issue, but whether a token can exist without being associated with a funding source, I have to read it to be able to give you an opinion on it.

Q. Let's turn to Paragraph 83 of your declaration, please.

A. Okay.

Q. In this paragraph, you cite five examples of what Oborne calls additional security, correct?

A. Yes.
Q. Each of those five examples comes from Oborne Paragraph 26, right?
A. I believe so.
Q. These five examples of additional security would involve the token server in Oborne, right?
MR. WILSON: Objection. Form.
THE WITNESS: I'm not really sure if they all involve the token server. Some -- I mean, these are all different security layers that are in Oborne. I don't think it discusses in detail exactly where they're implemented.
BY MR. ARGENTI:
Q. So if we look at the first example that you have, the first example is requiring a user to provide a user name and payment password to activate a payment token, right?
A. Yes.
Q. And so do I have it right that you are not sure whether that function is performed by the token server described in Oborne?
MR. WILSON: Objection. Form.
THE WITNESS: So the -- yeah, I think several components could be involved in this. So the user obviously is not providing the user name and password directly into the token server. They're probably providing it on some kind of a client web application or mobile

application. And I mean, I would have to look at the reference in detail to be able to tell you exactly what -- what components would be involved and to what extent Oborne talks about that.

BY MR. ARGENTI:

Q. Why don't we take a look at Figure 7A of Oborne.

A. Okay.

Q. And this is -- Oborne says this is a token-based purchase transaction execution example, right? Do you see that in the bottom right of the figure?

A. Yes.

Q. And if we look at Element 711, that's user authenticated, question mark, right?

A. Yes.

Q. And that step happens at the token server, right?

A. This step happens in the token server, yes, in this embodiment.

Q. Right. So Oborne is describing that the user authentication is performed by the token server in this embodiment, correct?

A. Yes, to check to see whether the user's authenticated as done here.

Q. And so then if we go back to those five examples of additional security that you have in Paragraph 83, each of those is a form of user authentication, correct?

A. These are all different forms of authentication, but -- I

mean, the actual authentication could be done somewhere else, but the check that that 711 that we saw, that check, that kind of question mark, that verification, according to this figure on this embodiment, is on a token server.

Q. Does Oborne disclose user authentication taking place anywhere other than at the token server?

A. I'll have to read the -- I can't answer that off the top of my head. I have to review Oborne.

Q. Okay.

A. Do you want me to review it?

Q. Yes.

A. Okay. If it's okay, I'll pull up the electronic copy so I can go through it.

Q. Okay.

A. So I'm looking at Paragraph 26, and if you look at some of the other examples of authentication that he has like later on, it talks about authentication chips. So an example, it says, "Thus, in order to make purchase with a payment token, in some implementations, the user may be required to present the payment token physical cart to the authentication chip disposing communication with the client before the user can make a purchase order using the token." That to me doesn't sound like it's happening on the token server; that seems to be happening maybe at the point of sales or something like that.

When I look at Paragraph 30, when it's talking about "verify chat," it talks about how, in some implementations, the customer service representative, example, an agent, like a human, may manually determine the authenticity of the user using the video of the user. Again, I don't think that's happening on the token server.

Q. But wouldn't the agent need to then communicate with the token server to let the token server know that the user has been authenticated?

A. Possibly, yeah. I would have to read in more detail, but that's plausible.

Q. If the token server is what processes the token transaction, including performing user authorization, it's going to need to receive confirmation from that agent and ultimately the token server is what will determine whether the user is authenticated, correct?

MR. WILSON: Objection. Form.

THE WITNESS: So Paragraph 54 says, "In some implementations, the token server may determine whether the user token is authenticated." So that suggests to me that in other implementations, the token server may not determine that. I don't know. I mean, basically, I would have to read Oborne to be able to give you kind of a complete answer whether token server is the only place where authentication is happening.

BY MR. ARGENTI:

Q. But the user authentication is at least an example of how Oborne says to -- sorry. Strike that question.

Let's go back to those five examples in Paragraph 83 of your declaration.

A. Okay.

Q. Each of these five examples is concerned with ensuring that the correct user is utilizing the token, right?

A. These are all authenticating the user to some extent, yes.

Q. Let's turn to Paragraph 86, please, on the next page.

A. Okay.

Q. In this paragraph, in the first sentence you say: "Fourth, given that Dr. Shamos opines that this problem had already been solved using a different technique," and then you have a few lines of text and at the end of the sentence you say, "Dr. Shamos failed to explain why it would have been routine to implement a different technique to solve this problem."

Do you see that?

A. Yes.

Q. My question is: What were you referring to when you say "this problem?"

A. Well, I'm referring to Dr. Shamos's essentially Paragraph 241 where he briefly talks about some kind of a hypothetical problem that he creates with respect to unofficial forged or altered tokens in the marketplace. And he says, with respect

1 to this problem, it would have been routine to solve it, you
2 know, using the -- you know, the issuer basically verifying
3 that the tokens that are being generated.
4 Q. Where does he say with "respect to this problem?"
5 A. I thought you were asking me -- I thought you were asking me
6 what this problem is referring to. I was referring to these
7 declarations. So he has a -- he has a section earlier in his
8 report where he says, in 1967, the problem of whether
9 credentials are essentially valid or not was solved by the
10 presenter of the credential furnishing additional information
11 prove that they are the person named in the credential, and
12 then he presents essentially the same problem later on in
13 Paragraph 241 when he's talking about tokens, but he seems to
14 kind of skip over or forget about the solutions that he had
15 proposed earlier in his report.
16 Q. So in Paragraph 241 of Dr. Shamos's declaration where he
17 says, "The existence of unofficial forged or altered tokens
18 in the marketplace would create problems for both issuers and
19 users," is that what you were just referring to?
20 A. Yes.
21 Q. So he says it would create problems. He uses it as a plural,
22 and then we get to your declaration, for example, in
23 Paragraph 86, and you refer to this problem in the singular.
24 Is that a particular problem that you're referring to?
25 A. Where does he -- sorry, I have to look up his -- I have to

pull up his report to know exactly what he said. I'm just looking at my own report right now.

Q. Oh, sure. Go ahead. Do you have a copy of Dr. Shamos's report on hand?

A. I don't. I mean, I have it on my computer, so I can pull it up here.

Q. And just for the record, because I think Dr. Shamos did not make things as convenient for everyone and his paragraph numbering might not be the same from IPR to IPR, are you referring to Exhibit 1005 from the 531 IPR?

A. Yes.

Q. Okay.

A. Right. So in Paragraph 118, he says -- one of the problems that he's talking about is that digital -- he says, "A digital credential can easily be copied, forged or altered, and then he says, and it's difficult to issue a challenge to remote network user to prove that they are the person named in the credential."

And then in Paragraph 120, he says, "A solution to No. 2" -- which is what we just discussed. "A solution to 2 is to require the presenter of the credential to furnish additional information to prove that they are the person named in the credential. This protects against credentials being copied or stolen. And then he says, In the banking industry, this was done starting in 1967 by requiring the

user to enter a PIN at an ATM machine."
Q. So specific problem you were just referring to there is the problem of ensuring that the correct user is using the credential, right?
A. Well, the problem is what he already said in Paragraph 118, which is that a digital credential can be easily copied, forged or altered, and then he's presenting a solution to that, to verify the identity of -- of the user to supposedly solve that problem.
Q. And again, if we look back at Paragraph 86 of your declaration, that's what you're quoting from Dr. Shamos is the portion of his declaration where he's talking about requiring "the presenter of the credential to furnish additional information to prove they are the person named in the credential," right?
MR. WILSON: Objection. Form.
THE WITNESS: I don't -- I don't see. Can you point me to it again?
BY MR. ARGENTI:
Q. In Paragraph 86 of your declaration starting in the third line --
A. Uh-huh.
Q. -- where -- and I believe -- when I say "quote," I believe you're quoting from Dr. Shamos's declaration, but you are referring to Dr. Shamos's declaration, discussion of

"requiring the presenter of the credential to furnish additional information to prove that they are the person named in the credential"?

A. Yes.

Q. Okay. So that's the problem that you are referring to there and that is a problem of ensuring that the correct user is using the credential, right?

MR. WILSON: Objection. Mischaracterizes testimony.

THE WITNESS: No. So I'm basically pointing out what Dr. Shamos has testified. So in Paragraph 118 of his declaration, he says, "A challenge or problem was that additional credential can easily be copied, forged or altered." And then in Paragraph 124 -- sorry, 120 of his report, he's presenting a solution to that problem, and his solution, as he understands it, "was available" from 19- -- "since 1967 was for the presenter of the credential to furnish additional information, such as like a PIN, PIN card or PIN, or an ATM card at an ATM machine to prove that they are the person named in the credential."

BY MR. ARGENTI:

Q. But he's more specific about the problem in Paragraph 118 than you're giving him credit for by selectively reading, right?

A. No, I'm just simply reading to help the court reporter.

Q. Right. He actually says, "A digital credential can be easily copied, forged or altered and it is difficult to issue a challenge to a remote network user to prove that they are the person named in the credential."

That's what he says, right?

A. Yeah. I mean, that's one problem that he's describing there, right?

Q. Right. And elsewhere we saw that he says there are multiple problems that could arise and that's one specific problem that he's addressing right there, right?

MR. WILSON: Objection. Form.

THE WITNESS: That's not what he says. I mean, literally he says a solution to two and two is what we just read. I think his declaration's pretty clear as to what he's talking about.

BY MR. ARGENTI:

Q. Right, and in Paragraph 241 that you already referred me to, he says, "The existence of unofficial, forged or altered tokens in the marketplace would create problems for both issuers and users," correct?

A. Right. And in Paragraph 118, he's talking about multiple problems. He's saying a digital credential can easily be copied, one problem; forged, second problem, or altered, third problem. And then he says it's difficult to issue a challenge to a remote network user to prove that they are the

1 person named in the credential. And then in Paragraph 120,
2 he presents his understanding of the solution since 1967.
3 Q. Right. And in Paragraph 241, he likewise identifies multiple
4 problems when he says the existence of unofficial -- that's
5 one problem; forged -- that's another problem; or altered
6 tokens.
7 That's a third problem that he talks about there,
8 right?
9 A. Yes. So in Paragraph 241, it says, "The existence of
10 unofficial, forged or altered tokens in the marketplace would
11 create problems for both issuers and users."
12 Q. The problem of ensuring that the right user is using a
13 credential is a different problem than ensuring that a token
14 legitimately represents a particular credential, correct?
15 A. So are you disagreeing with what Dr. Shamos has testified
16 because he has said that that is a solution to that problem.
17 Q. Can you answer my question, please?
18 A. So that's not an opinion that I've provided. I've just
19 stated the opinions that Dr. Shamos has provided. According
20 to Dr. Shamos, the problem of unofficial, forged or altered
21 tokens in the marketplace is solved since 1967 by requiring
22 the presenter of the credential to furnish additional
23 information to prove that they are the person named in the
24 credential.
25 MR. ARGENTI: Why don't we take another

break. Should we do five minutes, ten minutes, Dr. Malek?

THE WITNESS: That's good. Thank you.

(Recess 10:09-10:21.)

EXAMINATION (Continuing)

BY MR. ARGENTI:

Q. Let's turn to Paragraph 101 of your 531 declaration, please. This is where you discuss Claim 2.

A. Yes.

Q. As you say in Paragraph 100, "Claim 2 involves generating a second over file comprising a second virtual representation of the credential, but is invalid for use in the first over file storage client device for authenticating the user," correct?

A. Yes.

Q. At the end of Paragraph 101, you say, "In this context of Claim 2, the two over files are different from each other, each containing a virtual representation of the credential that is different from the virtual representation in the other over file."

Do you see that?

A. Yes.

Q. Where does Claim 2 say that the two virtual representations are different?

A. So I think that's implied by the claim language. So Claim 1

1 talks about an over file with a virtual representation, so
2 that's the first virtual representation, and Claim 2 talks
3 about a second over file and a second virtual representation
4 and it says that the second virtual representation or the
5 second over file -- sorry.
6 It says -- it says that the second official
7 representation of the credential that is invalid for use in
8 the first over file, so I think when you put all that
9 together to a POSA, it would tell that the two over files are
10 different from each other and each contain a virtual
11 representation of the credential that is different from the
12 virtual representation in the other over file.
13 Q. But that Claim 2 requirement is that the second over file is
14 invalid for use in the first over file storage client device
15 for authenticating the user, correct?
16 A. Yes, it requires that.
17 Q. So why can't the second over file be a copy of the first over
18 file and it's just in a second over file that's invalid for
19 use in the first device?
20 MR. WILSON: Objection. Form.
21 BY MR. ARGENTI:
22 Q. Sorry. Yeah. I garbled that one. My apologies.
23 Why can't the second virtual representation be a copy
24 of the first virtual representation and it's the second over
25 file that's invalid for use in the first client device?

A. I mean, the language says -- the language of the claim is that -- I mean, the language of the claim is it says, "A second virtual representation of the credential that has been verified by the issuing agency to be a second official representation of the credential that is invalid for use in the first over file storage client device for authenticating the user."

So I think from that claim language, I think it's clear that the two over files are different from each other.

Q. Right. And I'm asking about the virtual representation specifically. Is it your understanding that the virtual representation in Claim 2 is what needs to be invalid for use on the first device?

A. I think the two over files are different and the two virtual representations are different.

Q. So it's your understanding that a copy of the first virtual representation in Claim 1 could not be the second virtual representation in Claim 2; is that right?

A. I think they're the same. Yeah, I mean, if they're the same, then I don't see how one would be invalid on one device and the other one wouldn't.

Q. Does Claim 2 require that the virtual representation be invalid for use on the second device or simply that the second over file be invalid for use? Sorry. I garbled that one again. I'll give you a second to think about it and let

me rephrase that question.

Does Claim 2 require that the second virtual representation be invalid for use on the first client device or simply that the second over file be invalid for use on the first client device?

A. I think the over files are different because you have the first over file and you have the second over file, and also the require virtual representations are different because the claim language says, "A second virtual representation of the credential that has been verified by the issuing agency to be a second official representation of the credential that is invalid for use in the first over file."

Q. And the two virtual representations recited in Claims 1 and 2 in your view can't be copies of each other. Do I understand that correctly?

A. I don't think they're identical, if that's what you're asking me. They can't be identical.

Q. And that's because in your view, it's the virtual representation that needs to be invalid for use on the client device for user authentication; is that right?

A. Well, because the claim language says, again, "A second over file comprising a second virtual representation of the credential that has been verified by the issuing agency to be a second official representation of the credential that is invalid for use in the first over file storage client device

for authenticating the user."

So the words "second" and, you know, the "second over file," "second virtual representation," the "second official representation," and then the fact that it's invalid for use in the first over file storage client device, I think that indicates to me that the over file and the virtual representations are different.

Q. In your understanding, both the second over file and the second virtual representation have to be invalid for use on the first client device?

A. I think the claim says that they're different. There's a first over file. There's a second over file. There's a first virtual representation. There's a second virtual representation, and the virtual representations represent -- so the second virtual representation is a representation that has been verified by the issuing agency to be a second official representation of the credential and that is invalid for use in the first over file storage client device.

Q. What needs to be invalid for use in the first over file client storage device for authenticating the user? Is it the over file or the virtual representation or both?

A. Well, I mean, over file is defined in terms of virtual representation, right, and that's the claim construction that we have. So the construction that we have is an over file encompasses the virtual representation of one or more

1 credentials to be used for verification of those credentials.
2 So by the virtual over file encompassing the virtual
3 representation, you know, both over file and the virtual
4 representation are going to be different.
5 Q. If you look at your declaration for the '854 patent, if you
6 can pull that out?
7 A. '854 patent?
8 Q. Right. We talked earlier about how you have, for the most
9 part, the same material in the equivalent numbered paragraphs
10 across your declarations. Here's one instance where I do
11 want to clarify.
12 A. So what IPR is it?
13 Q. The '854 is, I believe, the '488 IPR.
14 A. Yes, I have that.
15 Q. Right. And so if we look at Paragraph 101 of that
16 declaration, you see that that paragraph is discussing the
17 independent claims, but has the same analysis that you have
18 for Claim 2 in the '531 patent, right?
19 A. Paragraph 101?
20 Q. Right.
21 A. Okay.
22 Q. So unlike the '531 patent where the second over file appears
23 in Claim 2, in the '854 patent the second over file is part
24 of the independent claims, Claim 1, right?
25 A. Yes.

Q. But your analysis in Paragraph 101 of the '854 declaration is substantively the same as your analysis in Paragraph 101 of the '531 declaration that we just discussed, correct?
A. I believe -- I believe that's true. Yeah, I think the language is a little bit different, but I think the analysis is more or less the same.
Q. So do I understand correctly then that the testimony you just gave regarding the '531 patent and why you believe that the second virtual representation must be different than the first virtual representation, that also applies to the discussion in Paragraph 101 of your '854 declaration?
A. Yes, I think it would be the same testimony.
Q. Let's turn back to your '531 declaration now and look at Paragraph 162.
A. 162?
Q. Paragraph 162, and in particular on Page 73. Do you see the last line on that page that says, "Nothing in Purves indicates that any portion of the virtual wallet card images or card account information is stored beyond transient storage on a client or user device"?
Did I read that right?
A. Yes.
Q. What do you mean by "transient storage" in that sentence?
A. So basically, Purves discusses how the card images are stored on the server, and if you're looking at those card images on

the web browser, the browser may be temporarily loading that data, load that image to display it to the user, and then that image is typically deleted after the browser is closed or when you move to a different page. So that's what I'm referring to there.

Q. And when you say you're looking at or if you're looking at that image or card images on the web browser, where is that web browser located?

A. Well, I mean, the browser could be anywhere. It could be on a device.

Q. On a user device?

A. It could be on a user device, yes.

Q. So when you say the browser may be temporarily loading that data, the image data to display to the user, what's it loading it from?

A. So the browser typically would indicate -- so like something like Purves, because the images are stored on the server so it would load it from the server. It would get it to display it.

Q. And what would happen when it loads it?

A. It's displayed by the browser.

Q. And that's where the transient storage takes place; is that what you're referring to?

A. Yes.

Q. What type of storage would that be?

A. It would be storage in -- in RAM, in memory.
Q. And so what you're referring to there is storage in RAM on a user's device for the purpose of displaying the web browser screen to the user?
A. So that would be -- yes. So that, you know, whatever data is retrieved from the server would be loaded in the RAM parsed by HTML parse server on the browser and then it would be displayed.
Q. So then I want to make sure I have it right. The card information, such as the card image, are transmitted from the Purves server to the user's mobile device where they're stored in RAM in order to display the wallet information on the user's device screen; is that right?
A. Yeah, so a user's -- so in a web-based application, the web browser would request data from the server, would receive that data. If that data involves images, those would be also loaded up in the memory parse, you know, processed by the web browser and then displayed on the screen to the user.
Q. Purves calls its system a wallet service enrollment platform, or WSEP for short, right?
A. Yes.
Q. Purves describes encrypting incoming and outgoing WSEP communications, correct?
A. I have to review it. I don't recall the details of that.
Q. Purves is Exhibit 1013. Do you have a copy of that available

to you there?
A. Yes. Is there a specific portion you want me to look at?
Q. Before we go into specifics, I was just asking if you have an understanding of whether Purves describes encrypting incoming and outgoing WSEP communications?
A. I don't remember off the top of my head. It's 86 pages, but I can look for encryption if you want.
Q. At the time that you prepared your opinions in your declaration, did you have an understanding whether Purves describes encrypting incoming and outgoing WSEP communications?
A. I may have had when I was preparing the report. I don't know if I've said that in the report, but even if I didn't say it, I may have had --
Q. But you don't remember now?
A. I don't remember right now, no. I haven't memorized all the references.
Q. Okay. Why don't we take a look at Paragraph 33 of Purves.
A. Paragraph 33?
Q. Right. Paragraph 33 says, "Figure 25 shows a block diagram illustrating embodiments of a WSEP controller," right?
A. Yes.
Q. If you turn to the previous page, do you see Figure 25?
A. Yes.
Q. In the top left portion of Figure 25, do you see the elements

under the label "Computer Systemization 2502"?
A. Yes.
Q. Do you see the component "crypto 2526"?
A. Yes, I see that.
Q. Do you have an understanding of what that is?
A. It sounds like it's a component dealing with cryptography.
Q. Did you review what that component does when you prepared your declaration?
A. I did review the entirety of Purves, yeah, when I prepared my declaration.
Q. Let's turn to Paragraph 130 of Purves.
Paragraph 130 says, "The WSEP controller 2501 may be based on computer systems that comprise, but are not limited to components such as a computer systemization 2502 connected to memory 2529."
Did I read that right?
A. Yes.
Q. And the next paragraph, 131, Purves says that, "Computer systemization 2502 may include a number of different components." And if we look seven lines down from the top of the column on the right, one of those components is a cryptographic processor, 2526, right?
A. Yes.
Q. Do you have an understanding, again, of what the purpose of the cryptographic processor is in Purves?

A. I mean, yeah. Typically a cryptographic processor encrypts and decrypts data.
Q. Let's turn to Paragraph 143 now, please. This paragraph provides some more description of the cryptographic processor, correct?
A. It has more details about the cryptographic units, yes.
Q. And the middle of Paragraph 143, Purves says that, "Cryptographic units support the authentication of communications from interacting agents as well as allowing for anonymous transactions."
Do you see that?
A. Yes.
Q. What is Purves referring to when he talks about using a cryptographic unit to allow for authentication of communications and anonymous transactions?
MR. WILSON: Objection. Form.
THE WITNESS: I don't understand what you're asking me there.
BY MR. ARGENTI:
Q. Do you have an understanding of what Purves is referring to in that sentence?
MR. WILSON: Objection. Form.
THE WITNESS: That sentence says, "Cryptographic units support the authentication of communications from interacting agents as well as allowing

for anonymous transactions."

BY MR. ARGENTI:

Q. Let's turn to Paragraph 157, please.

What's the heading above this paragraph?

A. "Cryptographic Server."

Q. And in Paragraph 157, Purves provides detail regarding a cryptographic server, correct?

A. It has some discussions, yes, some details about it.

Q. And looking down at the last couple of lines on this page, Purves says that its wallet system can use both symmetric and asymmetric encryption and/or decryption, correct?

A. Where are you? What paragraph?

Q. This is in Paragraph 157, the sentence that carries over from Page 26 to 27.

A. Yes, it says, "The cryptographic component allows for both symmetric and asymmetric," yeah. In parentheses, "Pretty good protection, PGP encryption and/or decryption."

Q. And after that, it goes on to provide some examples of cryptographic techniques, correct?

A. Yes.

Q. And about halfway down in that paragraph, the same paragraph, but on Page 27, Purves says, "Employing such encryption security protocols, the WSEP may encrypt all incoming and/or outgoing communications."

Do you see that?

A. Sorry. Are you in Paragraph 159?
Q. Paragraph 157, halfway down in the paragraph that's on Page 27.
A. All right.
Q. Right after the reference to HTTPS and the like?
A. Yes, I see that.
Q. So again, that sentence reads, "Employing such encryption security protocols, the WSEP may encrypt all incoming and/or outgoing communications."
Do you see that?
A. Yes.
Q. Do you have any reason to disagree with that statement in Purves?
A. I don't have an opinion about it, no.
Q. Let's turn now to Paragraph 122 of Purves, please.
A. Paragraph 122?
Q. Right. Let me know when you're there.
A. I'm there.
Q. Okay. About two thirds of the way down in Paragraph 132, right across from where Paragraph 126 starts in the next column, do you see where Paragraph 122 says, "In some embodiments, confidential data, such as PAN number, account number and/or the like may be obscured from the overlaid data using a tool such as ImageMagick"?
A. Yes.

Q. What is ImageMagick?
A. It's an image manipulation tool, I believe. I think I've used it many years ago.
Q. So that was my next question: Were you familiar with ImageMagick before your work in this case? It sounds like you were.
A. I vaguely recall using it many years ago, yes.
Q. Do you remember what year that would have been?
A. No. It would have been many years ago.
Q. What are the tools that ImageMagick provides a user to obscure data in an image?
A. I don't recall the details of that.
Q. Do you recall whether ImageMagick allows for redaction of text?
A. I -- I would have to speculate. I don't recall the details of it.
Q. Do you recall whether ImageMagick allows for deletion of a portion of an image?
A. Possibly, but I can't testify to that. I don't recall the details of it.
Q. Do you recall whether, once a portion of an image has been obscured using ImageMagick, can the original image be recovered?
A. So again, I don't recall details of ImageMagick, but what I do know is that there is well-established research and

1 principles in computer security that security through
2 obscurity is futile, meaning that through -- through
3 obfuscation techniques, you can't achieve good security
4 generally speaking.
5 Q. When you refer to "obfuscation techniques," does that
6 encompass redaction?
7 A. So -- so obfuscation would be, for example, like blurring an
8 image, or in software programming, sometimes people obfuscate
9 their code before they release it so it cannot be easily
10 reverse engineered, and that -- that has a lot of -- I mean,
11 we're talking about in general, but in general, obfuscation
12 and that kind of methods such as blurring an image, they're
13 not considered the best form of security because they can
14 be -- you know, because they can be reverse engineered and
15 the images can be recovered in those kinds of situations.
16 Q. So aside from blurring, are there other types of obfuscation?
17 A. Sorry. What is that?
18 Q. Aside from blurring, are there other types of obfuscation?
19 A. Yeah, I mean, it depends on what kind of data you're talking
20 about. So if it's an image, blurring would be one example.
21 If you're talking about source code, like JavaScript code
22 that might be loaded into your web browser, you can obfuscate
23 that JavaScript code so then people can't reverse engineer
24 your code and figure out what the code is doing.
25 Q. So focusing just on images, are there other examples of

obfuscation beyond blurring?

A. Like I said, it depends on the data. There are different techniques, but generally speaking, as I said, obfuscation is not a good form of securing something because -- because there are techniques available to -- and I think I even talk about that in my report.

There are techniques available to reverse that obfuscation or reverse that blurring of an image, for example, to try to recover the data that is there.

Q. Is redaction of a portion of an image an example of obfuscation?

A. It depends. I would have to look to see how it's redacted and some forms of redacting data can still be -- yeah, there's, for example, metadata and things like that that are associated with data that could be used to recover the data.

Q. Is it possible to redact a portion of an image in a way that it can't be recovered?

A. Yeah, not sending the image or sending a different image, that would be -- that would make -- you know, would make it difficult to recover it. But I think in the context of the opinions that I've provided in this case and what's really at issue in this case, I understand Dr. Shamos is saying that a user would be provided with an image, for example, of a card that they can use to remember what types of payment systems they have so they can retrieve tokens and things like that.

And in that case, you are presenting an attacker with valuable information, such as the fact that it's even a credit card, such as the fact that this is a credit card by a certain bank. That information by itself is something that is very valuable to an attacker to try to be able to, through various methods, including brute force, try to determine what is the credit card number on that credit card.

Q. So you mentioned that a redacted image, the way to ensure that a redacted image can't be recovered is to not send the image in the first place. Is it your opinion that it is impossible to redact an image such that the redaction can't be undone?

A. You see that's not the opinion that I've offered in this case. The opinion that I've offered is in the context of what Dr. Shamos is saying. Dr. Shamos is not saying to send -- to send no image or to send an image that is completely redacted. He's saying you would send an image that would help the user to know, to remember what the card or what kind of a bank account we're dealing with.

So you would, for example, say this is Bank of America, this is Wells Fargo, this is Visa card and so on. So in that context where you're providing some information to the user to help them remember and organize what's going on with their payments, you're also providing an attacker with valuable information that could be used to -- to attack the system to

recover the credit card, recover the bank account and things like that.

Q. Look at Paragraph 167 of your declaration, please.

In this paragraph, you present a conceptualization of what a credit card with the confidential information obscured might look like, right?

A. Yes.

Q. Did you create that image?

A. I believe the counsel created this image.

Q. Are you aware of whether whoever created that image used ImageMagick?

A. I -- I don't know what tool they used, no.

Q. So then I gather you also were not aware of what mechanism they used to blur the text?

A. I don't, but I mean, there are many tools available for doing this. I could have done it myself. It's not -- you know, it's trivial to blur images.

Q. Do you know whether there was an option to select the level of blurring applied to the image?

A. Again, I don't know what tools they used, but I know the tools that I would use, they have -- they give you the option of selecting the level of blurring that you would like to achieve.

Q. Do you know what level of blurring was selected when creating this image?

A. No, I don't.

MR. ARGENTI: We can take another break, a short break. I think that might be all my questions. I just need to confirm.

MR. WILSON: Okay. Sounds good.

(Recess 11:01-11:08.)

EXAMINATION (Continuing)

BY MR. ARGENTI:

Q. Just a couple quick questions before I wrap it up.

Earlier today, Dr. Malek, when I was asking you about your billing in these matters, I think I asked how much have you been paid to date and you responded that you had billed on the order of 150 to 200 hours.

One follow-up question there: Is any of your compensation contingent on the outcome of these proceedings?

A. No, it isn't, no.

Q. So when you responded that you had billed 150 to 200 hours, have you been compensated for the majority of that work, actually paid?

A. Yeah. Just to clarify, I don't think I've billed that entirety -- that entire amount yet because I bill per month and there's been a lot of work that has happened this month obviously to prepare for the deposition. I haven't invoiced that, but -- but I believe I am -- I've been paid for the

work that I've done so far, yes.
Q. During any of our breaks today, have you discussed your testimony or my questions with counsel for Cortex?
A. No.
Q. Okay.
MR. ARGENTI: That's all my questions barring any follow-up after redirect.
MR. WILSON: We don't have any questions except that we will reserve the right to read and sign.
MR. ARGENTI: Okay.
THE COURT REPORTER: All right, Counsel. Do either of you need a rough draft?
MR. ARGENTI: Yes, please.
MR. WILSON: I don't -- do we want a rough draft? Yeah, yeah. Please send us a rough.
(Signature reserved.)
(Deposition concluded at 11:10 a.m.)

REPORTER'S CERTIFICATE

I, CONNIE A. RECOB, the undersigned Certified Court Reporter, authorized to administer oaths and affirmations in and for the States of Washington, Oregon, Utah and Idaho, do hereby certify that the sworn testimony and/or proceedings, a transcript of which is attached, was given before me at the time and place stated therein; that any and/or all witness(es) were duly sworn to testify to the truth; that the sworn testimony and/or proceedings were by me stenographically recorded and transcribed under my supervision, to the best of my ability; that the foregoing transcript contains a full, true, and accurate record of all the sworn testimony and/or proceedings given and occurring at the time and place stated in the transcript; that a review of which was requested; that I am in no way related to any party to the matter, nor to any counsel, nor do I have any financial interest in the event of the cause.

WITNESS MY HAND and SIGNATURE this 20th day of December, 2024.

/s/CONNIE A. RECOB, RMR, CRR
Washington CCR No. 2631
Oregon CCR No. 15-0436
Utah CCR No. 1133171-7801
Idaho CCR No. SRL-1220

DEPOSITION ERRATA SHEET

Our Assignment No. J12100626
Case Caption: VISA vs. CORTEX

DECLARATION UNDER PENALTY OF PERJURY

I declare under penalty of perjury that I have read the entire transcript of my Deposition taken in the captioned matter or the same has been read to me, and the same is true and accurate, save and except for changes and/or corrections, if any, as indicated by me on the DEPOSITION ERRATA SHEET hereof, with the understanding that I offer these changes as if still under oath.

Signed on the _____ day of _____, 20__.

_____

SAM MALEK, Ph.D.

DEPOSITION ERRATA SHEET

Page No._____Line No._____Change to:_____

_____

Reason for change:_____

Page No._____Line No._____Change to:_____

_____

Reason for change:_____

Page No._____Line No._____Change to:_____

_____

Reason for change:_____

Page No._____Line No._____Change to:_____

_____

Reason for change:_____

Page No._____Line No._____Change to:_____

_____

Reason for change:_____

Page No._____Line No._____Change to:_____

_____

Reason for change:_____

Page No._____Line No._____Change to:_____

_____

Reason for change:_____

SIGNATURE:_____DATE:_____

SAM MALEK, Ph.D.

**0**

**00490**
8:14

**1**

**1**
12:15,21
28:11
30:9,11
31:7
63:25
65:17
66:13
68:24

**10,749,859**
8:6

**100**
13:5
63:10

**1001**
30:7

**1005**
58:10

**101**
63:7,16
68:15,19
69:1,2,11

**1013**
71:25

**105**
9:17,20
10:16
11:22
12:4

**10:09-10:21**
63:3

**11,329,973**
8:11,17

**118**
58:13
59:5
60:12,22
61:21

**11:01-11:08**
82:6

**11:10**
83:17

**12**
4:2

**120**
58:19
60:14
62:1

**122**
76:15,16,
21

**124**
60:14

**126**
76:20

**130**
73:11,12

**131**
73:18

**132**
76:19

**14**
27:12

**143**
74:3,7

**144**
12:10,13

**148**
10:3

**15**
15:13,18
18:13

**150**
15:11
82:14,18

**1519A**
10:4

**157**
75:3,6,13
76:2

**159**
76:1

**16**
19:21
22:12

**162**
69:14,15,
16

**167**
81:3

**19-**
60:17

**1967**
57:8
58:25
60:17
62:2,21

**1990s**
19:22

**1999**
19:24

**2**

**2**
28:12
58:20
63:8,10,
17,23
64:2,13
65:12,18,
22 66:2,
13 68:18,
23

**20**
20:15

**200**
15:11
82:14,18

**2000**
19:25

**2007**
18:20

**2009**
8:24

**2012**
17:17,21
18:3
25:11

**2024**
4:2

**21**
14:12,18

**22**
14:18

**23**
14:13,18

**232**
12:14

**241**
56:22
57:13,16
61:17
62:3,9

**25**
21:22
72:20,23,
25

**2501**
73:12

**2502**
73:1,14,
19

**2526**
73:3,22

**2529**
73:15

**26**
52:2
54:15
75:14

**27**
75:14,22
76:3

**3**

**3**
12:14
14:20

**30**
55:1

**33**
72:18,19,
20

**4**

**4**
13:17

**42**
28:21

**46**
9:17

**486**
9:18

**488**
68:13

**5**

**5**
42:22

43:1,2
45:9 47:1

**50**
5:21

**531**
7:16,18
8:22
9:10,13
11:6,17
12:10,11
13:19,20
30:7
37:25
58:10
63:7
68:18,22
69:3,8,13

**54**
55:18

**6**

**60**
5:22 42:2
43:17

**61**
42:2
43:17

**62**
37:24
38:1,3
42:2
43:17

**7**

**7**
14:12

**70**
5:22

**711**
53:12
54:2

**73**
69:16

**750**
13:11

**7:57**
4:2

**7A**
53:6

**8**

**83**
51:22
53:23
56:4

**85**
8:25

**854**
7:25
68:5,7,
13,23
69:1,11

**859**
8:8

**86**
56:10
57:23
59:10,20
72:6

**9**

**9,251,531**
7:13

**9,954,854**
7:23

**973**
8:19

**9:03-9:10**
37:20

**9:10**
37:17

**A**

**a.m.**
4:2 83:17

**access**
19:3

**account**
43:11,20
44:5,15,
16 45:14,
16 46:13,
22 47:12
48:12,22
49:4,18
50:1,15,
21 51:4,
9,15,17
69:19
76:22
80:19
81:1

**accounts**
50:19

**accuracy**
9:11

**accurate**
6:7

**achieve**
49:16
78:3
81:23

**act**
38:6

**activate**
52:15

**actual**
40:5 54:1

**added**
9:5

**addition**
10:22

**additional**
51:25
52:5
53:23
57:10
58:22
59:14
60:2,13,
18 62:22

**address**
11:3
41:23
42:4

**addressed**
17:2 30:3

**addressing**
10:25
13:1
61:10

**agency**
30:22
31:14
38:5,14,
21 39:4,6
40:3
41:3,8,25
42:5
44:22
45:24
65:4
66:10,23
67:16

**agent**
55:3,7,14

**agents**
74:9,25

**agree**
50:20

**ahead**
58:3

**allowing**
74:9,25

**altered**
56:25
57:17
58:15
59:7
60:14
61:2,18,
23 62:5,
10,20

**America**
80:20

**amount**
82:22

**analysis**
29:6 33:8
68:17
69:1,2,5

**analyzed**
24:15

**and/or**
75:11,17,
23 76:8,
23

**Android**
20:20

**anonymous**
74:10,15
75:1

**answers**
6:16

**anymore**
26:15

**API**
17:7
23:18

**APIS**
16:12,14,

21 23:9

**apologies**
64:22

**appeared**
4:3

**appears**
38:2
68:22

**application**
20:16,18
21:8
24:13
25:20,21
27:2
28:18
52:25
53:1
71:14

**applications**
15:15,22
16:9,11
17:4
20:11,13,
17 22:20,
21 23:1,
3,19
24:10
25:18

**applied**
29:13,18,
19,22
31:19
32:2,4,
18,25
33:14,20,
22 81:19

**applies**
11:17,22
12:12
69:10

**apply**
29:5

**applying**
29:11,24
30:2,6

**approach**
24:6 43:9
44:3

**approval**
38:4,18,
24 39:12,
16,22
40:10,16,
21,25
41:2

**Approximately**
5:23
22:23

**apps**
24:15

**architecture**
18:15,19,
21

**ARGENTI**
4:15 8:15
18:1,12
24:5
25:10,15
33:17
34:14
36:18
37:13,16,
23 43:16
44:13,25
46:1,10,
19 47:8,
20 48:19
49:8,22
50:7 51:8
52:12
53:5 56:1
59:19
60:21
61:16
62:25
63:6
64:21
74:19
75:2
82:2,9
83:6,10,
13

**arise**
61:9

**art**
47:17

**arts**
14:6,19

**aspect**
32:13

**asserted**
14:6
18:11

**assignment**
27:21

**assume**
6:14 7:18

**assuming**
15:10

**assurances**
49:3

**asymmetric**
75:11,16

**ATM**
59:1
60:19

**attack**
80:25

**attacker**
80:1,5,24

**attorney**
31:2

**August**
19:24

**authenticated**
53:12,20
55:9,16,
20

**authenticating**
56:9
63:13
64:15
65:6
67:1,20

**authentication**
19:2,9
53:18,24,
25 54:1,
5,16,17,
20 55:25
56:2
66:20
74:8,14,
24

**authenticity**
55:4

**authorization**
19:2,9
55:13

**automatically**
27:14

**aware**
11:25
50:11
81:10,13

**B**

**bachelor's**
22:25

**back**
23:12
37:17
45:15
48:5
50:25
53:22
56:4
59:10
69:13

**background**
15:12

**bank**
41:25
42:6,9,
13,14
43:4,21,
25 44:14,
15,16
45:7,13,
15 46:12,
21 47:10,
15,16,22,
24,25
48:3,4,
10,11,21
49:2,3
80:4,19,
20 81:1

**bank's**
43:9 44:4

**banking**
58:24

**barring**
83:7

**based**
30:23
34:11,16,
18,21,24
35:8,14,
22,23,24
36:5,16,
22 37:1,
3,11

39:21
73:13

**basically**
14:7
16:12
19:2 21:8
39:2,17
44:9
55:22
57:2
60:10
69:24

**basis**
26:21
45:22

**batch**
23:17

**benefit**
6:17

**bill**
82:22

**billed**
15:9
82:13,18,
21

**billing**
82:12

**bit**
69:5

**block**
72:20

**blur**
81:14,17

**blurring**
78:7,12,
16,18,20
79:1,8
81:19,22,
24

**Board**
29:23
30:3
35:17
36:10

**Board's**
29:5,12,
14,18,20
30:6
35:17

**bottom**
9:20
53:10

**bought**
27:2

**break**
6:17,20
37:14
63:1
82:2,3

**breaks**
6:23 83:2

**briefly**
56:23

**bring**
12:1

**broad**
25:19
26:23
47:15

**browser**
23:11
70:1,3,7,
8,9,13,
16,21
71:3,7,
15,18
78:22

**brute**
80:6

**build**
17:4

**building**
16:9

**business**
23:4

---

**C**

---

**California**
4:2,22

**called**
12:15
16:14

**calls**
51:25
71:19

**camera**
26:2,5,9,
10

**capability**
22:22
28:8

**card**
19:18
21:3,14,
18 22:5,8
23:2,8,
10,14,24
24:2,4
44:1,5,
15,16
45:7,8
46:21,22
48:2
50:2,9,10
60:18,19
69:18,19,
24,25
70:7
71:9,10
79:23
80:3,7,
18,21
81:1,5

**cards**
16:15
23:16

**carefully**
9:10,24

**carries**
75:13

**cart**
54:20

**case**
5:4 11:13
14:8 28:3
42:13,16,
25 77:5
79:21,22
80:1,14

**cash**
21:18
22:2,4

**CC++**
20:22

**CCR**
4:3

**CE**
20:19

**challenge**
58:16
60:12
61:3,25

**challenged**
29:9

**chat**
5:7 55:2

**check**
21:18
22:5
25:13
39:15,22
40:14,25
41:3
50:16
53:20
54:2

**checking**
40:1

**chip**
54:20

**chips**
54:17

**citation**
43:18

**cite**
51:24

**cited**
5:1 14:10
50:11

**claim**
11:9
28:23
29:1,15
30:9,11
31:1,7,12
33:7,21
34:13,23
35:5,12
36:20
37:2,5
38:16,18
39:2,5
40:16,17,
20,22
41:4,5,
13,15,19
42:16
44:20,21
63:8,10,
17,23,25
64:2,13
65:1,2,8,
12,17,18,
22 66:2,
9,21
67:11,23
68:18,23,
24

**claimed**
42:10

**claims**
11:19,20, 24 32:1, 6,19
34:10
35:4
39:11
66:13
68:17,24

**clarification**
6:13
12:7,17, 21

**clarify**
47:22
68:11
82:21

**class**
15:20,24
16:5,20
17:2,6,9
18:17,18, 21,23
19:6,7

**classes**
15:14
24:18

**clean**
5:14

**clear**
6:10 46:2
61:14
65:8

**client**
47:3
52:25
54:21
63:13
64:14,25
65:6
66:3,5, 19,25
67:5,10, 18,20
69:20

**clients**
22:18

**closed**
70:3

**code**
24:22,24
25:3,17
26:1,11, 13,14
27:3,5,7, 13,16,24
28:2,16, 19 78:9, 21,23,24

**codes**
24:11
25:17,23
26:18,22, 24 28:6, 7,12,14, 20

**coding**
20:22

**collect**
20:25
21:12

**collected**
21:13,15
23:5,16

**collecting**
21:6 23:2

**collection**
22:3

**college**
20:2

**column**
73:21
76:21

**communicate**
25:25
26:20
55:7

**communication**
26:7,19, 25 54:21

**communications**
71:23
72:5,11
74:9,15, 25 75:24
76:9

**companies**
16:19

**company**
20:12,14, 15 21:5
27:19

**compensated**
13:7
82:19

**compensation**
13:15
82:16

**complete**
6:7 25:22
55:23

**completely**
80:17

**component**
73:3,6,7
75:15

**components**
52:22
53:3
73:14,20, 21

**comprise**
73:13

**comprising**
30:11,21, 25 31:8, 12 41:7
63:11
66:22

**computed**
12:23

**computer**
19:4
23:11
58:5
73:1,13, 14,18
78:1

**computer-implemented**
30:11

**conceptualization**
81:4

**concerned**
56:7

**concluded**
83:17

**confidential**
19:17
76:22
81:5

**confirm**
82:4

**confirmation**
38:5,19, 24 39:12, 16,22
40:11,16, 21 41:2
55:14

**connected**
46:21
48:22
73:14

**Connie**
4:3

**considered**
32:23
78:13

**construction**
28:23
29:1,9, 12,15,18, 22 30:6
31:19
33:4,6,20
35:17
36:14
37:2,8
67:23,24

**constructions**
29:5,13, 14,17,19, 20,24
30:2

**construe**
33:2,14, 23 34:3

**construed**
29:23
32:3
33:2,21
35:1,2,17
36:10,25
37:6

**consulting**
22:16,17

**context**
28:2
32:1,6
63:16

79:20
80:14,22

**contingent**
82:16

**Continuing**
37:22
63:5 82:8

**controller**
72:21
73:12

**convenient**
58:8

**convert**
27:23

**copied**
9:6
58:15,24
59:6
60:13
61:2,23

**copies**
4:25 5:5,
8,11,13,
14 7:7
66:14

**copy**
5:9 54:12
58:3
64:17,23
65:16
71:25

**corner**
42:13,15,
25

**correct**
5:2,18
7:2,21,23
8:4,6
9:14
14:14
29:2,25
30:14
33:19
40:21
41:18,25
49:18
50:2,21
51:4,25
53:19,24
55:16
56:8 59:3
60:6
61:20
62:14
63:14
64:15
69:3
71:23
74:5
75:7,11,
19

**correcting**
10:20

**correction**
10:15
11:21

**corrections**
12:5

**correctly**
20:14,19
21:2 22:5
36:19
66:15
69:7

**corresponds**
43:23

**Cortex**
13:16,19,
22 29:25
83:3

**counsel**
14:24
81:9
83:3,11

**count**
30:14

**counted**
5:21 13:4

**couple**
75:9
82:10

**courses**
24:20
25:1

**court**
35:1,2
36:25
60:25
83:11

**cover**
16:12,20
19:6
24:18

**covered**
16:5,9
18:23

**covers**
19:7

**create**
11:14
28:12,14,
15,16,19
57:18,21
61:19
62:11
81:8

**created**
12:15,18
81:9,10

**creates**
56:24

**creating**
12:24
28:2,7,20
81:24

**creation**
12:21

**credential**
18:24
19:15
30:22,23,
24 31:14,
15,22
32:20
33:10,19
34:7,12,
17,19,22,
25 35:8,
15,25
36:6,17,
23 37:4,
12 38:6,
7,15,22,
23 39:7,8
40:3,4,
18,19
41:7,9
44:22,23
45:25
57:10,11
58:15,18,
21,23
59:4,6,
13,15
60:1,3,7,
13,17,20
61:1,4,22
62:1,13,
14,22,24
63:12,18
64:7,11
65:3,5
66:10,11,
23,24
67:17

**credentials**
19:5,6,8,
12 35:3,
4,7,18,
19,21,22
36:11,12,
15,16,21,
22 37:7,
10 40:7
43:24
57:9
58:23
68:1

**credit**
16:15
19:18
21:3,14,
18 22:5,
7,8 23:2,
8,10,14,
16,24
24:2,4
43:25
44:5,15,
16 45:7,8
46:21,22
48:2
50:1,9,10
60:23
80:3,7
81:1,5

**CRR**
4:3

**crypto**
73:3

**cryptographic**
73:22,25
74:1,4,6,
8,14,24
75:5,7,
15,19

**cryptography**
73:6

**customer**
15:21
16:10
22:9 23:6
51:10
55:3

**customer's**
23:23

**customers**
21:6

**customers'**
23:20

**CV**
19:24
22:24

**D**

**data**
19:4,5
23:22
27:20
47:2,5
50:12,14,
18 70:2,
14 71:5,
15,16
74:2
76:22,23
77:11
78:19
79:2,9,
13,15

**database**
49:23
50:1,3

**date**
15:9
27:21
82:13

**day**
15:2

**dealing**
73:6
80:19

**dealt**
21:1

**December**
4:2

**decision**
30:4 37:2

**decisions**
29:5

**declaration**
7:19 8:3,
10,22,25
9:4,10,
13,17
11:2,6,17
13:17
14:12,14,
20 15:13
16:8
18:13
19:20
28:21
29:15
32:24
37:24,25
40:11
41:23
42:2
51:22
56:5
57:16,22
59:11,12,
20,24,25
60:12
63:7
68:5,16
69:1,3,
11,13
72:9
73:8,10
81:3

**declaration's**
61:14

**declarations**
5:1 7:4,
8,12 9:8
10:16
11:1,5,8,
18 12:6
13:1
14:5,10
17:22
18:4 38:2
57:7
68:10

**decryption**
75:11,17

**decrypts**
74:2

**deem**
23:23

**defined**
67:22

**definition**
39:20

**degree**
22:25

**degrees**
19:10

**deleted**
70:3

**deletion**
77:17

**dependent**
11:9

**depends**
16:25
17:7
25:19,20
78:19
79:2,12

**depict**
32:19

**depiction**
33:10,19

**deposed**
4:11 5:20

**deposition**
5:5,18
9:23 13:4
14:2,7,9,
21 82:24
83:17

**derived**
34:7

**describe**
22:11
46:20

**describes**
42:23
48:11
49:24
71:22
72:4,10

**describing**
53:18
61:6

**description**
74:4

**desirable**
49:17
51:2

**detail**
9:25
10:21
52:11
53:2
55:10
75:6

**details**
17:10
20:9
21:15,21,
22,24
22:10
71:24
74:6 75:8
77:12,15,
20,24

**determine**
55:4,15,
19,22
80:6

**develop**
20:13

**developed**
22:19,20
23:19

**developing**
20:11,24
22:12
24:10

**development**
24:13

**device**
20:18,21
63:13
64:14,19,
25 65:6,
13,20,23
66:3,5,
20,25
67:5,10,
18,20
69:20
70:10,11,
12 71:3,
11,13

**devices**
9:22
10:1,9,
11,12,20,
22,24

**devices_list**
10:9,13

**diagram**
47:2
72:20

**differences**

21:19

**difficult**
58:16
61:2,24
79:20

**digital**
32:9
58:14,15
59:6
61:1,22

**directed**
49:23

**directly**
52:24

**disagree**
26:17
76:12

**disagreeing**
62:15

**disclose**
10:22
39:10
46:6 54:5

**discloses**
10:23
43:22

**disclosure**
9:21,25
10:19
42:24
46:16
48:25

**disclosures**
34:5
41:10

**discuss**
63:8

**discussed**
58:20
69:3 83:2

**discusses**
52:11
69:24

**discussing**
68:16

**discussion**
59:25
69:11

**discussions**
75:8

**dispatch**
21:9

**display**
70:2,14,
18 71:12

**displayed**
70:21
71:8,18

**displaying**
71:3

**disposing**
54:21

**distinct**
39:23

**distinction**
27:9
39:10

**distributed**
18:14

**division**
17:9
22:17

**DOB**
10:6

**document**
35:16

**documents**
5:11,13
14:7

**download**
5:8 28:17

**draft**
83:12,15

**drawing**
27:16

**driver's**
19:16

**duly**
4:10

---

**E**

---

**E-COMMERCE**
15:22
16:9,11
22:19,20,
21 23:1,
3,4

**earlier**
49:23
50:25
57:7,15
68:8
82:11

**easily**
58:15
59:6
60:13
61:1,22
78:9

**electronic**
5:8,11
9:6 18:24
19:6
22:13
32:11,12
54:12

**electronically**
5:10

**element**
43:18
53:12

**elements**
30:15
31:6,23
72:25

**embodiment**
41:24
42:5,7,19
48:8
53:17,19
54:4

**embodiments**
72:21
76:22

**employed**
20:6

**Employing**
75:22
76:7

**employment**
22:23

**encode**
27:7,12

**encompass**
35:2 78:6

**encompasses**
35:6
67:25

**encompassing**
68:2

**encrypt**
23:22
75:23
76:8

**encrypting**
71:22
72:4,10

**encryption**
72:7
75:11,17,
22 76:7

**encrypts**
74:1

**end**
8:25
24:22
34:15
56:15
63:16

**engine**
30:21
31:8
41:6,18

**engineer**
78:23

**engineered**
78:10,14

**engineering**
15:15

**enrollment**
71:19

**ensure**
9:11 80:8

**ensuring**
56:7 59:3
60:6
62:12,13

**enter**
23:8,10
59:1

**entered**
9:4,5

**entire**
82:22

**entirety**
73:9
82:22

**entities**
16:13

**equally**
11:17

**equivalent**
11:17
68:9

**essential**
20:16

**essentially**
28:10
39:18
42:16
56:22
57:9,12

**establish**
45:3

**estimate**
5:22,24

**estimating**
13:5
15:11,25

**evaluated**
40:15

**exact**
15:10

**EXAMINATION**
4:14
37:22
63:5 82:8

**examples**
16:16
25:22
26:24
51:24
52:2,5
53:22
54:16
56:4,7
75:18
78:25

**execution**
53:9

**Exhibit**
8:24 30:7
58:10
71:25

**exhibits**
5:1,5
9:24

**exist**
51:19

**existence**
57:17
61:18
62:4,9

**exists**
45:16
46:22

**expanded**
39:20

**expected**
6:5

**experience**
19:21
22:11,12,
15 24:10

**explain**
12:19,22
26:22
56:16

**explained**
12:8

**explaining**
39:17

**explains**
12:13,18

**extent**
18:11
53:3 56:9

**extracts**
47:4

**eyes**
38:6

**F**

**fact**
10:1 67:4
80:2,3

**failed**
56:16

**fair**
11:16,19,
24

**fairly**
12:8

**familiar**
6:1 26:12
77:4

**family**
20:16

**Fargo**
80:21

**fashion**
23:17

**feature**
24:22

**features**
24:3
31:5,23

**feel**
12:1

**field**
21:5
50:10

**Fieldcentrix**
19:21
20:4,24
22:11

**fields**
10:5,7,8

**figure**
28:16
42:22
43:1,2
45:9 47:1
53:6,10
54:4
72:20,23,
25 78:24

**file**
9:5 30:21
31:8,10,
12,16,17,
20,21
34:11,20
35:1,5,
10,12,17,
20 36:10,
25 37:5
41:6
45:20,24
63:11,13,
20 64:1,
3,5,8,12,
13,14,17,
18,25
65:6,24
66:4,7,
12,22,25
67:3,5,6,
8,12,18,
19,21,22,
24 68:2,
3,22,23

**files**
63:17
64:9
65:9,14
66:6

**financial**
13:19

**find**
10:2 12:9
28:18
46:3

**fine**
45:2,5

**first_name**
10:6

**flat**
13:14

**flow**
47:2

**fly**
33:15,23
48:24

**focusing**
78:25

**follow**
42:25

**follow-up**
82:15
83:7

**force**
80:6

**forged**
56:24
57:17
58:15
59:7
60:14
61:2,18,
23 62:5,
10,20

**forget**
57:14

**forgot**
21:15

**form**
8:12
17:23
18:5,19,
21 21:13
22:4,21
23:7,25
25:6,12

26:14,18 33:11 34:9 36:7 43:12 44:7,18 45:17 46:4,14, 24 47:13 48:14 49:5,19 50:4 51:5 52:7,20 53:24 55:17 59:16 61:11 64:20 74:16,22 78:13 79:4

**formal**
38:4,18, 24 39:12 40:10,13, 16,21 41:2

**format**
34:1

**forming**
18:3

**forms**
17:1,5 23:13 53:25 79:13

**found**
9:21 10:19

**foundational**
19:7

**fourth**
8:10 56:12

**frame**
18:17

**free**
12:1

**front**
48:5

**frustration**
51:10

**full**
4:18 20:5,6,7, 10

**full-time**
20:4

**function**
52:18

**functionality**
24:22

**funding**
43:25 47:21,24, 25 48:1, 3,9 50:14,21, 23 51:20

**funds**
43:23 51:18

**furnish**
58:21 59:13 60:1,18 62:22

**furnishing**
57:10

**futile**
78:2

**G**

**garbled**
64:22 65:24

**gather**
22:7 81:13

**gave**
26:12,23 27:1,3 69:8

**general**
78:11

**generally**
10:18 11:19 22:2 25:23 78:4 79:3

**generate**
36:14,20

**generated**
34:11 35:24 37:11 42:24 45:11 46:17 47:19 48:6 57:3

**generates**
41:25 42:6 47:5 48:16

**generating**
30:16,18, 19,20 31:7 34:15 35:5 37:9 41:6 44:11 47:7 63:10

**generation**
34:20 41:11

**give**
11:16 25:21,22 27:25 51:21 55:23 65:25 81:21

**giving**
60:23

**glossed**
39:18

**glosses**
39:2

**goal**
49:16 51:1

**good**
4:16,17 24:12 37:14 63:2 75:17 78:3 79:4 82:5

**granting**
19:3

**ground**
6:2

**guess**
51:18

**guidelines**
6:12

**H**

**half**
15:6

**halfway**
75:21 76:2

**Han**
14:24

**hand**
58:4

**happen**
70:20

**happened**
82:23

**happening**
43:3 54:23,24 55:6,25

**hash**
12:14,20, 22

**head**
6:16 17:15,19 21:4 24:17 25:8 51:14 54:8 72:6

**heading**
28:23 75:4

**held**
44:15

**helpful**
11:3

**helps**
47:21

**highlighted**
47:3

**holder**
45:14

**honest**
26:15

**hour**
6:23
15:5,6
37:14

**hourly**
13:10

**hours**
12:25
13:5
15:7,8,11
82:14,18

**house**
21:9

**HTML**
71:7

**HTTP**
24:2,6

**HTTPS**
23:21
24:6,9
76:5

**human**
55:4

**hundreds**
24:15

**hypothetical**
56:23

**I**

**ID**
10:12
12:14,15,
18,21,24
28:11,12

**identical**
66:16,17

**identified**
14:16
42:12

**identifies**
62:3

**identify**
14:13
29:14
39:3

**identifying**
45:14

**identity**
59:8

**illustrating**
72:21

**image**
70:2,3,7,
14 71:10
77:2,11,
18,21,22
78:8,12,
20 79:8,
10,16,18,
23 80:8,
9,10,11,
16,17
81:8,9,
10,19,25

**Imagemagick**
76:24
77:1,5,
10,13,17,
22,24
81:11

**images**
69:18,24,
25 70:7,
17 71:16
78:15,25
81:17

**implement**
24:3
56:17

**implementations**
54:19
55:2,19,
21

**implemented**
52:11

**implied**
63:25

**impossible**
80:11

**include**
10:4
14:19
73:19

**including**
16:10
55:13
80:6

**incoming**
71:22
72:4,10
75:23
76:8

**independent**
68:17,24

**industry**
58:25

**information**
19:17
22:8
23:5,8,
10,20,24
24:2,4
26:20
27:7,12
28:11
30:24
34:12,16,
19,21,24
35:8,14,
23,24
36:6,16,
23 37:4,
11 57:10
58:22
59:14
60:2,18
62:23
69:19
71:10,12
80:2,4,
22,25
81:5

**inputs**
47:4,5

**instance**
68:10

**instances**
17:10

**institution**
29:5 30:4
37:2

**intended**
26:8

**interacting**
74:9,25

**interest**
13:19

**internet**
15:14

**interpret**
45:4,7

**interpretation**
46:20
47:9
48:10,13

**introduced**
17:14,16,
21 18:3

**invalid**
63:12
64:7,14,
18,25
65:5,12,
20,23,24
66:3,4,
12,19,25
67:4,9,
17,19

**invented**
25:4

**invoiced**
82:24

**invoices**
13:16

**invoicing**
21:2,7,11

**involve**
23:2
42:10
52:5,9

**involved**
15:20
52:22
53:3

**involves**
8:11,16
63:10
71:16

**involving**
24:11

**iphone**
20:21

**IPR**
7:2,11,
21,23
8:3,14
9:18

12:10
58:9,10
68:12,13

**IPR2024-00486**
7:13 8:24

**IPR2024-00488**
7:21

**IPR2024-00489**
8:4,10

**IPR2024-00490**
8:16

**IPRS**
7:4 9:19
11:12,16,
23 12:12
15:9

**Irvine**
4:2,22

**issue**
10:25
11:14
12:4
43:17
51:19
58:16
61:2,24
79:22

**issued**
38:5
43:25

**issuer**
57:2

**issuer's**
38:6

**issuers**
57:18
61:20
62:11

**issues**
11:9,24
42:10
43:9 44:4
47:10
48:22

**issuing**
30:22
31:14
38:5,14,
21 39:4,6
40:3
41:3,8,24
42:5 43:5
44:15,22
45:7,24
46:12,21
48:11
65:4
66:10,23
67:16

**J**

**Javascript**
16:12
78:21,23

**job**
20:4,7
21:10

**K**

**key**
12:16,19,
20,23

**kind**
21:8,25
22:3
23:7,17,
18 28:18
38:4
39:4,15,
16,22
40:13,14,
24,25
44:11
52:25
54:3
55:23
56:23
57:14
78:12,19
80:19

**kinds**
19:12
78:15

**knowing**
43:10
44:5,16
45:8
48:11

**knowledge**
13:24
47:11
48:21

**L**

**label**
73:1

**laid**
47:1
48:16

**language**
16:8
40:22
44:21
63:25
65:1,2,8
66:9,21
69:5

**laptop**
5:12

**largely**
11:1

**late**
19:22

**layers**
52:10

**lead**
51:10

**left**
72:25

**legitimately**
62:14

**level**
17:9
81:18,22,
24

**levels**
19:10

**license**
19:16

**light**
34:4
35:16
36:13

**likewise**
62:3

**limitation**
30:18,19
31:4,23
34:13,15
35:20
36:13
37:8
38:13
39:2,18
40:2,5
41:12,21
42:16
44:24
45:23
46:3,9
48:18

**limitations**
11:21

**limited**
10:5
26:18
31:10,18
35:11
73:13

**lines**
56:15
73:20
75:9

**linked**
49:4,18,
21 50:2,
20

**list**
10:9

**lists**
30:14

**literally**
61:13

**live**
13:13

**load**
70:2,18

**loaded**
71:6,17
78:22

**loading**
5:7 70:1,
13,15

**loads**
70:20

**located**
4:21 70:8

**long**
6:18 15:4
25:3,5
27:7,18,
23

**lot**
78:10
82:23

**M**

**M-A-L-E-K**
4:20
**machine**
59:1
60:19
**made**
10:18
11:21
**magazine**
26:1
**maintained**
47:10
**majority**
82:19
**make**
10:15
12:1,5,8
25:18
50:22
54:18,22
58:8 71:9
79:19
**makes**
27:6
**making**
39:1,10
49:13,15
51:2
**Malek**
4:4,10,
16,19
33:6 36:1
37:14
63:1
82:11
**managed**
48:9
**management**
18:24
**manipulation**
77:2
**manually**
28:12,14
55:4
**mark**
53:13
54:3
**marketplace**
56:25
57:18
61:19
62:10,21
**match**
11:1
**material**
68:9
**materially**
11:20,25
**materials**
14:13
**matter**
11:3
12:12
42:17
**matters**
82:12
**meaning**
11:20
26:9
31:13
32:2,4,18
33:1,13,
22 38:10
47:24
78:2
**means**
23:17
24:24
31:1 32:1
38:13
39:25
**meant**
32:10
**mechanism**
81:13
**meet**
14:21,23,
25
**meeting**
15:1,5,6,
7
**meetings**
15:2,4
**meets**
45:23
**memorized**
72:16
**memory**
71:1,17
73:15
**mention**
9:21
10:25
15:13
19:21
20:11
48:6
**mentioned**
10:9
25:16
26:19
80:8
**mentions**
48:4
**menu**
26:5
**message**
41:15,16,
17,20,22
**met**
41:19
42:18,19
**metadata**
79:14
**method**
30:11
41:14
**methods**
78:12
80:6
**middle**
74:7
**mind**
39:23
**minutes**
36:1
37:17,18
63:1
**Mischaracterizes**
60:8
**misspoke**
8:14
**mobile**
15:21
16:11
20:11,16,
20 24:10,
13,15
52:25
71:11
**modify**
9:14
**month**
82:22,23
**morning**
4:16,17
**move**
11:15
45:3 70:4
**movie**
26:14,15,
25 27:1,
3,4,11,
19,21
**movies**
26:13
**multiple**
9:22
10:1,10,
20,22
50:19
61:8,21
62:3

**N**

**named**
57:11
58:17,23
59:14
60:3,20
61:4
62:1,23
**names**
24:17
**network**
58:17
61:3,25
**nodding**
6:16
**nonsensical**
28:13
**note**
12:2
**notes**
5:16,17
**notion**

18:8,9

**November**
19:25

**number**
7:11 8:14
10:6
15:10
19:18
23:14
27:22
30:12
50:15
73:19
76:22,23
80:7

**numbered**
68:9

**numbering**
11:2,8
58:9

**numbers**
9:18
11:11

**numerical**
7:10

**O**

**oath**
6:5

**obfuscate**
78:8,22

**obfuscation**
78:3,5,7,
11,16,18
79:1,3,8,
11

**Objection**
8:12
17:23
18:5
23:25
25:6,12
33:11
34:9 36:7
43:12
44:7,18
45:17
46:4,14,
24 47:13
48:14
49:5,19
51:5
52:7,20
55:17
59:16
60:8
61:11
64:20
74:16,22

**Oborne**
9:22,24,
25 10:3,
11,19,21,
22 18:9
39:3,10
41:10,12,
24 42:5,
7,13,20,
21,22,24
43:1,4,8,
18,22
44:3,9,14
45:5,7,9,
10,13,19,
23 46:3,
6,12,15,
16,20,23,
25 47:2,
6,16,17,
23,25
48:1,4,5,
7,11,15,
20,25
49:7,10,
12,14,16,
24 50:6
51:1,12,
17,24
52:2,6,
10,19
53:3,6,8,
18 54:5,8
55:23
56:3

**obscure**
77:11

**obscured**
76:23
77:22
81:5

**obscurity**
78:2

**obtaining**
49:12

**offer**
33:4

**offered**
29:17,19
32:17,22
33:16
51:6
80:13,14

**offering**
47:18
48:24

**official**
30:23
31:15
38:14,22
39:7
40:4,18
41:8
44:12,23
45:25
64:6 65:4
66:11,24
67:3,17

**one-to-many**
26:6,18

**one-to-one**
26:21,25

**operates**
42:15

**opine**
28:13

**opined**
18:8 28:5

**opines**
56:13

**opining**
28:10
42:8

**opinion**
12:8,11
29:1,8
32:17,22
33:16,18,
25 34:6
42:9,19
45:1,2,6,
18 46:2,
5,6,11
48:24
51:7,21
62:18
76:14
80:10,13,
14

**opinions**
28:3
29:13
41:24
42:4 45:4
47:18
48:24
62:19
72:8
79:21

**option**
81:18,21

**order**
7:10 34:1
49:16
54:18,22
71:12
82:14

**ordinary**
32:2,4,18
33:1,13,
22 38:10

**organize**
80:23

**original**
77:22

**OSA-**
45:12

**outcome**
82:16

**outgoing**
71:22
72:5,10
75:24
76:9

**overlaid**
76:23

**owner**
13:20

**owns**
13:22

**P**

**Pacific**
37:17

**pad**
12:14,18,
24

**pages**
72:6

**paid**
82:13,20,
25

**PAN**
76:22

**paper**
27:16

**paragraph**
9:17,18, 20 10:3, 16 11:11, 22 12:4, 9,10,13 13:17 15:13,17, 18 18:13 19:20,21 20:11 22:12 28:21 30:5 37:24 38:1,3 51:22,24 52:2 53:23 54:15 55:1,18 56:4,10, 12,22 57:13,16, 23 58:8, 13,19 59:5,10, 20 60:12, 14,22 61:17,21 62:1,3,9 63:7,10, 16 68:15, 16,19 69:1,2, 11,14,16 72:18,19, 20 73:11, 12,18 74:3,7 75:3,4,6, 12,13,21 76:1,2, 15,16,19, 20,21 81:3,4

**paragraphs**
11:1,7 14:12,17, 18 42:2,4 43:17 68:9

**parentheses**
75:16

**parse**
71:7,17

**parsed**
71:6

**part**
17:3 19:11 20:3,5,7, 24 21:1 22:17 32:14 41:12 42:1 43:15 44:3,10 68:9,23

**parts**
20:5

**password**
52:15,23

**patent**
7:13,16, 18,19,23, 25 8:6,8, 11,17,19, 22 12:11 13:19,20 30:7 31:1 34:5 68:5,7, 18,22,23 69:8

**patents**
13:1,23 29:9

**paying**
13:15,16

**payment**
16:22 17:3,12 18:10 21:2,6, 13,18,21, 25 22:8, 13,21 23:5,15, 20 49:14, 18 51:4 52:15 54:18,20 79:24

**payments**
15:21 16:4,10, 20,24 17:5,13, 16,20 18:2 20:25 21:3,12, 15 23:2 49:13,15 51:2 80:24

**Paypal**
16:18

**pencil**
27:16

**pending**
6:19

**people**
26:1 78:8,23

**perform**
17:3 41:20

**performance**
19:13

**performed**
52:18 53:19

**performing**
33:8 48:17 55:13

**person**
26:9 57:11 58:17,22 59:14 60:2,20 61:4 62:1,23

**personnel**
20:12 21:5

**petition**
14:5

**PGP**
75:17

**Ph.d.**
4:4,10

**phone**
26:4

**phones**
26:2

**phrased**
13:25

**physical**
54:20

**physically**
26:10

**piece**
26:20

**PIN**
59:1 60:18,19

**place**
23:20 38:6 42:23 54:5 55:24 70:22 80:10

**plain**
32:2,4, 18,25 33:13,22 38:10

**platform**
20:20 71:19

**plausible**
55:11

**plural**
10:14 57:21

**point**
5:9 20:10 21:16 39:1 42:17 54:24 59:18

**pointed**
40:7,9,10 41:1 45:19 46:8,18 48:18 49:1 50:18

**pointing**
39:5 41:10,11

44:9,24 45:1,20, 21 60:11

**points** 39:9

**portion** 24:12 41:23 59:12 69:18 72:2,25 77:18,21 79:10,16

**POSA** 34:23 36:4,12, 20 40:23, 24 44:14 45:4,6,9, 12 46:3, 7,11 64:9

**Possibly** 20:9 51:7 55:10 77:19

**potentially** 41:19

**preference** 5:4

**preliminary** 11:3

**prepare** 14:2,21 82:24

**prepared** 72:8 73:7,9

**preparing** 9:23 12:25 13:2 14:9,14 17:21 18:4 72:12

**present** 19:12 54:19 81:4

**presented** 38:7

**presenter** 57:10 58:21 59:13 60:1,17 62:22

**presenting** 59:7 60:15 80:1

**presents** 57:12 62:2

**pretty** 18:20 21:17 61:14 75:16

**previous** 72:23

**Pricewaterhousecoopers** 22:16 23:1 24:8

**principles** 78:1

**printed** 4:25 5:5, 13 22:24

**prior** 9:10 14:6,19 17:16,21 18:3 25:11 47:17

**private** 12:15,19, 23

**problem** 56:13,17, 21,24 57:1,4,6, 8,12,23, 24 59:2, 3,5,9 60:5,6, 13,15,22 61:6,9, 23,24 62:5,7, 12,13,16, 20

**problems** 57:18,21 58:13 61:9,19, 22 62:4, 11

**proceeding** 5:6 6:12 29:11

**proceedings** 4:5 7:2, 21 13:8 82:16

**process** 5:7 21:12 23:9 40:14 43:1 44:11 47:7

**processed** 15:21 16:11 21:16 71:17

**processes** 55:12

**processing** 16:4,15, 23 17:3, 12 21:2, 17,21 22:21 23:15,16 24:16,18

**processor** 30:20 31:7 41:6 73:22,25 74:1,5

**professor** 18:20,22

**programming** 20:22 78:8

**project** 24:7,20

**projects** 22:19 24:21 25:16

**proper** 29:8

**properly** 49:3,17 51:3,9

**proposed** 30:3 57:15

**protect** 23:20 24:3

**protecting** 23:23

**protection** 19:11 75:17

**protects** 58:23

**protocols** 75:23 76:8

**prove** 57:11 58:17,22 59:14 60:2,19 61:3,25 62:23

**provide** 6:7,16 12:17 16:14,19, 22 17:12 19:14 24:16 28:6,25 51:1 52:14 75:18

**provided** 10:7 28:3 29:25 41:3 43:24 49:17 51:3 62:18,19 79:21,23

**providers** 16:17

**providing** 6:4 29:8 40:22 52:23,24 80:22,24

**PTAB's** 37:1

**pull**
7:7 26:4, 8 50:5 54:12 58:1,5 68:6

**purchase**
49:13 51:1,11 53:8 54:18,22

**purchases**
50:22

**purportedly**
45:14 46:21

**purpose**
26:6 71:3 73:24

**Purves**
69:17,24 70:17 71:11,19, 22,25 72:4,9,18 73:9,11, 18,25 74:7,13, 20 75:6, 10,22 76:13,15

**put**
64:8

**putting**
32:23

**Pwc**
22:23 23:19

**Q**

**QR**
24:11,16, 18,22,24 25:3,17, 23 26:1, 11,13,14, 18,22,24 27:3,4,5, 7,13,16, 24 28:2, 6,7,12, 14,16,19, 20

**qualifications**
15:12

**question**
6:11,14, 18,19,20 12:1 17:25 25:19 26:23 35:13 36:3,4 39:12 42:3 44:2 47:14,22 50:25 53:13 54:3 56:3,20 62:17 66:1 77:4 82:15

**questioning**
43:15

**questions**
6:10 11:4,6,15 82:3,10 83:3,6,8

**quick**
82:10

**quotations**
12:13

**quote**
59:23

**quoting**
59:11,24

**R**

**RAM**
71:1,2,6, 12

**rate**
13:10,12, 14

**rates**
13:13

**read**
10:7 30:19 45:9 48:5 51:20 54:7 55:10,23 61:14 69:21 73:16 83:9

**reading**
9:24 11:5 34:23 44:14 46:8 60:23,25

**reads**
76:7

**ready**
33:3,14, 22 34:3

**real**
33:5 43:11 44:6,17, 20 45:8

**realize**
45:10

**realized**
10:21

**reason**
6:7 76:12

**recall**
17:15 25:14 51:13 71:24 77:7,12, 13,15,17, 19,21,24

**receive**
5:10 55:14 71:15

**received**
22:8

**recently**
5:21

**recess**
37:20 63:3 82:6

**recipients**
26:8

**recite**
38:16,18

**recited**
36:5 66:13

**recites**
30:11 31:7

**Recob**
4:3

**record**
4:18 5:6 6:3,17 21:10 58:7

**recover**
79:9,15, 20 81:1

**recovered**
77:23 78:15 79:17 80:9

**redact**
79:16 80:11

**redacted**
79:12 80:8,9,17

**redacting**
79:13

**redaction**
77:13 78:6 79:10 80:11

**redirect**
83:7

**refer**
7:16,25 8:8,19 41:2 57:23 78:5

**reference**
28:5 47:24 48:5 53:2 76:5

**references**
18:7,11 72:17

**referred**
61:17

**referring**
7:17 8:1 37:25 42:1 56:20,22 57:6,19, 24 58:10 59:2,25 60:5 70:5,23 71:2 74:13,20

**regard**
7:1

**related**
18:23

**relates**
7:13,23 8:6 19:2

**release**
78:9

**relevant**
44:3

**relying**
48:9

**remaining**
33:21

**remember**
17:18 20:9,10, 14,19,21 21:1,4, 13,20,22 22:1,5,6, 7,10 23:5 24:17 25:8 50:13 51:16 72:6,15, 16 77:8 79:24 80:18,23

**REMEMBERED**
4:1

**remote**
58:17 61:3,25

**remotely**
4:3

**repeat**
17:24

**rephrase**
66:1

**report**
18:7 33:3,16 43:3,15 47:1 48:16 57:8,15 58:1,2,4 60:15 72:12,13 79:6

**reporter**
60:25 83:11

**reports**
14:6

**represent**
67:14

**representation**
30:21,23 31:9,11, 13,15,16, 18,21 32:1,3,7, 14,16,19 33:9,13, 18 34:1, 2,7,24 35:3,6, 11,13,18, 21 36:5, 11,14,21 37:3,6,9 38:15,21, 22 39:7,8 40:2,4,6, 18,19 41:7,9 44:12,21, 23 45:25 63:11,18, 19 64:1, 2,3,4,7, 11,12,23, 24 65:3, 5,10,12, 17,18,22 66:3,9, 11,19,22, 24 67:3, 4,9,13, 14,15,17, 21,23,25 68:3,4 69:9,10

**representations**
63:23 65:15 66:8,13 67:7,14

**representative**
55:3

**represents**
62:14

**request**
45:13 71:15

**requested**
43:10 44:4

**requesting**
49:2

**require**
33:8,9 35:4 37:3 38:16 40:16,21, 24 58:21 65:22 66:2,8

**required**
34:10 54:19

**requirement**
41:17 64:13

**requirements**
32:15

**requires**
33:7,19 35:5,20 36:13,20 37:5,8 39:6,12, 15 40:2, 17,20 41:13 44:21 64:16

**requiring**
52:14 58:25 59:13 60:1 62:21

**research**
17:18 24:12 77:25

**reserve**
83:9

**reserved**
83:16

**resources**
19:3,4

**respect**
47:6 56:24,25 57:4

**responded**
82:13,18

**response**
36:2

**rest**
31:22

**restaurant**
26:3,4,5, 12

**retrieve**
79:25

**retrieved**
71:6

**reverse**
78:10,14, 23 79:7,8

**review**
9:11 14:9,16 29:4 46:16 54:8,10 71:24 73:7,9

**reviewed**
14:5,7, 13,19

**reviewing**
10:21 35:16

**RMR**
4:3

**role**
20:24

**room**
4:23

**rough**
83:12,15

**routine**
56:16
57:1

**row**
27:11,20

**rules**
6:2

**run**
7:10
20:18

**S**

**S-A-M**
4:19

**safeguards**
23:19

**sales**
54:24

**Sam**
4:3,10,19

**satisfy**
35:12
41:4

**scan**
26:11

**school**
20:8

**screen**
23:11
71:4,13,18

**seat**
27:12,21

**section**
14:20
15:13
29:15
57:7

**sections**
43:19

**securing**
79:4

**security**
16:22
19:14
24:3,14
51:25
52:5,10
53:23
75:23
76:8
78:1,3,13

**select**
81:18

**selected**
81:24

**selecting**
81:22

**selectively**
60:23

**send**
41:17
80:9,16,17 83:15

**sending**
24:2
41:13,15,19,22
79:18

**sends**
45:15

**sense**
25:18
27:6
49:11

**sentence**
10:4
13:18
38:3
56:12,15
69:23
74:21,23
75:13
76:7

**server**
27:19,23
28:1
42:14,15
43:9 44:4
47:4,10
48:9
52:6,9,18,24
53:15,16,19 54:4,6,23
55:6,8,12,15,19,21,24
69:25
70:17,18
71:6,7,11,15
75:5,7

**service**
20:12
21:5 55:3
71:19

**services**
16:19

**Shamos**
18:7
28:5,9
39:2,8,19
40:5
41:1,9
42:8,12,25 44:9,23 45:1,19 46:8,17 47:17
48:8,18
49:1
50:11
56:13,16
58:7
59:11
60:11
62:15,19,20 79:22
80:15

**Shamos's**
14:6
41:23
42:4
43:18
56:22
57:16
58:3
59:24,25

**short**
15:1,5
71:20
82:3

**show**
40:6
44:12

**showed**
40:13

**shows**
44:10,20
45:19
47:2
72:20

**sig**
12:15,21
28:11

**sign**
9:8 83:9

**signature**
9:2,6
83:16

**signing**
9:10

**similar**
32:11

**simply**
60:25
65:23
66:4

**single**
9:22
10:12,23

**singular**
10:13
57:23

**sitting**
27:15

**situations**
27:6
51:14
78:15

**skip**
57:14

**software**
18:15,18,21 20:24
24:20
27:14
28:17
78:8

**sole**
45:2

**solution**
58:19,20
59:7
60:15,16
61:13
62:2,16

**solutions**
57:14

**solve**
56:17
57:1 59:9

**solved**

56:14
57:9
62:21

**someone's**
21:9

**sorts**
19:8

**sound**
11:10
19:25
54:23

**sounds**
6:1 20:1
22:1
32:11
33:1
39:21
73:6 77:5
82:5

**source**
43:23,25
47:21,24,
25 48:1,
3,10
50:14,21
51:20
78:21

**sources**
50:24

**speaking**
78:4 79:3

**speaks**
41:5

**spec**
41:21

**specific**
16:6,25
20:21
59:2
60:22
61:9 72:2

**specificall
y**
37:25
42:2
65:11

**specifics**
72:3

**speculate**
77:15

**spend**
11:4
12:25

**spending**
34:3

**SSN**
10:5

**Stafford**
12:13,18,
19,22
28:4,6,
11,19

**starting**
58:25
59:20

**starts**
76:20

**state**
4:18

**stated**
62:19

**statement**
10:18
76:12

**status**
21:10

**step**
12:14
30:16
34:16
53:15,16

**steps**
30:12,14

**stolen**
58:24

**storage**
63:13
64:14
65:6
66:25
67:5,18,
20 69:20,
23 70:22,
25 71:1,2

**stored**
69:19,24
70:17
71:12

**strike**
38:16
43:7 56:3

**Stripe**
16:14,18

**structure**
50:3,12,
14,18

**students**
17:8
24:20
25:1,17,
20

**studied**
18:11

**subject**
24:19,23

**submitted**
7:4,12
8:3

**subsequent**
49:13
50:22
51:2

**substantive
ly**
69:2

**sufficient**
23:23
34:4

**suggest**
6:24

**suggesting**
27:15

**suggestion**
9:21
10:19

**suggests**
55:20

**suite**
21:8

**summer**
20:7

**support**
17:12
74:8,24

**supposedly**
59:8

**sworn**
4:10

**symmetric**
75:10,16

**system**
27:1,19
71:19
75:10
80:25

**systemizati
on**
73:1,14,
19

**systems**
22:13
73:13
79:24

**T**

**table**
10:4,10
50:9

**tables**
49:24

**takes**
27:18
70:22

**taking**
54:5

**talk**
28:7,20
42:21
49:12
79:5

**talked**
12:4 17:5
31:22
68:8

**talking**
7:18
16:25
20:15
22:2 28:1
42:25
43:20
47:16
49:6 55:1
57:13
58:14
59:12
61:15,21
78:11,19,
21

**talks**
10:1
41:21
43:4,19
48:2

49:10,14
51:13,14
53:4
54:17
55:2
56:23
62:7
64:1,2
74:13

**taught**
15:14,25
16:2
18:14,17,
21

**teach**
15:24
24:20,23,
24 25:1
44:14
46:12

**teaching**
18:18
43:8 44:3
45:7,13

**teachings**
45:5

**teams**
24:20

**technicians**
21:9

**technique**
24:25
56:14,17

**techniques**
19:10
75:19
78:3,5
79:3,5,7

**technologies**
16:9 19:7

**technology**
16:25
17:7
24:25
25:2,3,17

**tells**
10:10,11

**temporarily**
70:1,13

**ten**
37:16
63:1

**term**
30:25
31:25
32:14
33:7,9
34:3 35:1
36:10
47:21

**terms**
16:6
19:13,14
29:1,9,
12,17
30:6
33:2,4,
20,21,23
67:22

**tested**
24:16

**testified**
4:11
35:10
60:11
62:15

**testify**
77:19

**testimony**
6:4,8
11:18
13:7,13
60:9
69:7,12
83:3

**testing**
24:13

**text**
56:15
77:14
81:14

**theaters**
26:15

**theatre**
26:25
27:1,21

**thing**
42:14

**things**
6:1 11:15
31:20
35:12
39:20,23
58:8
79:14,25
81:1

**thinking**
33:5,15,
24 34:4

**third-party**
16:13

**thirds**
76:19

**thought**
32:10
57:5

**Thursday**
4:1 15:2,
5

**ticket**
26:14
27:3,4,
11,20

**ticketing**
27:19

**time**
6:18 11:4
15:25
16:2
18:17
20:2,3,5,
6,7,10
29:11
33:5 34:4
37:14,17
72:8

**times**
5:20,21,
22,25

**today**
4:23 5:1
6:8 7:1
8:20 9:14
33:23
35:10
49:23
82:11
83:2

**token**
10:12,23
18:9
41:11,25
42:6,10,
14,15,23
43:5,9,
10,23,24
44:4,11,
12,15
45:8,10,
13,15,21
46:7,12,
17,21
47:4,5,7,
10,11,19
48:6,9,
11,16,17,
21,23
49:1,2,3,
12,17
50:2,12,
14,18,20,
22,23
51:1,3,9,
11,15,17,
19 52:6,
9,15,18,
24 53:15,
16,19
54:4,6,
18,20,22,
23 55:6,
8,12,15,
19,20,21,
24 56:8
62:13

**token-based**
53:8

**token_id**
10:5,13

**tokenized**
16:20,24
17:5,13,
16,20
18:2,10

**tokens**
16:22
49:14
51:13
56:25
57:3,13,
17 61:19
62:6,10,
21 79:25

**tool**
76:24
77:2
81:12

**tools**
77:10
81:15,20,
21

**top**
17:15,18
21:4

24:17
25:8
51:13
54:7
72:6,25
73:20

**topics**
18:23

**trade-offs**
19:13

**transaction**
53:9
55:12

**transactions**
74:10,15
75:1

**transient**
69:19,23
70:22

**transit**
23:22

**transmitted**
23:14
71:10

**trap**
11:14

**trip**
11:13

**trivial**
81:17

**true**
39:16
69:4

**truth**
6:5

**turn**
8:25 9:17
14:12
28:21
30:9
37:24
51:22
56:10
63:7
69:13
72:23
73:11
74:3 75:3
76:15

**turned**
27:4

**type**
20:18
70:25

**types**
19:6,8,9
78:16,18
79:24

**typically**
23:4 26:9
27:14
70:3,16
74:1

**U**

**U.S.**
7:13,23
8:11

**UCI**
15:14

**Uh-huh**
59:22

**ultimately**
55:14

**unclear**
6:11

**undergrad**
20:2,3

**underlying**
46:13
47:11
48:12,22

**understand**
6:4,10,14,21
7:1,16,20
8:1 17:11
34:23
36:4,13,19,20
40:23,24
42:7
43:22,24
44:14
45:1,12
46:7,11
48:8
66:14
69:7
74:17
79:22

**understanding**
4:25
11:11,12
13:16,22
17:13,20
18:2 21:7
28:3,4,6,9 30:25
31:2,3,4,10,20,25
33:7
34:18,20
37:1
38:12
39:25
42:12,21
43:8 44:2
45:22
46:23,25
48:2,15,20 62:2
65:11,16
67:8
72:4,9
73:5,24
74:20

**understands**
60:16

**Understood**
6:25

**undone**
80:12

**unique**
24:7

**unit**
74:14

**units**
74:6,8,24

**unlike**
68:22

**unofficial**
56:24
57:17
61:18
62:4,10,20

**upper**
17:9

**URL**
26:2

**usability**
19:13

**user**
9:22
10:10,22
27:8,13,15 28:10,15,16
30:24
34:12,17,19,22,25
35:9,15,25 36:17,23 37:4,12 41:14,17 43:20
49:2,10,12 51:4,9,10
52:14,22,23 53:12,18,24
54:5,19,21 55:4,5,8,13,15,20
56:2,8,9
58:17
59:1,3,8
60:6
61:3,25
62:12
63:13
64:15
65:7
66:20
67:1,20
69:20
70:2,11,12,14
71:4,18
77:10
79:23
80:18,22

**user's**
10:4
12:15,19,23 24:4
27:20
34:7 42:9
49:4,18
50:1,9
53:20
71:3,11,13,14

**user_id**
10:5

**users**
10:1
25:24

57:19
61:20
62:11

**utility**
20:12
21:5

**utilized**
25:17

**utilizing**
56:8

**V**

**vaguely**
77:7

**valid**
48:12,22
57:9

**validation**
24:14

**valuable**
80:2,5,24

**verbal**
6:16

**verification**
24:14
35:4,7,19,22
36:12,15,22 37:7,10 38:4,11,13
39:4,6,11,14,25
40:1,6,13,17,24
41:12,14,20 42:11,22 43:3
44:11
45:10,20,23 46:6,9,16
47:6,18
48:6,17,25 54:3
68:1

**verified**
30:22
31:14,17
38:14
40:3 41:8
43:5
44:22
45:21,24
65:4
66:10,23
67:16

**verify**
55:2 59:8

**verifying**
38:21
46:22
57:2

**versus**
21:18

**video**
55:5

**view**
43:4
45:12
66:14,18

**virtual**
30:21
31:8,10,13,16,18,21,25
32:3,7,10
34:6,23
35:2,6,11,13,18,20 36:5,11,14,21
37:3,6,9
38:21
39:6
40:2,6,17
41:7
44:21
63:11,18,19,23
64:1,2,3,4,10,12,23,24
65:3,10,11,14,16,17,22
66:2,8,9,13,18,22
67:3,6,9,13,14,15,21,22,25
68:2,3
69:9,10,18

**Visa**
30:3
80:21

**W**

**wallet**
69:18
71:12,19
75:10

**ways**
15:20
16:4,7,10
39:24
51:12

**web**
15:21
16:11
23:10,12,18 27:2
28:18
52:25
70:1,7,8
71:3,14,17 78:22

**web-based**
71:14

**week**
15:1

**well-established**
77:25

**Wells**
80:21

**widespread**
25:5,11

**Wilson**
8:12
14:24
17:23
18:5
23:25
25:6,12
33:11
34:9 36:7
43:12
44:7,18
45:17
46:4,14,24 47:13
48:14
49:5,19
50:4 51:5
52:7,20
55:17
59:16
60:8
61:11
64:20
74:16,22
82:5
83:8,14

**Windows**
20:19,20,22,23

**wit**
4:6

**word**
38:10
41:15,22
48:1

**words**
38:20,24
39:13
40:22
44:20
67:2

**work**
6:2 13:12
15:9
16:21
21:1
22:18
24:21
37:18
77:5
82:19,23
83:1

**worked**
21:20,21,25 22:19

**working**
19:21
22:16

**works**
47:2

**wrap**
82:10

**WSEP**
71:20,22
72:5,10,21 73:12
75:23
76:8

**X**

**XML**
50:11

**Y**

**year**
5:23
18:20
20:8
22:23
25:8 77:8

**years**
16:1,3
20:15
21:22
24:9 25:7
77:3,7,9

**yesterday**
15:2,6

# ERRATA SHEET

Case Name: *Visa, Inc. v. Cortex MCP, Inc.*
Case No.: IPR2024-00486, -00488, -00489, -00490
Witness Name: Dr. Sam Malek
Deposition Date: December 12, 2024

| Page | Line(s) | Change | Reason |
|---|---|---|---|
| 26 | 9 | Change “meaning” to “meeting” | Transcription error |
| 31 | 19 | Change “course” to “court’s” | Transcription error |
| 33 | 20 | Change “course” to “court’s” | Transcription error |
| 54 | 20 | Change “cart” to “card” | Transcription error |
| 54 | 21 | Change “disposing” to “disposed in” | Transcription error |
| 58 | 17 | Change “remote” to “a remote” | Transcription error |
| 60 | 13 | Change “additional” to “a digital” | Transcription error |
| 66 | 8 | Change “require” to “required” | Transcription error |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

I, the undersigned, do hereby certify that I have read the foregoing transcript, and the same is a correct and complete transcription of the testimony given by me with the exception of the corrections listed above.

Date: 01/16/2025

Sam Malek