UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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GOOGLE LLC,	)	
	)	
Petitioner,	)	
	)	
vs.	)	Case No.
	)	IPR2024-00212
SECURITY FIRST INNOVATIONS, LLC,	)	
	)	
	)	
Patent Owner,	)	
	)	

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WEDNESDAY, JANUARY 22, 2025

ZOOM DEPOSITION OF SAMRAT BHATTACHARJEE, PH.D.

VOLUME II

CONFIDENTIAL TRANSCRIPT

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REPORTER: BALINDA DUNLAP, CSR 10710, RPR, CRR, RMR

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A P P E A R A N C E S
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(None Marked.)

REMOTE VIA ZOOM, CALIFORNIA, JANUARY 22, 2025
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BE IT REMEMBERED that on Wednesday, the 22nd day of January 2025, commencing at the hour of 7:57 a.m. thereof, remotely via Zoom, California, before me, Balinda Dunlap, a Certified Shorthand Reporter in and for the County of San Francisco, State of California, remotely appeared:

SAMRAT BHATTACHARJEE, PH.D.

a Witness herein; called as a witness by the Patent Owner; who, after having been duly sworn by the Certified Shorthand Reporter to tell the truth, the whole truth, and nothing but the truth, testified as follows:

EXAMINATION BY MS. WOO

Q. Good morning, Dr. Bhattacharjee. First, thank you so much for agreeing to push the deposition. I really appreciate it.

So just so you know, I'll be conducting the first half, and then Mr. Elliot will be conducting the second half of our two-part deposition.

Is there any reason today you might not be able to provide truthful or accurate testimony?

A. No.

Q. Are you currently under the influence of

any substance that may preclude you from providing truthful or accurate testimony?

A. No.

Q. Do you understand you're testifying under oath?

A. Yes.

Q. Do you have clean copies of the filings in this IPR?

A. I have electronic copies of the replies. I'm not sure that I have -- I don't have printed copies of anything.

Q. Okay. But are the -- those replies that you mentioned, are they clean copies?

A. Yes.

Q. And do you have copies of the exhibits in this IPR?

A. I do.

Q. If you would like to access any documents during this questioning, I just ask that you let me know what document you are reviewing so I know the basis of your opinion; is that fair?

A. That's fair.

Q. Okay. Approximately how many hours did you spend preparing for your deposition today?

A. Between 10 to 15, I would think.

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Q. And what did you do to prepare?
A. I looked at the reply declarations that I provided. I also looked at the references, the patents at issue, some of the references that I cited. I looked at the institution decisions. I also briefly looked at patent holder's reply and also Dr. Rubin's declarations. Those are some of the things I looked at.
Q. Okay. And approximately how many hours did you spend preparing the second declaration?
A. I mean, there were three reply declarations. I'm not sure in total how many hours it was, but I wouldn't be surprised if it was about 20 or so.
Q. Okay. Is there any change in your opinions as stated in your declarations?
A. No, there were no changes. I did find some typos when I was going through them.
Q. Okay. Why don't we pull up your reply declaration. Why don't we start with the '854. So that's Exhibit 1111.
How do you prefer we review this? Do you want to pull up your own copy electronically, or should I share my screen?
A. Either way. Or if you could put a clean

copy in the chat, then maybe I could just work off of that.
Q. Of course. So I'm just uploading a clean copy of your '854 declaration. Please let me know when you have it open.
A. Yeah. I'm having some issues opening, but let me see. Yes, I have it open now.
Q. Okay. So do you want to point me to where you noted your typos?
A. I think I noted the typos primarily on the '609.
Q. Oh, I see. Why don't I drop that one in, then. Okay. It should be uploading.
A. The two typos I noticed were near paragraph 1 -- in paragraph 145.
Q. 45?
A. 145.
Q. Okay. I'm at paragraph 145.
A. In the very first sentence it states, "In its POR, SFI admits that the '609 copies Orsini's Figures 1-25 and paragraphs 1-[4]23, which SFI does not" -- and there should be the word "dispute" -- "does not discloses most of claim 1." There's the word "dispute" that's missing.
Q. Do you notice any other typos?

A. Yeah. There was a heading that has a weird word in it. It is above paragraph 185.
Q. I think I found the heading.
A. Yeah. The heading should be "POSAs would not have agreed" as opposed to "unagreed."
Q. I see. All right. Thank you.
So if we could return to your '854 declaration, did you note any typos in this declaration?
A. Not that I recall.
Q. Okay. So if we go to paragraph 3 of your declaration, just let me know when you're there.
A. Of the '854 declaration?
Q. Yes.
A. Okay.
Q. This is a list of the documents you reviewed in connection with preparing your second declaration, correct?
A. That's correct.
Q. Did you review a copy of the transcript from your first deposition in forming your opinions in the second declaration?
A. I don't recall whether I did that or not.
Q. And then if we can scroll to paragraph 8 of the same declaration.

A. Okay.
Q. So in this paragraph you set forth your understanding of the analysis for analogous art; is that right?
A. In this paragraph I discuss what counsel told me about what analogous art should be, yes.
Q. Okay. Do you recall being informed that when considering whether a reference is reasonably pertinent to a problem, whether one should identify the problem to which that reference relates?
MR. NIEBERG: I'm just going to counsel Dr. Bhattacharjee not reveal the substance of any attorney-client conversations.
THE WITNESS: Oh, I have written down what I was told about pertinence and problems in this paragraph.
Q. BY MS. WOO: So do you recall being told anything about the analogous art analysis that does not appear in this paragraph?
MR. NIEBERG: Object to form. And again, I'll caution Dr. Bhattacharjee not to reveal the substance of any attorney-client conversations.
THE WITNESS: I think this paragraph is a good summary of the law as I was told.
Q. BY MS. WOO: Okay. To your understanding,

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1 would one consider a reference's title when
2 determining that reference's field of endeavor?
3 A. I mean, I'm not a lawyer, and I'm not sure
4 if that's a legal analysis or not, but one would
5 consider the entire reference. And as part of that,
6 one would look at the title as well.
7 Q. To your understanding, would one consider a
8 reference's abstract when determining that
9 reference's field of endeavor?
10 A. Again, I'm not a lawyer. Not sure whether
11 this was a legal analysis or not, but one would
12 consider the entire reference and, as part of that,
13 would consider the abstract as well.
14 Q. And to your understanding, would one
15 consider a reference's background section when
16 determining that reference's field of endeavor?
17 A. I'm not a lawyer. I'm not sure "field of
18 endeavor" is a legal standard or legal analysis or
19 not. But certainly one would consider the entire
20 reference, including its background, in trying to
21 understand the reference.
22 Q. And to your understanding, when considering
23 whether a reference is reasonably pertinent to a
24 problem, should one identify the problem to which
25 that reference relates?

1 MR. NIEBERG: Object to form.
2 THE WITNESS: Can you ask me that question
3 again?
4 Q. BY MS. WOO: Sure. Yeah.
5 To your understanding, when considering
6 whether a reference is reasonably pertinent to a
7 problem, should one identify the problem to which
8 that reference relates?
9 MR. NIEBERG: Object to form.
10 THE WITNESS: I think there is an
11 assumption in your question, which I'm not sure
12 always holds, which is there is only one problem
13 that this reference relates to.
14 But, of course, in looking at whether a
15 reference is pertinent to a problem, that you would
16 look at all of the problems that this particular
17 reference is addressing and discuss it.
18 Q. BY MS. WOO: So in considering whether a
19 reference is reasonably pertinent to a problem or
20 problems, should one consider the problems that the
21 patent at issue and the reference relate to?
22 MR. NIEBERG: Object to form.
23 THE WITNESS: Oh, I think one would look at
24 the patent at issue, the problems it is considering
25 and a related reference, and look at the problems

1 that are being considered and the entire teaching of
2 both of the -- both the patent at issue and also the
3 reference.
4 Q. BY MS. WOO: Have you ever heard of someone
5 named Bruce Schneider?
6 A. I have -- maybe -- don't know --
7 MR. NIEBERG: I'll say object to form.
8 THE WITNESS: I have -- I mean, there is a
9 cryptographer of a security research whose name, I
10 think, is Bruce Schneider. I have heard of him or
11 if there is somebody else. I'm not sure who you are
12 referring to.
13 Q. BY MS. WOO: I believe I'm referring to
14 that Bruce Schneider. So would you consider the
15 Bruce Schneider you mentioned in your previous
16 answer to be an expert in computer security?
17 MR. NIEBERG: Object to form. Scope.
18 THE WITNESS: Oh. I mean, I don't know the
19 full extent of Mr. -- or Dr. Schneider's expertise,
20 but I think he's written a fair amount about
21 computer security. And depending upon the context,
22 he may be an expert in computer security, yep.
23 Q. BY MS. WOO: Do you consider Bruce
24 Schneider to be an expert in cryptography?
25 MR. NIEBERG: Object to form. Scope.

1 THE WITNESS: I would have to take a look
2 at the specific cryptography at issue. And also, I
3 don't recall Mr. -- or Dr. Schneider's, you know,
4 particular applications or expertise in that matter
5 off the top of my head.
6 Q. BY MS. WOO: Okay. Why don't we turn to
7 Foster, and I will drop a clean copy again into the
8 chat. So that is Exhibit 1006, I believe, in all
9 three matters, but correct me if I'm wrong.
10 THE WITNESS: I have looked at the Foster
11 reference as you sent it over.
12 Q. BY MS. WOO: When did you last review
13 Foster?
14 A. I looked at parts of Foster recently.
15 Q. How recently?
16 A. Maybe over the weekend.
17 Q. Okay. Do you see when Foster was filed?
18 A. I believe it says April 18, 2002.
19 Q. So would it be fair to say that Foster's
20 time frame is roughly 2002?
21 MR. NIEBERG: Object to form.
22 THE WITNESS: Again, I'm not a lawyer, but
23 Foster presumably was filed in that time frame, yes.
24 Q. BY MS. WOO: Okay. Why don't we look at
25 Figure 1, and let me know when you're there.

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A. Okay. I'm there.
Q. What does Figure 1 depict?
MR. NIEBERG: Object to form.
THE WITNESS: Oh, I mean, there's a description of Figure 1 in Foster. We can go through that if you like.
Q. BY MS. WOO: Sure. Are you referring to paragraph 49?
A. Oh, I mean, Figure 1 is discussed first in paragraph 15, says "Figure 1 depicts a flow diagram of digital rights management system (DRMS)." And then it's discussed in more detail starting paragraph 49, yeah.
Q. What is a digital rights management system?
A. It's a broad term. It depends upon the context in which it's used. But in general, if there is a piece of content in the -- let's say, owner or current owner or provider of the content wants to put some access restrictions on it, then one way to do it would be using a digital rights management system.
Q. Can you give me a short explanation of how the DRMS in Figure 1 works?
MR. NIEBERG: Object to form.
THE WITNESS: As stated in paragraph 49, it

states that as part of Figure 1, "content is packaged with access rights/content usage conditions and loaded onto media server. The keys used to access the content are downloaded to a PC as a separate component from the content.
"Specifically, either at download or at rendering time, license server must be accessed to receive permission to access the content and a description of any corresponding usage conditions."
There's also a web server that provides pages that walk the customer through the steps to access the content on the media server.
Q. BY MS. WOO: Do you know if DRMS was used in roughly 2002?
MR. NIEBERG: Object to form.
THE WITNESS: As I said, it's a broad concept. Certainly certain types of DRMS or access control systems were available and used in the early 2000s.
Q. BY MS. WOO: What type of content was DRMS used to secure roughly around 2002?
A. I mean, again, DRMS is a broad concept. It could technically be used to secure any kind of digital content. For example, music, movies, documents, even binary data, if necessary.

Q. Could DRMS around 2002 be used for -- to secure television?
MR. NIEBERG: Object to form.
THE WITNESS: Depending on the system -- and I don't know exactly what you mean by "television" in this context. But systems that were -- that, say, transmitting data that were part of television content could be secured using DRMS.
Q. BY MS. WOO: So in the next paragraph, in paragraph 50, do you see that it says, "As shown, the contents can be delivered through streaming delivery, e.g., if the file is" too "large." Do you see that?
MR. NIEBERG: Object to form.
THE WITNESS: I see that, except I think you added the word "too."
Q. BY MS. WOO: Oh, sorry. "e.g., if the file is large."
What is streaming delivery?
A. That, again, is a relatively broad concept, but the idea of streaming delivery broadly is that the content is transmitted at a rate that is reasonably commensurate with the rate of playback.
Q. So my understanding of streaming is perhaps colored by Netflix and Prime Video and such.

Was there any difference between streaming today and streaming in the rough 2002 time frame?
MR. NIEBERG: Object to form. Scope.
THE WITNESS: The -- I mean, depending upon at what level we're talking, there's certainly many differences. For instance, some of the protocols that are used today impact DASH, HLS, commonly used protocols. I am not sure they existed back then.
But the basic idea of transmitting the data at a rate commensurate with the play-out speed would likely have been similar even 25 years ago.
Q. BY MS. WOO: Is there a difference between streaming delivery and cable television?
MR. NIEBERG: Object to form.
THE WITNESS: I think that's a very broad question. Again, streaming delivery can take very many different forms. And without looking at a specific system and the actual transmission protocols they were using, I'm not sure I can answer that.
And again, cable television also has very many different protocols and systems that they used. And, in fact, some cable television was even analog in the early days. So it's not clear to me that I can reasonably answer this question without looking

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at specific systems for both streaming and cable television.

Q. BY MS. WOO: Okay. Why does Foster say that if the file is large, content can be delivered through streaming delivery?

MR. NIEBERG: Object to form.

THE WITNESS: A philosophical question. You may just have to ask Foster and the other authors.

But in general, Foster discusses delivery using download and streaming. And it says, for example, if a file is large, and then one of the options would be to use streaming delivery. That's just a system choice that they're discussing.

Q. BY MS. WOO: So if a file is small, would it not be delivered through streaming delivery?

MR. NIEBERG: Object to form.

THE WITNESS: I don't think we can draw that implication and/or conclusion from here. This is -- in paragraph 50, all this is saying is if a file is large, then one of the options is streaming delivery. It's saying nothing about not being able to download large files, and it is not saying anything about small files.

Q. BY MS. WOO: You said streaming delivery is

one of the options.

What are the other options?

MR. NIEBERG: Object to form.

THE WITNESS: Are we talking about Foster in general or, I mean, with a delivery system?

Q. BY MS. WOO: We're talking about Figure 1 in Foster.

A. Figure 1 in Foster is a schematic of a system, and it is not -- it can emit many types of data transfer.

So, for instance, the content could be streamed, at which content may be sent at a rate, as I said, commensurate with play-out. It could be downloaded, at which point the rate at which the content is being sent is not necessarily related to the play-out speed.

It could be -- it could be -- so as far as the rate of transmission goes, it's either related to the play-out or it could be faster or slower. And then the content itself can be played or stored to be played later and so on. All of those are admitted by Foster.

Q. So in the next paragraph, paragraph 51, do you see it says, "The DRMS fails to provide synchronized delivery of the content with the keys

used to encrypt the content"?

A. I see that sentence.

Q. So why does DRMS fail to provide synchronized delivery of the content with the keys used to encrypt the content?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: That said -- can you ask me the question again, please?

Q. BY MS. WOO: Sure. Why does the DRMS fail to provide synchronized delivery of the content with the keys used to encrypt the content?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: That's a -- that's a choice that the DRMS designer has made. The keys in this particular case has to be accessed from the licensed server separately.

Q. BY MS. WOO: To your understanding, does the DRMS referred to in paragraph 51 refer to the DRMS depicted in Figure 1?

MR. NIEBERG: Object to form.

THE WITNESS: Oh, paragraph 51 says, "As indicated above." And above is discussing Figure 1. So at least in some DRMS systems that can be the case.

Q. BY MS. WOO: Just to be clear, in

paragraph 51 when it says the DRMS, to your understanding, is it referring to Figure 1's DRMS?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: I think Figure 1 is broad by itself. It's a system with different components, and it's really the components of the system that are being shown. And in some cases, using Figure 1 system, the keys and the content can be decoupled. But the same figure and the same system can also be programmed such as that is not the case.

Q. BY MS. WOO: And what is the basis for your opinion that it can be programmed so that the keys and content are not decoupled?

A. Because the components in Figure 1 don't have to change in order for the keys to be coupled.

Q. And what is the basis for that opinion?

A. One of the bases is just the Foster reference itself. It is discussing how such a system can be used such that these decoupling of keys and content does not have to happen.

Q. Is there a specific portion of Foster that you're relying on?

A. I'll have to look through Foster, because a lot of the reference is discussing coupling of the keys and the content. So would you like for me to

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1 look through Foster?
2 Q. Why don't we revisit that later.
3 In your opinion, is Figure 1 a depiction of
4 Foster's invention?
5 MR. NIEBERG: Object to form.
6 THE WITNESS: Figure 1 is a schematic of
7 different components, and Foster's invention can
8 certainly be implemented in a system such as
9 Figure 1.
10 Q. BY MS. WOO: As Figure 1 is depicted, is
11 Foster's invention implemented in Figure 1?
12 MR. NIEBERG: Object to form.
13 THE WITNESS: As I said, Figure 1 is a
14 relatively broad schematic of components, and
15 Foster's system can be implemented in the systems
16 using the components of Figure 1.
17 Q. BY MS. WOO: Okay. Why don't we look at
18 Figure 2.
19 What does Figure 2 depict?
20 MR. NIEBERG: Object to form.
21 THE WITNESS: Figure 2, as discussed in
22 paragraph 16, "Depicts a flow diagram of a
23 conditional access system, CAS."
24 Q. BY MS. WOO: And what is a conditional
25 access system?

1 A. It's, again, a broad term. The examples
2 given for conditional access system are cable or
3 satellite television systems in Foster. And it's,
4 again, a system that enables access to content
5 depending upon the -- whether the recipient meets
6 certain conditions.
7 Q. And do you know if CAS was used in the 2002
8 time frame?
9 MR. NIEBERG: Object to form.
10 THE WITNESS: It's a broad term.
11 Conditional access was certainly available in the
12 early 2000s.
13 Q. BY MS. WOO: What is the difference between
14 DRMS and CAS?
15 MR. NIEBERG: Object to form.
16 THE WITNESS: Again, as I said, these are
17 very broad terms. They -- I think they sort of go
18 together. One may use DRMS to implement a
19 conditional access system, CAS.
20 Without looking at very specific examples
21 of DRMS and a CAS, I'm not sure I can give you an
22 explicit distinction, because these are terms that
23 are used to restrict access to content. And
24 depending upon the level that which one considers
25 the system, it may be considered a CAS. If you look

1 at some of the techniques that are used, maybe those
2 would be considered DRMS.
3 Q. BY MS. WOO: In your opinion, is there a
4 difference between the DRMS depicted in Figure 1 and
5 the CAS depicted in Figure 2?
6 MR. NIEBERG: Object to form. Scope.
7 THE WITNESS: I mean, the two systems have
8 slightly different components. So in that way, the
9 CAS in Figure 2 is using terms that are mostly used
10 in cable systems, for instance. Maybe other systems
11 as well.
12 But overall, I think they're trying to
13 implement a similar goal but using different types
14 of components and different terminologies.
15 Q. BY MS. WOO: All right. Why don't we look
16 at paragraph 52. And around the middle of the
17 paragraph it says, "Thus, similar to the DRMS, the
18 CAS also fails to provide synchronized delivery of
19 keys with encrypted content." Do you see that?
20 A. I see that sentence.
21 Q. Do you understand "the DRMS" to be
22 referring to the DRMS depicted in Figure 1?
23 MR. NIEBERG: Object to form.
24 THE WITNESS: I think that's a fair
25 assumption.

1 Q. BY MS. WOO: Okay. And do you understand
2 "the CAS" to refer to the CAS depicted in Figure 2?
3 A. That is how I understand it.
4 Q. And why does the CAS fail to provide
5 synchronized delivery of keys with encrypted
6 content?
7 A. That's a system choice that has been made
8 in the particular CAS that's being talked about in
9 this paragraph.
10 Q. And why would a system choose to not have
11 synchronized delivery of keys with encrypted
12 content?
13 MR. NIEBERG: Object to form. Scope.
14 THE WITNESS: I think we would have to take
15 a look at a specific system and what design
16 constraints they were built under. And in some
17 cases it may be beneficial to keep the content and
18 the keys separate. In other cases, they may be
19 beneficial to have them coupled. So that's just a
20 system choice that one would make.
21 Q. BY MS. WOO: Why don't we look at
22 paragraph 54, and let me know when you're there.
23 A. Yes, I'm here.
24 Q. Okay. Do you see where it says -- it is
25 near the bottom half of this paragraph. It says,

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"By reencrypting title key 24, the protection on the content can be varied without having to reencrypt the content itself, which would be significantly more time-consuming and/or consume more resources than reencrypting title key 24."

A. I see that sentence.

Q. In your opinion, is this an accurate statement?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: Let me just take a look at Figure 4 for a second that it's referring to.

Q. BY MS. WOO: Sure.

A. In general, the key is smaller than the content, or usually keys are smaller than content.

And here we're talking about reencrypting a title key and not the content itself. And reencrypting a content would be more time-consuming than reencrypting a key.

Q. Why would reencrypting the content itself be significantly more time-consuming than reencrypting the title key?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: It depends. But as I said, usually the time and/or resources required to process and/or encrypt the piece of data is

proportional to the length of the data itself. Because usually all of the bits and/or bytes of the data have to be scrambled or put through a particular function.

And if the content is longer than the key, which is often the case, then encrypting the content would take more time because you would have to run over every bit of the content, as you would with the key, but the key is smaller, and so it would consume fewer resources.

Q. BY MS. WOO: Okay. Why don't we look now at Figures 14 and 15 and let me know when you're there.

A. Yep.

Q. So do you see Figure 14 depicts a transport stream? Do you see that?

A. Yes.

Q. And do you see Figure 15 depicts a program stream?

A. Yes.

Q. What is the difference between a transport stream and a program stream?

MR. NIEBERG: Object to form.

THE WITNESS: The reference itself talks a little bit about that. I can read from

paragraph 73, if that's okay.

Q. BY MS. WOO: Sorry. Paragraph 73. Sure.

A. So overall, transport streams and program streams are part of the MPEG standard. They are used in different scenarios as described here.

As part of paragraph 73 the reference says, "A transport stream is typically used in error-prone broadcast environments, such as digital television. As depicted, transport stream packets are relatively small, and it generally takes multiple transport stream packets to contain a single video PES unit.

"The second option is a program stream, which is shown in Figure 15. A program stream is generally used in more reliable transmissions such as those with error-correcting codes or in fixed storage. Unlike transport stream packets, however, a single program stream packet can hold multiple video PES units."

Q. What is an error-prone broadcast environment?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: Again, a relatively broad question. But in general when we have a transmission medium, all transmission media have a, let's say, base error level. So if I transmit,

let's say, a million bits, some number of them may be corrupted. They could be flipped and so on.

And depending upon the context, an error-prone one may induce some number of errors that we considered to be error-prone.

Now, there is no perfect transmission medium possible. So everything is error-prone. Depending on the context, one may say that this is more error-prone versus not.

So, for instance, you know, in a home or even anywhere -- let's say that I have an Ethernet at work which is wired. And if it's wired correctly and so on, it may have a few bits that will be corrupted for every million bits that will be corrupted, right?

And in the same environment, I may have an 802.11 wireless network, and maybe that's next to a kitchen. And somebody turns on a microwave and several thousand bits may be corrupted of a million, because it shares the spectrum where microwaves also live.

So again, depending on the context, one may say, "Hey, the wireless is more error-prone than the Ethernet."

Q. BY MS. WOO: I'm recalling Zoom meetings

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where my dad turned on the microwave sometimes, which was not so productive.

A. As it turns out, the original spectrum for 802.11 was given away free because of all of the interference from microwaves, not only from people's appliances, but also from the universe itself.

Q. So thank you for that.

Do you see also Foster gives digital television as an example of an error-prone broadcast environment?

A. I think you're referring to the sentence "A transport stream is typically used in error-prone broadcast environments such as digital television"?

Q. Yes.

A. Yes.

Q. What is digital television?

A. It depends, again, on the context. I think here, this is probably referring to over-the-air ATSC signals, essentially over-the-air television but in a digital form, not the original ATSC analog form.

Q. Is cable television digital television?

A. Again, it depends on the time frame. Original cable, if I remember correctly, was analog, but later cable systems transferred over to a

digital format.

Q. And is satellite television digital television?

MR. NIEBERG: Object to form.

THE WITNESS: Depends on the specific satellite and the encoding. Many satellite sort of small dishes that we see on people's houses are nowadays digital, but there is nothing fundamental about satellite that has to be digital. It can be analog as well.

Q. BY MS. WOO: Okay. And then a little later on in paragraph 73 do you see, "A program stream is generally used in more reliable transmissions, such as those with error-correcting codes or in fixed storage." Do you see that?

A. I see that.

Q. What is a transmission with error-correcting codes?

MR. NIEBERG: Object to form.

THE WITNESS: Same. Many transmission systems will have built-in ways of correcting errors, not just detecting errors.

And so an example, for instance, would be the communication that NASA uses to the Voyager crew. Now, the round-trip for Voyager is several

days. So on the other hand, the SpaceLink is very well characterized, and we expect certain number of bits to be corrupted over, let's say, a thousand bits.

And so there are mathematical functions that are used to transform the data such that if the number of errors is less than the threshold that we expect, then the entire original transmission can be recovered even though some of the bits may have been corrupted in transmission.

So that's an example. That's a general idea of an error-correcting code, which is, given a set number of errors, one can still reconstruct the original data.

Similar types of codes are used, for instance, in encoding on CDs -- people remember those -- or DVDs or Blu-ray, right? There's an expected number of bits that can be flipped on the optical media and in the read-out system. So when the data is written, it's written with a certain amount of redundancies so that the original uncorrupted data can be recovered.

Q. BY MS. WOO: You said "if people recollect CDs." I admit, I barely do.

So do you see it says, again, "A program

stream is generally used in more reliable transmissions such as those with error-correcting codes or in fixed storage."

What is fixed storage?

MR. NIEBERG: Object to form.

THE WITNESS: I think fixed storage here is referring to media such as CDs or hard discs where the data is written and is expected to be persistent. And again, as I said, those types of media often have built-in error correction, because they're designed to be reliable over a longer period of time.

Q. BY MS. WOO: So as you read before, Foster says, "Transport stream packets 350A-F are relatively small."

And then later on it says, "A single program stream packet can hold multiple video PES units 302 and 362."

Would it be fair to say that program stream packets are larger than transport stream packets?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: I would have to take a look at the specification. I just don't recall the size bounds on these packets on the program elementary stream units, how they are defined for transport

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1 versus program.
2 Q. BY MS. WOO: So I guess I'm trying to
3 understand why are there two types of streams
4 depending on the environment? Why not just have one
5 type of stream?
6 MR. NIEBERG: Object to form. Scope.
7 THE WITNESS: I think that's a question
8 primarily for the designers of the MPEG standard
9 itself. The MPEG forum recognized that as a video
10 format, the encoded video can be used in many
11 different scenarios, for instance, transmission over
12 unreliable links, also for storage on persistent
13 media or just otherwise being stored.
14 And those use cases are different enough
15 that it made sense to optimize for these use cases.
16 And these optimizations at the very least resulted
17 in the codification of at least these two types of
18 streams that are transport and program streams.
19 That's my best answer, is that they are designed and
20 optimized for slightly different use cases.
21 Q. BY MS. WOO: Do you know how a transport
22 stream is optimized for an error-prone broadcast
23 environment?
24 MR. NIEBERG: Object to form. Scope.
25 THE WITNESS: I would have to take a look

1 at the transport stream documents again. I think
2 there was more multiplexing -- just off the top of
3 my head, I remember there was more multiplexing in
4 the transport streams, but -- and the program stream
5 usually contains content from what we would consider
6 one source for video and audio, whereas transport
7 streams can multiplex multiple.
8 And then beyond that, it gets into very
9 much the details of the encoding, which I don't
10 remember off the top of my head.
11 Q. BY MS. WOO: So do you see at the end it
12 says, "A single" -- Foster, paragraph 73, "A single
13 program stream packet 360 can hold multiple video
14 PES units 302 and 362." Do you see that?
15 A. I see that sentence. It's part of a
16 sentence, but yeah.
17 Q. And do you see that a little earlier Foster
18 says, "A program stream is generally used in more
19 reliable transmission, such as those with
20 error-correcting codes or in fixed storage"? Do you
21 see that?
22 A. Yes.
23 Q. So if a program stream is stored on fixed
24 storage, why is it broken up into packets at all?
25 Why is it not just one giant block of data?

1 MR. NIEBERG: Object to form. Scope.
2 THE WITNESS: Okay. So there are several
3 issues here. First, there is nothing stopping a
4 transport stream from being stored on fixed storage.
5 It just may not be as efficient.
6 In general, the stream formats of MPEG were
7 designed with multiple goals in mind. One of them
8 is to optimize for use cases such as transmission
9 versus storage.
10 But even when stored, the streams would
11 have to support functionality, such as random
12 access, forward, reverse, and so on.
13 And one of the reasons that they're stored
14 in integral or PES units is to facilitate random
15 access.
16 Q. BY MS. WOO: And then why don't we look
17 at -- let's see. It is paragraph 40. And let me
18 know when you're there.
19 A. 4-0?
20 Q. Yes.
21 A. I'm there.
22 Q. Do you see it defines a receiver as "a
23 consumer device such as a set-top box, a DVD player,
24 et cetera, that receives content directly from a
25 content owner, from a content service, or from

1 another receiver within a" home "consumer network."
2 Do you see that?
3 A. Yes. It says "consumer home network," but
4 I do see it.
5 Q. How does a DVD player receive content
6 directly from a content owner?
7 MR. NIEBERG: Object to form. Scope.
8 THE WITNESS: Even in the early 2000s there
9 were networked DVD players. So it had the
10 functionality of being able to play a DVD, but the
11 decoding unit could be interfaced with that network
12 interface, and it could receive content from a
13 network. That's one way.
14 I mean, I don't know if the intent here
15 encompasses saying, "Hey" -- I don't know if you
16 remember, but the way Netflix started, we had these
17 little red envelopes with DVDs in it.
18 And let's just say that in this case,
19 Netflix is a content service provider. I don't
20 believe they had their own content back then. So,
21 you know, maybe inserting the DVD counts as
22 receiving content directly from a content owner or
23 service provider.
24 But certainly consumer devices such as DVD
25 players, if I remember correctly, by the mid to

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1 early 2000s also had network interfaces.
2 MS. WOO: I see. And I'll represent to you
3 I don't recollect DVD players or red envelopes very
4 much. Maybe vaguely. But unfortunately, I am of a
5 generation that is not really used to DVD players.
6 So we've been going for about an hour. Why
7 don't we take a quick break. How does ten minutes
8 sound to you?
9 (Discussion off the record.)
10 (A recess was taken.)
11 MS. WOO: All right. Let's go back on the
12 record.
13 Q. So, Dr. Bhattacharjee, if we could return
14 to Figure 1 in Foster. Can you let me know when
15 you're there?
16 A. I'm there.
17 Q. So in your opinion, does Figure 1 depict
18 synchronized delivery of the content with the keys
19 used to encrypt the content?
20 MR. NIEBERG: Object to form. Scope.
21 THE WITNESS: Figure 1 is a schematic of
22 different components, and Foster's system is
23 designed such that a system such as this could do
24 what is called synchronized delivery of content.
25 (Discussion off the record.)

1 Q. BY MS. WOO: So if we can turn back to
2 paragraph 51. And let me know when you're there.
3 I'm sorry. If you said something, I don't
4 think that we heard it.
5 A. I said I'm there.
6 (Discussion off the record.)
7 Q. BY MS. WOO: So in paragraph 51 do you see
8 where it says, "As indicated above, the DRMS fails
9 to provide synchronized" -- sorry -- "provide
10 synchronized delivery of the content with the keys
11 used to encrypt the content." Do you see that?
12 A. I do see that.
13 Q. In that sentence, would it be fair to say
14 "the DRMS" refers to the DRMS depicted in Figure 1?
15 MR. NIEBERG: Object to form. Scope.
16 THE WITNESS: I think if it's showing -- it
17 is talking about a way the DRMS can fail to
18 synchronize delivery of content. But the goal of
19 Foster is to take systems such as this and enable
20 the synchronization along with other things that
21 Foster teaches.
22 And if we take a look at, for instance, the
23 end of paragraph 48, Foster says that "previous
24 systems failed to provide such synchronized
25 transmission. Moreover, by synchronously

1 transmitting the title key with the encrypted
2 content, the present invention maintains
3 compatibility and compliance with current front-end
4 and back-end standards."
5 And so the systems that are being shown in
6 Figure 1 and Figure 2 are compatible with Foster,
7 but Foster shows how in some ways they can be
8 changed.
9 Q. BY MS. WOO: What is a front-end standard?
10 MR. NIEBERG: Object to form. Scope.
11 THE WITNESS: It depends on the context.
12 But the front-end standard can refer to the
13 processing that is done at the recipient as defined
14 by Foster.
15 Q. BY MS. WOO: And what is a back-end
16 standard?
17 MR. NIEBERG: Object to form. Scope.
18 THE WITNESS: The back-end standard, again,
19 depends on context. But the back-end standard would
20 be, for instance, as an example, the systems and
21 techniques that are used, for instance, to store,
22 encrypt, and transmit through a front end.
23 Q. BY MS. WOO: When you say "front end," what
24 are you referring to?
25 MR. NIEBERG: Object to form.

1 THE WITNESS: Yeah, one system's front end
2 could be another system's back end and so on. So we
3 have to take a look at the context in which these
4 words are being used.
5 But in general, a front end can be a
6 recipient in Foster, and the back end,
7 correspondingly, depending on perspective, would be
8 the set of systems that are used to transmit data to
9 the front end.
10 Q. BY MS. WOO: Is DRMS a standard?
11 MR. NIEBERG: Object to form. Scope.
12 THE WITNESS: "DRMS" is a broad term.
13 There are standards for DRMS. For instance, again,
14 going back to DVDs, there is a DRMS standard called
15 CAS that encrypts contents of DVDs. That's one
16 standard.
17 But by itself, "DRMS" is a broad term that
18 just refers to techniques for digital rights
19 management.
20 Q. BY MS. WOO: Does Figure 1 depict a DRMS
21 that fails to provide synchronized delivery of the
22 content with the keys used to encrypt the content?
23 MR. NIEBERG: Object to form. Scope.
24 THE WITNESS: Figure 1 is a schematic of a
25 system that implements DRMS. And that system may or

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may not do synchronized delivery of keys with content.

Foster describes how such a system could be used to synchronize delivery, but it doesn't have to always synchronize delivery of keys with content in such a system at that level of abstraction.

Q. BY MS. WOO: Okay. Why don't we look at Figure 16 of Foster, and just let me know when you're there.

A. Okay.

Q. What does Figure 16 depict?

MR. NIEBERG: Object to form.

THE WITNESS: According to Foster, Figure 16 depicts a computer system having an attachment system according to the present invention that's paragraph 30 in Foster.

Q. BY MS. WOO: In your opinion, does Figure 16 depict Foster's invention?

MR. NIEBERG: Object to form.

THE WITNESS: Figure 16 depicts a computer system having an attachment system according to the present invention.

Q. BY MS. WOO: Okay. Why don't we look now at Hayhurst. I will drop that into the chat, and I will email that to the reporter during the next

break.

So here is Hayhurst, which is Exhibit 1007, and just let me know when you have it open.

A. I have it open.

Q. When did you last review Hayhurst?

A. Again, I think over the weekend.

Q. Do you see the title of Hayhurst?

A. I see the title of Hayhurst.

Q. Did you consider Hayhurst's title when determining Hayhurst's field of endeavor?

MR. NIEBERG: Object to the form.

THE WITNESS: I considered Hayhurst, all of it, including the title.

Q. BY MS. WOO: So in your opinion, what is Hayhurst's field of endeavor?

MR. NIEBERG: Object to form.

THE WITNESS: Hayhurst, paragraph 2, under "Technical Field" states, "This application relates to the field of electronic media delivery, such as video-on-demand, including the secure handling and storage of such media."

Q. BY MS. WOO: And in your opinion, is that field of -- that technical field that you just read, is that the Hayhurst's field of endeavor?

MR. NIEBERG: Object to form.

THE WITNESS: Hayhurst has many ideas. And the technical field broadly is secure handling and storage of electronic media and its delivery.

If we -- if you have a specific part of Hayhurst you would like for me to look at, I can sort of give you more problems that it's working on.

Q. BY MS. WOO: If we go back to Hayhurst's title, how does Hayhurst's title indicate Hayhurst's field is, I believe you said, secure handling and storage?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: There were a few things here. First, the title is what it is. And Hayhurst is a Hayhurst specification and written description. It's several pages. It would be impossible to incorporate everything that Hayhurst is talking about into its three-word title.

Having said that, the title includes "decentralized." And in this case, "decentralized" means that the media is broken into different pieces, and then those pieces are given to different -- are distributed to different places in the network. And that's how it's decentralized, it's breaking up the media and distributing it.

And that way of segmenting media provides a

measure of security against compromise of the media, illegal or, let's say, unauthorized access and piracy and so on.

So the title refers to decentralization, which helps with security and also deters piracy.

Q. BY MS. WOO: Why don't we look at paragraph 8 of Hayhurst, and let me know when you're there.

A. Okay.

Q. So do you see it says, "The segmented and distributed storage of the media file provides a high level of security and a deterrence to piracy"? Do you see that?

A. I see that sentence.

Q. Do you agree with the statement?

MR. NIEBERG: Object to form.

THE WITNESS: The segmented and distributed storage does provide a level of security and deterrence to piracy. I do agree with that.

Q. BY MS. WOO: How does the segmented and distributed storage of media provide a high level of security?

MR. NIEBERG: Object to form.

THE WITNESS: The next sentence explains what Hayhurst means. It says, "No single subscriber

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1 unit has more than a segment of a media file, which
2 segment, by itself, has little value."
3 So by splitting up the original data,
4 presuming that, let's say, a particular subscriber
5 was compromised, then the segment by itself would
6 not provide much value.
7 And I should note that Hayhurst also
8 encrypts its segments, and so the attacker would get
9 a small encrypted part of a media file, for
10 instance. And even if it were able to compromise
11 the encryption, the amount of data it would get
12 would likely not be as useful as the entire file,
13 for instance.
14 Q. BY MS. WOO: You said it would not be --
15 getting one segment would not be as useful as
16 getting the entire media file, but would acquiring
17 one segment have some use?
18 MR. NIEBERG: Object to form. Scope.
19 THE WITNESS: It depends on the context,
20 right? Let's say this is a movie and it's been
21 divided in some way and the attacker really just
22 wanted to see one particular scene in the movie, and
23 by luck it got that scene, then maybe it's super
24 useful for the attacker.
25 On the other hand, if the attacker wants to

1 pirate the movie and sell it, then having one scene
2 is of little use to that attacker.
3 But in general, again, as the patents at
4 issue have also pointed out, dividing up media or
5 content and splitting it deters the access to the
6 whole, which by itself increases security.
7 Q. BY MS. WOO: Is distributing the segments
8 of the media file, is that a cryptographic method?
9 MR. NIEBERG: Object to form. Scope.
10 THE WITNESS: It depends. One can
11 cryptographically distribute pieces, or they may be
12 not cryptographic.
13 So depending on the system that we are
14 looking at and how it's implemented, it would -- I
15 would have to take a look at how the distribution is
16 done and what is required to, let's say, recompile
17 the components.
18 And so depending upon how it's done and if
19 there is a cryptographic method used to do the
20 distribution, then it could be cryptographic, but it
21 doesn't have to be.
22 Q. BY MS. WOO: Do you know if Hayhurst
23 cryptographically distributes the segments?
24 MR. NIEBERG: Object to form. Scope.
25 THE WITNESS: Hayhurst, as I said, has a

1 way of distributing, and there is a piece that I
2 want to find and read to you.
3 So let me just read a few pieces of
4 Hayhurst. Paragraph 23 of Hayhurst says, "The main
5 server (26) contains a controller (36) that controls
6 the distribution of a multitude of segments over the
7 network."
8 Later in that paragraph it says, "In one
9 embodiment, the main server (26) includes a
10 segment-tracking module (34) for tracking the
11 location of the segments. For example, in some
12 networks not all the subscriber units (22) may at
13 all times participate in the media-file delivery
14 system of the present invention.
15 "Accordingly, the segment-tracking module
16 stores the addresses of the participating units and,
17 via a look-up table or the like, keeps track of
18 which segments are distributed to which units."
19 Next, it says in paragraph 24, "Whenever a
20 subscriber requests a movie, the segment-tracking
21 module (34) provides an efficient way of instructing
22 the remaining units (that is, the one storing the
23 segments of the requested movie) to forward all of
24 the stored segments to the requesting subscriber."
25 Also in paragraph 21 of Hayhurst says that

1 "the segments are separate in the sense that they
2 represent discontinuous or nonsequential portions of
3 the movie and must be," says "soiled," but, well,
4 "must be soiled and integrated with the remaining
5 segments, distributed elsewhere in the network, to
6 provide the complete movie.
7 "This approach to segmenting the movie
8 provides increased security from piracy since each
9 subscriber A, B, C, et cetera, will store only very
10 small portions of the movie on the storage device of
11 the unit.
12 "If the segments are made very small, to
13 the scale of a few bytes or single bits, decoding of
14 any individual bundle will be virtually impossible.
15 "Further, access to the correct method for
16 recombining the segments to recreate the original
17 media file could be stored in a password-protected
18 file linked to an encryption key or locked to all
19 devices except the specific hardware device that
20 created the bundled segments."
21 So to answer your question, Hayhurst
22 envisions that encryption and decryption would be
23 required to be able to recombine the segments. And
24 depending on the scale over which the movie or,
25 let's say, the segments have been distributed, it is

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1 going to be difficult and potentially untenable for
2 an attacker to try to put this thing back together
3 without having access to something, the decoding
4 instructions that are stored encrypted.
5 Q. BY MS. WOO: Forgive my layperson's
6 understanding of encryption and cryptography.
7 So I'm not sure whether you've made clear
8 whether Hayhurst -- Hayhurst's method of
9 distributing to several set-top boxes, whether that
10 is a cryptographic method. Perhaps you can help me
11 understand.
12 MR. NIEBERG: Object to form. Scope.
13 THE WITNESS: Depending upon how Hayhurst
14 is implemented, as it says, one would have to have
15 access to an encrypted key in order to recompile or
16 put together the pieces to reconstitute the whole.
17 In that way, it is a cryptographic method,
18 because encryption and decryption is required in
19 order to put the pieces back together.
20 Q. BY MS. WOO: Is the step of just storing
21 segments on different storage devices or set-top
22 boxes, is that a cryptographic step?
23 MR. NIEBERG: Object to form. Scope.
24 THE WITNESS: At the end of the day, when
25 we take an encryption algorithm, what it is doing is

1 scrambling pieces of the original into different
2 places or bits, as the case may be, right?
3 And depending upon how Hayhurst does the
4 distribution and at what granularity it does the
5 distribution, as it says, it's virtually impossible
6 to decode without having access to the key and/or
7 the distribution method. And that is then protected
8 cryptographically.
9 So overall Hayhurst envisions that the
10 distribution provides security that is commensurate
11 with cryptographic scrambling, let's say.
12 Q. BY MS. WOO: Okay. Why don't we now look
13 at Orsini, so that is Exhibit 1005, which I will
14 again put in the chat and email the reporter during
15 the break. Oh, hang on. I don't even know if this
16 was sent. This one is a massive file.
17 MR. NIEBERG: Which exhibit number is that
18 again?
19 MS. WOO: This is 1005.
20 MR. NIEBERG: I have a version that's
21 7 megabytes.
22 MS. WOO: Oh, yes. Maybe you can email
23 that to the reporter, because I don't think that
24 will attach in the email, is the problem. The ones
25 we received were 45 megabytes.

1 (Discussion off the record.)
2 Q. BY MS. WOO: Just let me know when you
3 have it.
4 A. I do have it.
5 Q. Okay. Thank you so much. So if we can
6 look at Figure 21, just let me know when you're
7 there.
8 A. Yes, I'm there.
9 Q. What do you see at the very bottom of the
10 figure? Do you see a box, or two boxes, rather,
11 that say, "Encrypted share 2 (data/session key),"
12 and next to it a box that says, "Key 1." Do you see
13 that?
14 A. Yes.
15 Q. Would an attacker with access only to this
16 encrypted share 2 box and key 1 box be able to
17 decrypt encrypted share 2?
18 MR. NIEBERG: Object to form.
19 THE WITNESS: It depends on the
20 capabilities of the attacker and the encryption of
21 share 2.
22 Q. BY MS. WOO: What capabilities would that
23 attacker need to decrypt encrypted share 2 with
24 key 1?
25 MR. NIEBERG: Object to form.

1 THE WITNESS: It's not clear to me that
2 key 1 would necessarily be useful to decrypt
3 encrypted share 2. But if the encryption were such
4 that the attacker were able to convert it, so to
5 speak, without having the key, then, obviously, they
6 may be able to do it.
7 If key 1 and key 2 were somehow
8 correlated -- for instance, a bad random number
9 generator chose the keys to be sequential numbers,
10 and if I have key 1, then I know what key 2 will
11 be -- of course, that would also help and so on.
12 But in a properly designed system with an
13 encryption that is known at least to be secure
14 against the capabilities of that attacker, the
15 attacker would presumably be reduced to doing brut
16 force attacks on the key or it -- the thing is it's
17 not -- it would have a low likelihood of being able
18 to decrypt it, the key.
19 Q. BY MS. WOO: And if encrypted share 2 and
20 key 2 were stored together, would that have a higher
21 likelihood of being decrypted?
22 MR. NIEBERG: Object to form. Scope.
23 THE WITNESS: If a piece of encrypted data
24 and its key is provided and the encryption algorithm
25 is known, then it should be a deterministic process

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to be able to decrypt, presuming it's a proper encryption algorithm.

Q. BY MS. WOO: So on the same level, to the left, do you see the box -- boxes that say, "Encrypted share 1 (data/session key)" and "key N"?

A. I can see that.

Q. What does N stand for here?

A. I think N is a number that's bigger than 3, is the best guess.

Q. So assuming that N is 4, if an attacker were able to acquire and decrypt one of the shares, the encrypted shares in Figure 21, how much of the dataset -- of the encrypted dataset would the attacker have?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: It depends on whether the split was equal. If we assume that the splits are of equal size, then presumably it would have about a quarter of the original data to be parsed.

Q. BY MS. WOO: If an attacker managed to acquire access to encrypted share 2 and key 1, would that attacker know which encrypted share key 1 was used to encrypt?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: It would depend. It depends

upon what other information is there. And so to the extent we're saying that the attacker has received encrypted share 2 and key 1, then it knows it's key 1 and encrypted share 2. So by the label, it would know.

If it was just an encrypted share and a key, then it may or may not know, depending upon what other information is being kept along with it.

Q. BY MS. WOO: Okay. So you see this last row has the label "Obfuscate" next to it.

A. I see it, yes.

Q. To your understanding, what is happening in this step?

MR. NIEBERG: Object to form.

THE WITNESS: We can take a look at the reference. Let me just take a look.

If we take a look at paragraph 299, it says, "5. Encrypting each share, then store the encryption keys in different locations from the encrypted data portions or shares: Share 1 gets key 4, share 2 gets key 1, share 3 gets key 2, share 4 gets key 3."

And the storage of encryption keys in different locations from the encrypted data portions or shares is, I think, being described in the

obfuscation step.

Q. BY MS. WOO: Okay. Is the step of storing shares in different locations a cryptographic step?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: It depends upon how many shares there are and how the distribution was done of the -- if there are only four shares -- I mean, this seems like a rotation.

Again, I think one of the problems is it's not necessarily clear what it means for something to be cryptographic. A cryptographic function is just a mathematical function.

And, for instance, if I have encryption with a key, and let's say that the key is ten bits, then an attacker without knowing anything has a one-in-a-thousand or one-in-1024 chance of being able to decrypt just by using a random ten-bit number. Okay. It is a deterministic step at that point.

So on the other hand, assuming that all the attacker has to do, can do, is pick a random key, then its chances -- well, the worst chance it has is one over the exponential of the number of bits. So one would say, "Hey, a ten-bit key is no good. Because if I could do a thousand or 1024 tries, I

will get there," right?

So cryptographic security is -- usually it takes into account the capabilities of the attacker. If we say my algorithm with a key size of, let's say, a hundred bits, if such that a computer that a government can make that would have to run for a thousand years for it to have, let's say, an even chance of decrypting. Maybe one would consider that to be cryptographic security.

So anything can be a cryptographic step if the chances of decrypting become a large function of the computational ability, which is the randomness that's inherent in the algorithm itself.

So as written here with just a shift, a rotation, maybe that's not a cryptographic step. But there can certainly be ways of doing -- let's say, storing keys in different locations. That would require a large amount of computation to be able to decode, and that may become a cryptographic step.

Q. BY MS. WOO: Okay. So if I have, say, a copy of a movie, I split into four just along the time stamps, I put each portion on a USB, I give one to my sister, she drives off, I give one to my mom, she drives off, I give one to my dad, he drives off,

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is that a cryptographic method?
MR. NIEBERG: Object to form. Scope.
THE WITNESS: I don't think I had quite analyzed that, you know. Usually, a cryptographic method refers to the amount of computation that would be required in order to undo a certain step, for instance.
And I don't know where they drove off, how difficult it would be. Computationally, it's not something that one would be able to quantify. So I'm not able to answer your hypothetical.
Q. BY MS. WOO: If I have a dataset and I take one portion of it, as long as it's less than a whole, I put it on a USB, and I just remove that USB from my computer, is that a cryptographic method?
MR. NIEBERG: Object to the form. Scope.
THE WITNESS: So I think we are getting into the territory of security versus cryptography.
So cryptography usually refers to the computational process and the amount of computation needed to reverse, let's say, an encryption that would be a cryptographics trend.
Now, from a network attacker's point of view, if you were to put a piece of data on a USB drive, remove it from the original computer that's

connected to the network, it's nearly perfect security. Because no matter how much computation they have, they're not going to be able to get to it. So it's a very secure method. It is offline storage, it's usually called.
But cryptographically it's difficult, if not impossible, to quantify because it's really not a -- it's not depending on the mathematics of the process but on the physical steps you've taken, if that makes sense.
So I think it's a secure method, but it is not a method that's relying on cryptography to provide security, but our physical actions and, let's say, dissociation from the memory from what's reachable over the network to provide security.
MS. WOO: Why don't we take another quick ten-minute break, and then why don't we return at 10:00 a.m. Pacific Time.
(A recess was taken.)
MS. WOO: Let's go back on the record.
Thank you, Dr. Bhattacharjee.
Mr. Elliot will conduct the rest of the deposition.
MR. ELLIOTT: Well, unless we have to recross and redirect.

EXAMINATION BY MR. ELLIOTT
Q. Mr. Bhattacharjee, I think we met, I think, at your last deposition for this matter. I'm Stephen Elliott. I'm with Sullivan & Cromwell.
I wanted to ask you primarily questions about your report relating to the '116 patent, which is the 212 IPR.
First, you have a number of grounds in there. Among the grounds are Foster and Hayhurst. And I just wanted to ask a couple of questions about Foster, if we can go back to that. And that is Exhibit 1006, which I think has been provided to you already.
A. Before we get going, would it be possible for me to get the '116 reply declaration?
Q. Sure. Let me pull it up here.
MR. ELLIOTT: Can we go off the record for a second.
(A recess was taken.)
THE WITNESS: I have it.
Q. BY MR. ELLIOTT: Dr. Bhattacharjee, I want to ask you, though, to turn to figure -- I'm sorry -- to the Foster reference. Again, that's Exhibit 1006.
Do you have that?

A. Okay. Yes.
Q. I want to understand your position on this. If I look at paragraph 15 of Foster, it says "Figure 1 depicts a flow diagram of a digital rights management system."
Did I have that correct?
A. That's correct.
Q. Figure 1 is a DRMS system, right?
A. That's what it says.
Q. And then in paragraph 49 it says, referring to Figure 1, "a depiction of a DRMS system is shown," correct?
A. That's correct.
Q. We can conclude from that, can't we, that Figure 1 does depict the DRMS system?
MR. NIEBERG: Object to form.
THE WITNESS: Paragraph 49 says, "Referring now to Figure 1, a depiction of a digital rights management system (DRMS) is shown."
Q. BY MR. ELLIOTT: Is it fair to say Figure 1 depicts a DRMS system?
A. Figure 1 is showing schematics of a system that can implement DRMS.
Q. That's not what paragraph 49 says, is it?
Paragraph 49 says, "A depiction of a

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1 digital rights management system is shown." It
2 doesn't say anything about implementation. It says,
3 "A depiction of a digital rights management system
4 is shown," right?
5 MR. NIEBERG: Object to form.
6 THE WITNESS: I think we may, then, have to
7 understand what "depiction" means. But it's showing
8 the schematic of a system in which DRMS can be
9 implemented.
10 Q. BY MR. ELLIOTT: So you disagree with
11 paragraph 49, which says that Figure 1 depicts a
12 DRMS system?
13 MR. NIEBERG: Object to form.
14 Q. BY MR. ELLIOTT: You're saying it doesn't
15 depict a DRMS system; it only depicts a system in
16 which DRMS might be implemented?
17 MR. NIEBERG: Object to form.
18 THE WITNESS: I would disagree with that
19 characterization of it. Figure 1 has many
20 components. If we take a look, it has a PC, for
21 instance, with a browser and a DRMS client. It has
22 servers, different types of servers and so on. And
23 all together, this is depicting a schematic of a
24 system in which DRMS can be implemented.
25 Q. BY MR. ELLIOTT: Is DRMS implemented in the

1 system of Figure 1?
2 MR. NIEBERG: Object to form.
3 THE WITNESS: It depends upon how that
4 system is used. But as I said, it's showing the
5 schematics of the components necessary, or at least
6 as demonstrated, a system where DRMS can be
7 implemented.
8 Q. BY MR. ELLIOTT: But you don't think it
9 shows a system in which DRMS is implemented?
10 MR. NIEBERG: Object to form. Scope.
11 THE WITNESS: I don't know how to answer
12 that, frankly. It's showing a system in which DRMS
13 can be implemented.
14 Q. BY MR. ELLIOTT: Well, it's important
15 because I think -- does Figure 1 depict a system in
16 which the implementation of DRMS fails -- strike
17 that.
18 It's true, isn't it, that DRMS does not
19 provide synchronized delivery of content with the
20 keys used to encrypt the content?
21 MR. NIEBERG: Object to form. Scope.
22 THE WITNESS: I wouldn't agree with such a
23 broad characterization.
24 Q. BY MR. ELLIOTT: Well, if I look at
25 paragraph 51 it says, "As indicated above, DRMS

1 fails to provide synchronized delivery of the
2 content with the keys used to encrypt the content,"
3 right? And is that -- did I read that correctly?
4 Did I read that correctly?
5 A. The sentence, "As indicated above, the DRMS
6 fails to provide synchronized delivery of the
7 content with the keys used to encrypt the content."
8 That's the sentence.
9 Q. Is that the DRMS that's implemented in
10 Figure 1?
11 MR. NIEBERG: Object to form. Scope.
12 THE WITNESS: It is talking about a DRMS
13 system, and schematic of that system is shown in
14 Figure 1.
15 Q. BY MR. ELLIOTT: No, Dr. Bhattacharjee. It
16 says "the DRMS." Is the reference to "the DRMS" the
17 DRMS that's referred to in Figure 1?
18 MR. NIEBERG: Object to form.
19 THE WITNESS: I think here the DRMS is the
20 digital rights management system. Figure 1 is not
21 the only way to implement DRMS. And also, Figure
22 1's DRMS can be implemented with or without
23 synchronization. So the --
24 Q. BY MR. ELLIOTT: So what is the --
25 A. May I finish?

1 So this is a depiction of a schematic of a
2 system in which DRMS can be implemented. And as
3 Foster teaches, these types of systems can be used
4 to provide synchronization between the key and the
5 encrypted content as well, because Foster is
6 compatible with existing systems.
7 So I think to the extent you are asking
8 Figure 1 would preclude synchronization, I would
9 disagree. But Figure 1 is showing the schematic of
10 a system in which DRMS can be implemented.
11 Q. Let me ask it this way. What is the
12 reference to the DRMS in Figure 1? What is the
13 reference to "as indicated above, the DRMS"? What
14 is the DRMS there?
15 A. That DRMS is the digital rights management
16 system.
17 Q. And it's the digital rights management
18 system that's implemented in Figure 1, right?
19 MR. NIEBERG: Object to form.
20 THE WITNESS: Figure 1 is a depiction of a
21 digital rights management system. But Figure 1
22 itself is broad, and it has schematic -- it is a
23 schematic of different components which are being
24 used to implement a digital rights management
25 system.

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Q. BY MR. ELLIOTT: I see. And what's the reference to "the DRMS" in paragraph 51?
A. The DRMS is the digital rights management system.
Q. What digital rights management system?
A. That would be a type of DRMS that can be implemented using the components of Figure 1.
MR. ELLIOTT: I'm sorry. Balinda, could you read that back, please, the answer?
(Reporter read back as requested.)
Q. BY MR. ELLIOTT: Okay. And so the DRMS that can be implemented with the components of Figure 1 fails to provide synchronized delivery of the content with the keys used to encrypt the content, right?
MR. NIEBERG: Object to form.
THE WITNESS: I wouldn't agree with that characterization. Multiple types of DRMS can be implemented using Figure 1. Because all of the components are there that are required for Foster.
Now, a depiction of DRMS is shown in Figure 1. And as depicted, it may or may not synchronize, but the components are there such that it can synchronize.
Q. BY MR. ELLIOTT: Do you have any basis in

Foster for saying that the DRMS in Foster does not fail to provide synchronized delivery of content with the keys used to encrypt the content?
Is there any basis in Foster for saying that?
MR. NIEBERG: Object to form.
THE WITNESS: I cannot understand your question. Could you ask it again?
Q. BY MR. ELLIOTT: You're saying that the DRMS does not require synchronized delivery of content -- I'm sorry. Strike that.
Is there any basis in Foster for your opinion that the DRMS described in paragraph 51 that fails to provide synchronized delivery of the content with the keys used to encrypt the content is not the DRMS depicted in Figure 1?
MR. NIEBERG: Object to form. Scope.
THE WITNESS: Okay. So if I understand correctly -- well, maybe I don't really understand. Can you ask that question again? Because I don't --
MR. ELLIOTT: Can you read the question back, please?
(Reporter read back as requested.)
MR. NIEBERG: Object to form. Scope.
THE WITNESS: Would it be possible for you

to ask that question slightly differently? Because I really don't understand some of the premise and/or what you're asking.
Q. BY MR. ELLIOTT: Paragraph 51 refers to the DRMS, correct?
A. Paragraph 51 uses the phrase "the DRMS," correct.
Q. And when it uses that phrase, it's referring to the DRMS that "fails to provide synchronized delivery of the content with the keys used to encrypt the content," right?
A. It says that, yes.
Q. The DRMS refers to a DRMS that "fails to provide synchronized delivery of the content with the keys used to encrypt the content," right?
A. I mean, you're just reading from paragraph 51, right?
Q. That's right.
A. Yes. It's talking about a particular implementation that fails to provide synchronized delivery of the content with the keys used to encrypt the content.
Q. Okay. And figure -- is there any basis in Foster for your opinion that that DRMS that's referred to in Figure 1 is not the DRMS depicted --

I'm sorry. This is getting complicated.
Is there any basis in Foster for your opinion that the, quote, "the DRMS" referred to in figure -- in paragraph 51 is not the DRMS depicted in Figure 1?
MR. NIEBERG: Object to form. Scope.
THE WITNESS: Let me try and answer, and maybe we'll have to do this again.
Figure 1 is showing a schematic of a system in which DRMS can be implemented.
That particular system may or may not provide synchronization.
Now, in one implementation, the DRMS tables will provide --
Q. BY MR. ELLIOTT: Let --
A. May I finish?
Q. Let me stop you there, because I think I understand the confusion here. Let me ask the question a different way.
When you say "the DRMS depicted in Figure 1 may or may not provide synchronization," what's the basis in Foster for saying that?
MR. NIEBERG: Object to form.
THE WITNESS: Figure 1 is a depiction of a system with multiple components. Foster, among

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other things, teaches how to synchronously transmit the title key with encrypted content.

In paragraph 48, as I read earlier, Foster says, "The present invention maintains compatibility and compliance with current front-end and back-end standards."

So just by reading Foster and looking at the components of Figure 1, that particular schematic can also implement Foster's invention, and, thus, it is a system that you provide the DRMS and may provide synchronization or may not.

Q. BY MR. ELLIOTT: Is your only basis in Foster for saying that the DRMS in Figure 1 may or may not provide synchronization, is that statement in paragraph 48 your only basis for saying that?

MR. NIEBERG: Object to form.

THE WITNESS: No. That statement in paragraph 48 explicitly says that the present invention, which among other things, provides synchronization between keys and encrypted content, maintains compatibility and compliance with existing systems.

Now, the rest of Foster describes Foster's techniques. And all of these can be implemented on the system that's in Figure 1, because among other

things, Foster maintains compatibility. But also we can just go through the text of Foster, and it will be clear that it is compatible. And one of ordinary skill would understand how to implement Foster within the context of existing systems, including existing DRMS systems.

Q. BY MR. ELLIOTT: All right. Let me ask the question again, because I don't think you answered it.

Is the statement that you mentioned in paragraph 48 the only basis in Foster that you have?

Can you point me to another statement in Foster for it -- as a basis for your opinion that the DRMS depicted in Figure 1 may or may not provide synchronization?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: Figure 1 refers to a schematic, and it's a set of components that can be used to implement DRMS. It may not provide synchronization if the title keys are not transmitted along with the encrypted content.

However, Foster teaches a method that is compatible with such a system and provides such synchronization.

So that particular schematic can provide

synchronization by, among other things, using Foster's technique, or it could be run without providing synchronization.

And first basis, of course, is what I said, Foster maintains compatibility and compliance. But the rest of Foster also really enforces this by describing how it maintains compatibility and compliance with existing systems.

Q. BY MR. ELLIOTT: The only description in figure -- of the DRMS in connection with Figure 1, though, says that it fails to provide synchronized delivery of the content with the keys used to encrypt the content, right?

MR. NIEBERG: Object to form.

THE WITNESS: Foster's entire invention can be implemented within the bounds of Figure 1. And so I wouldn't say that's the only description of Figure 1. Figure 1 shows a schematic of components that can be used to implement DRMS and includes synchronization as taught by Foster.

Q. BY MR. ELLIOTT: Can you point me to a description of Figure 1 somewhere else in Foster, a description of Figure 1 that shows a synchronous delivery of a content with the keys used to encrypt the content?

A. All of Foster is describing how to do -- well, not all, but a lot of Foster is describing how to do the synchronization, and it maintains compatibility with the existing systems. It says so.

Q. There's no other discussion of Figure 1 in Foster, though, that describes -- that describes the use of a DRMS that doesn't -- that -- I'm sorry. There's no description -- strike that. Let me start again.

There's no description in Foster, is there, of Figure 1 in a context where DRMS is provided that can do synchronous delivery of content with the keys used to encrypt the content?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: Okay. So DRMS is a description of methods that can provide digital rights management.

What Foster is doing does not change that fundamental fact, that the content provider or owner can put restrictions on which recipient can render the content when.

So Foster's system enhances DRMS systems and -- but still remains a DRMS system, and it remains compatible with existing hardware for doing

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1 DRMS.
2 Q. BY MR. ELLIOTT: Foster's method is an
3 improvement on the prior art DRMS systems, right?
4 MR. NIEBERG: Object to form. Scope.
5 THE WITNESS: Foster's method is a way --
6 well, first, Foster teaches many things; but among
7 other things, it teaches a synchronization method.
8 But implementing that synchronization method does
9 not make a previous DRMS system no longer a DRMS
10 system. It's still a DRMS system, which may be more
11 efficient with respect to how keys are transmitted.
12 MR. ELLIOTT: Can you read that back,
13 please?
14 (Reporter read back as requested.)
15 Q. BY MR. ELLIOTT: The synchronization in
16 Foster makes the previous DRMS systems more
17 efficient; is that your testimony?
18 MR. NIEBERG: Object to form.
19 THE WITNESS: DRMS systems provide digital
20 rights management. Foster teaches a particular way
21 of transmitting keys, which in some cases and many
22 cases may make the system more efficient with
23 respect to various aspects of storage and rendering
24 that Foster discusses.
25 Q. BY MR. ELLIOTT: Makes it more efficient

1 because the previous systems didn't have it, right?
2 MR. NIEBERG: Object to form.
3 THE WITNESS: Can you ask me that question
4 again complete?
5 Q. BY MR. ELLIOTT: It's actually more
6 efficient because the previous systems didn't have
7 that, right?
8 MR. NIEBERG: Object to form.
9 Q. BY MR. ELLIOTT: Foster's invention makes
10 it more efficient, because the previous systems did
11 not have synchronization, right?
12 MR. NIEBERG: Object to form. Scope.
13 THE WITNESS: Sorry. What is "it"?
14 MR. ELLIOTT: Foster's -- can you read back
15 the question, please?
16 (Reporter read back as requested.)
17 MR. ELLIOTT: Sorry. Can you read back his
18 previous answer?
19 (Reporter read back as requested.)
20 Q. BY MR. ELLIOTT: So Foster makes the DRMS
21 system more efficient as compared to prior art DRMS
22 by providing synchronization, right?
23 (Discussion off the record.)
24 (A recess was taken.)
25 Q. BY MR. ELLIOTT: So I think my question was

1 Foster's invention, because it provides synchronous
2 transmission of content and the keys used to encrypt
3 that content, it's more efficient than prior art
4 systems like that depicted in Figure 1, right?
5 MR. NIEBERG: Object to form. Scope.
6 THE WITNESS: Okay. "Efficient" is a vague
7 word here. Foster's system enables random access.
8 And also, potentially, it removes an impediment to
9 finding which key had been used to encrypt which
10 piece of content, potentially allows different keys
11 to be used without having to worry about finding the
12 particular key that was used to encrypt a piece of
13 content.
14 All of these are discussed in Foster. So
15 it changes the system such that the key that was
16 used to encrypt the content is -- is easily found.
17 That's the easiest way to put it.
18 Q. BY MR. ELLIOTT: That is the improvement
19 that Foster provides over other DRMS systems, right?
20 MR. NIEBERG: Object to form. Scope.
21 THE WITNESS: I think an improvement that
22 Foster discusses, that still provides DRMS but was
23 potentially not known previously.
24 Q. BY MR. ELLIOTT: Okay. And that's an
25 improvement that Foster provides over CAS systems,

1 right, other prior art CAS systems, right?
2 MR. NIEBERG: Object to form. Scope.
3 THE WITNESS: Foster discusses CAS systems
4 that do not have synchronization.
5 Q. BY MR. ELLIOTT: That's right. And in
6 paragraph 52 Foster says, "Thus" -- I'm looking at
7 around the middle of paragraph 52. "Thus, similar
8 to DRMS, the CAS also fails to provide synchronous
9 delivery of keys with encrypted content," right?
10 A. I see that sentence.
11 Q. And that's true, isn't it?
12 MR. NIEBERG: Object to form. Scope.
13 THE WITNESS: The particular conditional
14 access system that is discussed in Foster does not
15 have synchronization.
16 Q. BY MR. ELLIOTT: And that's the system
17 discussed in Figure 2, right, or depicted in
18 Figure 2?
19 A. Again, that's a system that can have
20 synchronization. But as discussed, or as it is
21 implemented in Figure 2, it does not provide
22 synchronization.
23 MR. ELLIOTT: Can you read that back,
24 please?
25 (Reporter read back as requested.)

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Q. BY MR. ELLIOTT: I'm going to ask you to turn to your declaration on the '116 patent.
MR. NIEBERG: I'm sorry. The reply?
MR. ELLIOTT: Yes. Your reply declaration.
Q. BY MR. ELLIOTT: Let me ask you to turn to paragraph 9 of your reply declaration. This is Exhibit 111.
A. Okay.
Q. I believe it is Exhibit 111. Do you have it?
A. Yes.
Q. There you're discussing SFI's '854 patent. Do you see that?
A. Yes.
Q. You don't contend, do you, that the '854 patent is prior art for the '116 patent?
MR. NIEBERG: Object to form. Scope.
THE WITNESS: I don't know the -- I don't know the prior art history of '854 which was taught in '116 off the top of my head.
Q. BY MR. ELLIOTT: So you have no opinion as to whether it's prior art or not?
MR. NIEBERG: Object to form.
THE WITNESS: The discussion in that paragraph is not to do with prior art or priority.

It's the fact that the total key information is used routinely to mean an object that includes the encryption key.
Q. BY MR. ELLIOTT: Right. But you're not -- again, it's not your opinion that the '854 patent is prior art to the '116 patent, right?
MR. NIEBERG: Object to form.
THE WITNESS: I don't have an opinion with respect to the priority of the '854 patent or whether it's prior art to '116.
Q. BY MR. ELLIOTT: And with respect to in paragraph -- in paragraph 11, you refer to Exhibit 1113.
A. That's correct.
Q. It's not your opinion that Exhibit 1113 is prior art to the '116 patent, is it?
MR. NIEBERG: Object to form.
THE WITNESS: Off the top of my head, I don't remember the dates on Exhibit 1113. I believe it's contemporaneous, but I'd have to take a look at it. But again, here what I'm saying is that Exhibit 1113 likewise uses the term "key information" to encompass at least the key.
Q. BY MR. ELLIOTT: But you're not offering the opinion that Exhibit 1113 is prior art?

MR. NIEBERG: I'll object to form. Scope.
THE WITNESS: I don't know that I've done a prior art or priority analysis of 1113 with respect to the '116 patent.
MR. ELLIOTT: Colette, do you have the Tajima prior art? I think it's Exhibit 1005. Can you drop it into the chat?
MS. WOO: Yeah. I'll drop it into the chat.
THE WITNESS: I have the Tajima open.
Q. BY MR. ELLIOTT: You have it open. Great. When's the last time you reviewed the Tajima reference?
A. I think over the weekend.
Q. Okay. So you looked at it over the weekend?
A. Yes.
Q. About how much time did you spend looking over it?
A. I don't recall specifically.
Q. Is the purpose of the invention of the Tajima to improve the security of personal information stored in areas connected to the Internet?
MR. NIEBERG: Object to form.

THE WITNESS: The Tajima discusses various methods of improving security of data. And some of the examples that it uses has to do with personal information.
Q. BY MR. ELLIOTT: Are there any examples in Tajima other than personal information?
MR. NIEBERG: Object to form. Scope.
THE WITNESS: I'd have to take a look at the Tajima. But again, the Tajima I know discusses shopping; and depending upon what information is stored with shopping, that may or may not be personal information.
Q. BY MR. ELLIOTT: Let's see. Is there any discussion in Tajima of the storage of media information?
MR. NIEBERG: Object to form.
THE WITNESS: I'd have to take a look at the Tajima. But again, the method of Tajima can be applied to any type of data. It's just digital data that can be split and encrypted. So there would be no reason for it not to be applicable to any kind of data.
Q. BY MR. ELLIOTT: There's no example in the Tajima, though, of applying it to media information, is there?

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1 MR. NIEBERG: Object to form.
2 THE WITNESS: I have to -- sorry. At
3 least -- or I can look through the Tajima, but I
4 don't know that the Tajima produced media
5 information.
6 Q. BY MR. ELLIOTT: When you were reviewing it
7 this weekend, did you find any example like that?
8 MR. NIEBERG: Object to form.
9 THE WITNESS: I don't know that I was
10 looking for media information, per se. But off the
11 top of my head, I don't -- I can't answer the
12 question. I don't know whether I read that or not.
13 Q. BY MR. ELLIOTT: Tajima makes a distinction
14 between data fragments and data portions, doesn't
15 it?
16 MR. NIEBERG: Object to form. Scope.
17 THE WITNESS: Can you point me to a
18 particular part of Tajima that you want me to
19 consider?
20 Q. BY MR. ELLIOTT: You're not aware of the
21 distinction between data fragments and data portions
22 in Tajima?
23 MR. NIEBERG: Object to form. Scope.
24 THE WITNESS: Yeah, those are very similar
25 phrases, and Tajima uses data fragments. I think it

1 also uses data portions. And again, if there's a
2 specific distinction you would like for me to
3 comment on, I'll be happy to look at it.
4 Q. BY MR. ELLIOTT: But sitting here now,
5 you're not aware of the distinction between those
6 two?
7 MR. NIEBERG: Object to form.
8 THE WITNESS: Tajima uses both phrases,
9 "data fragments" and "data portions." And I'd have
10 to take a look at Tajima to see to what extent it's
11 being used differently.
12 Q. BY MR. ELLIOTT: Look, for example, at
13 paragraph 111.
14 Does that refresh your recollection as to
15 the distinction between data fragments and data
16 portions in Tajima?
17 A. I'm looking.
18 MR. NIEBERG: Object to form.
19 MR. ELLIOTT: I'll withdraw the question.
20 Q. Let me ask you about something else.
21 The -- Tajima divides the personal
22 information that is being secured into data
23 fragments, data portions, and it stores the data
24 fragments in different locations; is that correct?
25 MR. NIEBERG: Object to form.

1 THE WITNESS: Tajima divides information
2 that can be personal information. And eventually
3 the data fragments are encrypted, and each encrypted
4 fragment is then stored in different databases.
5 Q. BY MR. ELLIOTT: That's one embodiment of
6 Tajima that you mentioned, right?
7 A. That's correct.
8 MR. NIEBERG: Object to form.
9 MR. ELLIOTT: And the -- I'm sorry. Can
10 you read that answer back, please?
11 (Discussion off the record.)
12 (Reporter read back as requested.)
13 Q. BY MR. ELLIOTT: It's important in -- in
14 Tajima the different databases are controlled by
15 separate or by different entities, right?
16 MR. NIEBERG: Object to form. Scope.
17 THE WITNESS: At least in some
18 implementations of Tajima that may be the case.
19 Q. BY MR. ELLIOTT: Well, take a look at the
20 abstract of Tajima. It says, "Personal information
21 that is registered with areas that can be connected
22 to the Internet, divided into plurality data
23 portions, which are then each registered with areas
24 that are under different control."
25 What do you understand is meant by

1 "registered" there?
2 A. Tajima uses "registered" in different
3 contexts. But among things, registered with a
4 database usually means stored with it, stored in the
5 database.
6 Q. It says that they're registered with areas
7 that are under different control.
8 What does that mean?
9 MR. NIEBERG: Object to form. Scope.
10 THE WITNESS: It is saying what it is.
11 It's registered with areas that are under different
12 control.
13 Q. BY MR. ELLIOTT: What do you understand to
14 be meant by "control"?
15 MR. NIEBERG: Object to form. Scope.
16 THE WITNESS: I think that's a very broad
17 word here. Different control is just that,
18 depending -- there are different examples of types
19 of control, for instance. But it could be
20 administrative control. It could be different
21 control based upon other attributes as well.
22 Q. BY MR. ELLIOTT: The examples in Tajima,
23 though, are of control, different control by
24 different entities, right, different certificate
25 authorities?

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1 MR. NIEBERG: Object to form. Scope.
2 THE WITNESS: Is there a specific part of
3 Tajima you would like for me to look at?
4 Q. BY MR. ELLIOTT: Well, can you answer the
5 question that I asked?
6 MR. NIEBERG: Object to form. Scope.
7 THE WITNESS: Not without being specific
8 about what is it that you're asking about.
9 Q. BY MR. ELLIOTT: Well, in Tajima, the
10 areas, the databases are controlled by different
11 certificate authorities, right?
12 MR. NIEBERG: Object to form. Scope.
13 THE WITNESS: I think that's one of the
14 examples, but I don't know that Tajima requires
15 there to be different certificate authorities.
16 It is, in general, talking about
17 distributed storage, and certificate authorities are
18 an example of different areas with different
19 control.
20 Q. BY MR. ELLIOTT: Different certificate
21 authorities would be different entities that issue
22 the certificates, right?
23 MR. NIEBERG: Object to form. Scope.
24 THE WITNESS: You would have to take a
25 specific example and see what the administrative

1 structure is for the certificate authorities.
2 Q. BY MR. ELLIOTT: Let me ask you to look at
3 the summary of the invention.
4 A. I'm sorry. Can you give me a paragraph
5 number to look at?
6 Q. It's around paragraph 44, 45, 46.
7 A. Okay.
8 Q. Is it your understanding that the summary
9 of invention describes the Tajima's invention?
10 MR. NIEBERG: Object to form. Scope.
11 THE WITNESS: The summary of invention is
12 exactly that. It summarizes a use case. But I
13 think it is important to understand that Tajima
14 teaches a method that can be used to secure data.
15 And one of the use cases is what's being described
16 in the summary.
17 Q. BY MR. ELLIOTT: Well, the summary is not
18 describing the use case, right? The summary is
19 describing, as it says in paragraph 45, the present
20 invention. It is not describing a particular
21 embodiment, is it?
22 MR. NIEBERG: Object to form. Scope.
23 THE WITNESS: I would disagree with that
24 characterization. I think that's much too narrow.
25 Q. BY MR. ELLIOTT: You think the summary of

1 the invention is not describing the present
2 invention, Tajima's invention?
3 MR. NIEBERG: Object to form. Scope.
4 THE WITNESS: That's not what it said. I
5 think one of ordinary skill reading Tajima would
6 understand that it is a method for securing data.
7 And the example that is being used is for personal
8 data and specific storage areas and so on.
9 Q. BY MR. ELLIOTT: Well, the summary of the
10 invention at least describes an authentication
11 means -- in looking at paragraph 46, it says, "The
12 authentication means or service provider divides the
13 submitted personal information through a plurality
14 of data portions, registers at least one of the
15 plurality of data portions with the database that is
16 provided in the authentication means or service
17 provider, and register the other portions with other
18 areas that are connectable to the Internet and under
19 control that is separate from the authentication
20 means or service provider." Do you see that?
21 A. Yes.
22 Q. It's fair to say, isn't it, that part of
23 Tajima's invention is making sure that the data
24 fragments, the data portions, are stored in areas
25 that are not under the control of the entity that's

1 doing the dividing?
2 MR. NIEBERG: Object to form. Scope.
3 THE WITNESS: That's one implementation of
4 Tajima. But in general, Tajima is describing a
5 method for securing data and how to split data and
6 store data.
7 Q. BY MR. ELLIOTT: Are you aware of any
8 example in Tajima where the -- the data is stored in
9 locations that are not under separate control or not
10 under different control?
11 MR. NIEBERG: Object to form. Scope.
12 THE WITNESS: I would have to take a look
13 at Tajima and see whether -- what it says about
14 storage.
15 Q. BY MR. ELLIOTT: Sitting here today, you're
16 not aware of any example; is that right?
17 MR. NIEBERG: Object to form.
18 THE WITNESS: No. I would just have to
19 take a look at Tajima because certainly there are --
20 while there are many implementations and
21 embodiments, and I don't have them memorized off the
22 top of my head.
23 Q. BY MR. ELLIOTT: But you have looked at
24 Tajima a number of times now, right, in connection
25 with preparing your declaration for the petition, in

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terms of preparing for your deposition the first time around, in terms of preparing your declaration.

In this case you looked at Tajima again. You looked at it again this weekend in preparing for your deposition.

Having looked at it all those times, are you aware of any example in Tajima where the data is not stored in locations that are under separate or different control?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: Sorry. That's a very long question. Can you ask me again?

MR. ELLIOTT: Can you read it back?

(Reporter read back as requested.)

MR. NIEBERG: Object to form. Scope.

THE WITNESS: As I said, I'd have to take a look at the storage aspects of Tajima again to be able to fully answer your question.

Q. BY MR. ELLIOTT: But sitting here, you're not aware of any examples; is that right?

MR. NIEBERG: Object to form.

THE WITNESS: I don't have Tajima memorized. I just have to look at it again to see the extent of disclosure of storage in Tajima.

Q. BY MR. ELLIOTT: Why would Tajima require

separate or different control of the areas in which the data fragments are stored?

MR. NIEBERG: Object to form. Scope.

THE WITNESS: Where it says that, it's not clear that Tajima's method requires that. Tajima's embodiments and examples may state that. But in general, this is the same sort of idea that's in Hayhurst, for instance, also described to a certain extent by the patents at issue.

When we divide and store data at different locations, then all of those locations would have to be, well, compromised, assuming the full data has to be recovered, and that adds a measure of security.

Q. BY MR. ELLIOTT: So just considering the examples in Tajima that require Tajima's statement that separate or different control is necessary, for example, in paragraph 46, why would separate control be necessary?

A. Well, it's not clear to me that Tajima says it's necessary. The idea is that if data is stored in different places, then ideally, if one site is compromised, that does not automatically, you know, lead to a compromise at another site. One way to potentially decrease that chance is to make them have different control. Potentially they will use

different methods, different security protocols and so on. And that could reduce the chance of one compromise spilling over to another.

MR. ELLIOTT: Let me take a quick break. We've been going more than an hour, I think. Can we take five minutes?

MR. NIEBERG: Sure.

MR. ELLIOTT: Let's go off the record.

(A recess was taken.)

Q. BY MR. ELLIOTT: Let me ask you to turn back to your declaration, which I think is Exhibit 1111.

A. Just a second. I'm having some issues with my computer again. Okay.

Q. I'm going to turn back to one of the references here.

Let me ask you to turn to page 7 of your declaration. I just had a question about the figure that you have there.

MR. NIEBERG: I'm sorry. Page 7 or paragraph 7?

MR. ELLIOTT: Page 7. There's a figure on page 7.

THE WITNESS: Sorry. Page 7 of the PDF or -- sorry. This is --

Q. BY MR. ELLIOTT: Page 7 of the declaration.

A. Which declaration?

Q. Your reply declaration.

A. For?

Q. The '116?

A. Okay. Because they're all Exhibit 1111.

Q. Oh, that's right. Yes. It's Exhibit 1111 in the 212 IPR relating to the '116 patent.

A. Okay.

Q. You see the figure on page 7?

A. Yes.

Q. That's Figure 13 of the Tajima reference, right?

A. Sorry. Let me make sure I'm looking at the correct one. This is before paragraph 10?

Q. I'm sorry. I apologize. I'm looking at the wrong thing.

I think it's on page 18 of your declaration. I was looking at your counsel's brief. It's before paragraph 24.

A. Okay.

Q. This is a figure that you put into your declaration?

A. That's correct.

Q. It's Figure 13 of the Tajima reference,

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1 Exhibit 1005?
2 A. That's right. I annotated it, but yes.
3 Q. And I get -- my first question is what the
4 two squares that you have highlighted in yellow,
5 what are those?
6 MR. NIEBERG: Object to form. Scope.
7 THE WITNESS: The two squares is what
8 Tajima usually calls key information.
9 Q. BY MR. ELLIOTT: Key information for what?
10 MR. NIEBERG: Object to form.
11 Q. BY MR. ELLIOTT: Well, actually, strike
12 that. Let me ask the question differently.
13 What's your basis for saying that those two
14 squares are key information?
15 A. My basis is reading Tajima's specification,
16 and also that part is similar to how Figure 11 also
17 describes it. And in Figure 11 those two squares
18 are specifically labeled as "key information."
19 Q. In Figure 13 in your declaration, those
20 squares aren't labeled, are they?
21 A. They do not have the phrase "key
22 information" on top of the curly bracket.
23 Q. Okay. And then you talk about dividing
24 step in the figure.
25 What do you mean by "dividing step"?

1 A. So if we take a look at paragraph 113 in
2 Tajima, which I have quoted, that discusses this
3 figure.
4 MR. ELLIOTT: Can you read back the
5 question and answer, please?
6 (Reporter read back as requested.)
7 Q. BY MR. ELLIOTT: Okay. But what is meant
8 by -- what did you mean when you labeled a portion
9 of Figure 13 in your declaration as "dividing step"?
10 MR. NIEBERG: Object to form.
11 THE WITNESS: As paragraph 113 says, "As
12 yet another method of dividing personal information
13 as shown in Figure 13. Personal information that
14 the user of terminal" -- "user of user terminal (10)
15 has submitted to certificate authority (40a) is
16 first encrypted, and the encrypted personal
17 information and the information on the key that was
18 used in encrypting the personal information are then
19 divided into a plurality of data portions, each of
20 fixed length as shown in Figure 8, or of arbitrary
21 length as shown in Figure 9 or 10."
22 And so this dividing step is what's being
23 described in that sentence -- or those sentences I
24 just read.
25 Q. BY MR. ELLIOTT: Okay. And what's being

1 divided there -- first off, that's the -- what's
2 being divided there is information on the key that
3 was used in encrypting the personal information,
4 right?
5 A. What is being divided there is the
6 encrypted personal information and the information
7 on the key that was used in encrypting.
8 Q. Okay. Then what is the -- in Figure 13 in
9 your declaration, what is the relationship between
10 the squares highlighted in yellow, if there is any,
11 between the squares highlighted in yellow and the
12 squares highlighted in blue?
13 MR. NIEBERG: Object to form.
14 THE WITNESS: As paragraph 113 continues,
15 information regarding the key that was used to
16 encrypt data fragment Y is attached to encrypted
17 data fragment X. Then the information regarding the
18 key that was used to encrypt data fragment X is
19 attached to encrypted data fragment Y.
20 So the dividing step creates the blocks,
21 and the key information is then swapped in this
22 example.
23 Q. BY MR. ELLIOTT: What key information?
24 A. The key information is the information
25 regarding the key that was used to encrypt data

1 fragment Y, which is attached to data fragment --
2 encrypted data fragment X. And the information
3 regarding the key that was used to encrypt data
4 fragment X is attached to encrypted data fragment Y.
5 Q. So is there any relationship between -- in
6 Figure 13 between the squares highlighted in yellow
7 and the squares highlighted in blue?
8 MR. NIEBERG: Object to form. Scope.
9 THE WITNESS: The information from the
10 squares in yellow are present in information in the
11 squares highlighted in blue. But the steps -- at
12 least the information, key information, of Y is
13 stored with data fragment X, and vice versa.
14 Q. BY MR. ELLIOTT: Is the key information of
15 X, does that correspond to one of the yellow boxes
16 that you have highlighted in Figure 13?
17 MR. NIEBERG: Object to form.
18 THE WITNESS: There was information that is
19 in the yellow that is also present in blue.
20 Q. BY MR. ELLIOTT: Can you explain that?
21 A. Sure. The yellow part is, again, as I
22 said, "the encrypted personal information and the
23 information on the key that was used in encrypting
24 the personal information are then divided into
25 plurality of data portions, each of fixed length as

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1 shown in Figures" -- "Figure 8 or of arbitrary
2 length as shown in Figures 9 and 10."
3 And then, "This plurality of data portions
4 is then arranged into two data fragments, data
5 fragment X and data fragment Y, according to a set
6 method of arrangement, and further, data fragment X
7 and data fragment Y are each encrypted. The
8 encrypted data fragment X is then registered with
9 database (41a) of certificate authority (40a) and
10 the encrypted data fragment Y is registered with
11 database (41b) of certificate authority (40b).
12 "Information regarding the key that was
13 used to encrypt data fragment Y is attached to the
14 encrypted data fragment X, and information regarding
15 the key that was used to encrypt data fragment X is
16 attached to encrypted data fragment Y."
17 So there is information in the dividing
18 step that is attached to the data fragments X and Y.
19 Q. Okay. But there's no direct correspondence
20 between one of the yellow boxes and one of the blue
21 boxes?
22 MR. NIEBERG: Object to form. Scope.
23 THE WITNESS: It's not clear. I would
24 agree with that. I mean, Figure 13 is doing the --
25 Figure 13 is doing what was in Figure 11 and also

1 doing another encryption. And it is swapping the
2 keys and information from the yellow boxes that are
3 present in the data fragments and the key
4 information.
5 Q. BY MR. ELLIOTT: Information about the
6 yellow boxes is included in the key information
7 that's in the blue boxes?
8 MR. NIEBERG: Object to form. Scope.
9 THE WITNESS: There was metadata about the
10 dividing step, and that's in the fragments in the
11 blue boxes.
12 Q. BY MR. ELLIOTT: I see. Is that what's
13 referred to in the figure there as information
14 relating to the method of dividing and the method of
15 arranging the personal information?
16 MR. NIEBERG: Object to form.
17 THE WITNESS: That is -- that is a label
18 that is in the figure. That's correct.
19 Q. BY MR. ELLIOTT: And is that the
20 information that corresponds to what's in the yellow
21 boxes?
22 MR. NIEBERG: Object to form. Scope.
23 THE WITNESS: That is at least some of the
24 information that is in the yellow boxes.
25 Q. BY MR. ELLIOTT: Is it fair to say that

1 what's in the yellow boxes is information about the
2 key that was used to encrypt all of the data, all of
3 the personal data? What's in the blue boxes is key
4 information or information about the key that was
5 used to encrypt the two fragments, X and Y?
6 MR. NIEBERG: Object to form.
7 THE WITNESS: I wouldn't agree with such a
8 narrow characterization.
9 Q. BY MR. ELLIOTT: Why not?
10 A. There was more information than just the
11 information used to encrypt the data in the yellow
12 boxes. And there was more information than just the
13 keys used to encrypt the data fragments in the blue
14 boxes.
15 MR. ELLIOTT: Can you read that answer
16 back, please?
17 (Reporter read back as requested.)
18 MR. ELLIOTT: I don't have any additional
19 questions at this time.
20 MR. NIEBERG: Can we take, like, a -- call
21 it a 13-minute break just to figure out if I have
22 any redirect?
23 MR. ELLIOTT: Of course.
24 (A recess was taken.)
25 //

1 EXAMINATION BY MR. NIEBERG
2 Q. Hi, Dr. Bhattacharjee. Do you recall being
3 asked some questions today about the Hayhurst
4 reference?
5 A. Yes.
6 Q. Do you recall being asked questions about
7 Hayhurst's field of endeavor?
8 A. Yes.
9 Q. Okay. Can you please turn to your
10 declaration for the '854 patent -- reply declaration
11 for the '854 patent, which is Exhibit 1111?
12 A. Okay.
13 Q. Can you please turn to paragraph 11?
14 A. Yes.
15 Q. Can you please read that paragraph?
16 MR. ELLIOTT: Can you hang on one second?
17 I'm having a problem switching back and forth
18 between the different Exhibit 1111s.
19 Okay. I have it. Where are we at?
20 MR. NIEBERG: Paragraph 11 on page --
21 native page 7.
22 THE WITNESS: This is '854, correct?
23 MR. NIEBERG: Correct.
24 THE WITNESS: I'm ready.
25 MR. NIEBERG: Stephen, are you ready? I

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1 didn't hear.
2 MR. ELLIOTT: Yes. Yes.
3 Q. BY MR. NIEBERG: Can you please read
4 paragraph 11?
5 A. Paragraph 11, "SFI argues the '854's field
6 is securing data, including securely storing and
7 communicating the secured data, POR 33 through 35.
8 I have not been asked to opine on whether SFI has
9 identified the correct field of endeavor for the
10 '854 patent.
11 "That is not necessary to my opinion
12 because for the reasons I discuss below, it is my
13 opinion Hayhurst is at least in the same field of
14 endeavor that SFI has identified for the '854
15 patent."
16 Q. In paragraph 11 have you identified the
17 field of endeavor for the Hayhurst reference?
18 MR. ELLIOTT: Objection.
19 THE WITNESS: Well, Hayhurst is at least in
20 the same field of endeavor that SFI has identified
21 for the '854 patent.
22 Q. BY MR. NIEBERG: And what field of endeavor
23 is that?
24 A. The field is securing data, including
25 securely storing and communicating the secured data.

1 Q. In light of your testimony that you gave
2 today, does paragraph 11 of your '854 reply
3 declaration still reflect your opinion on the field
4 of endeavor for the Hayhurst reference?
5 A. Yes.
6 Q. Did any of the testimony you gave today
7 cause you to reconsider your opinion of what is
8 Hayhurst's field of endeavor?
9 A. No.
10 Q. Did any of the testimony you gave today
11 cause you to change any of the opinions you offered
12 in your reply declarations?
13 A. No.
14 MR. NIEBERG: No further questions.
15 MR. ELLIOTT: Colette, should we talk, or
16 do you want to --
17 MS. WOO: Yeah. Can we take a quick
18 five-minute break?
19 MR. ELLIOTT: Yeah. Thanks.
20 MS. WOO: Thank you.
21 (A recess was taken.)
22 MR. ELLIOTT: I don't have any additional
23 questions.
24 COURT REPORTER: Mr. Nieberg, did you need
25 a copy of the transcript?

1 MR. NIEBERG: Yeah. I guess I'll get a
2 copy.
3 COURT REPORTER: And, Mr. Elliot?
4 MR. ELLIOTT: No, I don't need a copy.
5 (Whereupon the proceedings were
6 concluded at 12:12 p.m.)
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(Civ. Proc. § 2025.520(e))

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I, Samrat Bhattacharjee, hereby make the following corrections to my January 22, 2025 deposition transcript:

Page(s)	Line(s)	Change/Correction	Reason(s)
19	9	emit → admit	Transcription error
25	15	corrupted → transmitted	Transcription error
32	1	SpaceLink → space link	Transcription error
41	15	CAS → CSS	Transcription error
50	15	encrypted → encryption	Transcription error
53	15	brut → brute	Transcription error
79	1	total → term	Transcription error
84	4	with → in	Transcription error
98	23-24	"It's not clear. I would agree with that." → "It's not clear that I would agree with that."	Transcription error

Date: 01-31-2025

Samrat Bhattacharjee