

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4
5 GOOGLE LLC,

6 Petitioner,

7 v.

8 SANDPIPER CDN, LLC,

9 Patent Owner.

10
11 Case IPR2025-00860

12 U.S. Patent No. 10,924,573

13
14
15 Deposition of TODD C. MOWRY, PH.D.

16 Conducted Virtually

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21 Stenographically reported by: Judith E. Bellinger,

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1 Deposition of TODD C. MOWRY, PH.D., conducted
2 virtually.

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11 Pursuant to notice, before Judith E.
12 Bellinger, Registered Professional Reporter,
13 Certified Realtime Reporter, and Notary Public in
14 and for the State of Maryland.

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C O N T E N T S

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By Ms. Kelly	6

E X H I B I T S

(Retained by counsel)

Exhibits:	PAGE
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1 P R O C E E D I N G S

2 TODD C. MOWRY, PH.D.,

3 Being first duly sworn, was examined
4 and testified as follows:

5 EXAMINATION BY COUNSEL FOR THE PATENT OWNER
6 BY MS. KELLY:

7 Q Good morning, Dr. Mowry.

8 A Good morning.

9 Q I know that you have given several
10 depositions already in matters related to this
11 one, so I will do my best to keep the preliminary
12 questions short because I know you know how
13 depositions work. And I want to be respectful of
14 your time.

15 So, are you aware that you are here for
16 a deposition today regarding your expert
17 declaration in IPR20250-00860?

18 A Let's see. I don't have those numbers
19 in front of me, I know it's for the '573 patent.
20 That's probably the correct number, I just don't
21 have the number in front of me to confirm that.
22 But I trust that that's the right number.

1 Q So do you have the exhibits available
2 to you in the chat?

3 PLANET DEPOS TECHNICIAN: One second.
4 And, Counsel, I'm only able to upload one exhibit
5 at a time, unless you would like me to upload the
6 entire link.

7 Is there a specific exhibit you would
8 like me to upload to the chat?

9 MS. KELLY: Yes. Can you go to 1006.

10 PLANET DEPOS TECHNICIAN: Yes.

11 And it should be in the chat now.

12 (Exhibit 1006 marked for identification
13 and retained by counsel.)

14 A I see it in the chat. I'm in the
15 process of downloading it here. Okay. I have it.

16 Q Okay. Dr. Mowry, do you recognize
17 Exhibit 1006?

18 A Yes, I do.

19 Q Is it the declaration that you
20 submitted in this proceeding?

21 A Yes. It appears to be, yes.

22 Q Does it confirm for you that the case

1 number for the proceeding is IPR2025-00860?

2 A Yes, I see that on the first page.

3 Q Where are you sitting today?

4 A I'm in Pittsburgh, Pennsylvania.

5 Q Are you at your home?

6 A Yes.

7 Q And other than the computer that you're
8 using for this Zoom conference, do you have any
9 other electronic devices in the room with you?

10 A My phone is silenced on a table, on the
11 other side of the room, and I have a smart watch
12 in my pocket.

13 Q Are you able to turn your phone off for
14 the proceeding?

15 A Oh, sure. Yes.

16 Q And with your phone off, other than the
17 computer in front of you, do you have any
18 electronic means of communication?

19 A Nope.

20 Q Other than the Zoom application that
21 we're using for this deposition, do you have any
22 other windows open on your computer?

1 A Just the Acrobat PDF reader.

2 Q For the current Exhibit 1006?

3 A Yes, that's right.

4 Q Do you have any other documents or
5 materials in the room with you?

6 A No.

7 Q So as you know, this is a virtual
8 deposition. Everything that we are saying is
9 being transcribed by a court reporter, so it's
10 important that we allow time for, you know,
11 questions to be finished before you begin
12 answering, your attorney to make any objections,
13 and then I will do my best to make sure your
14 answers are done before I give the next question
15 because we are not to talk over each other.

16 Do you understand?

17 A Yes.

18 Q And other than an objection based on
19 privilege with an instruction not to answer the
20 question, despite any objections your attorneys
21 make, you are to try to answer the question as
22 asked, to the best of your ability.

1 Is that fair?

2 A Yes.

3 Q And if you need a break at any time,
4 you can always ask for a break. I will try to
5 take one every hour. All I ask is that if you
6 need a break and there's a question pending, you
7 answer the question first.

8 Sound like the drill you're familiar
9 with?

10 A Yes, that makes sense.

11 Q Is there any reason you cannot testify
12 fully and truthfully today?

13 A No.

14 Q Can you turn to page 3 of your
15 declaration, paragraph 11.

16 A Okay.

17 Q In paragraph 11, you describe your
18 experience working in the computer industry, in
19 various capacities, throughout the 1990s and early
20 2000s.

21 Is that a fair summary?

22 A Yes.

1 Q And that included computer architecture
2 consulting in Mountain View, California; is that
3 right?

4 A Yes.

5 Q Were you familiar with Sandpiper, the
6 patent owner in this case, during that time in
7 your career?

8 A No.

9 Q Were you familiar with developments in
10 CDN technology, in general, at that time?

11 A Yes. I had an extensive research
12 collaboration with Bruce Maggs, who is a professor
13 at Carnegie Mellon, and he also did a leave of
14 absence in the 1990s to be one of the key
15 technical people at Akamai, and Bruce and I had a
16 research project together that resulted in the
17 Ph.D. thesis of one of our -- one of our students.
18 And that was related to -- that was about content
19 delivery networks.

20 Q Can you turn to paragraph 34 of your
21 declaration.

22 A Okay.

1 Q So in this paragraph, you talk about
2 your understanding of how obviousness is assessed,
3 correct?

4 A Yes. This is part of my discussion of
5 that. Yes. That's correct.

6 Q One of the things you mention here is
7 the importance of not determining obviousness
8 using the benefit of hindsight; is that correct?

9 A Yes.

10 Q What did you do in your analysis, in
11 this case, to avoid using the benefit of
12 hindsight?

13 A Well, I did the analysis in this case
14 the way I normally do it, which is that I read the
15 patent, I did a search of prior art, prior to the
16 priority date, and I selected the best prior art
17 references that I could find, and I did my
18 analysis based on that time frame, including both
19 the references and my own knowledge and expertise
20 in the area in that time frame.

21 Q You said you did a search of prior art
22 prior to the priority date.

1 What date did you use?

2 A Sorry. I know there's a part of my
3 declaration where I discuss priority dates. If I
4 can search for it here, I don't want to guess as
5 to the priority date without looking this up. If
6 you happen to know where that section is, that
7 could speed things up, but I can search otherwise.

8 Q Well, on page 21, you discuss the
9 priority date. Is that the section you're looking
10 for?

11 A Yes. Thanks. Just looking through it
12 here. Well, I looked for both references prior to
13 February 25th, 2019, and, also, April 4th, 2008.
14 As I described in my declaration I -- my opinion
15 is that February 25th -- sorry, February 25th,
16 2019, would be the appropriate priority date, but
17 I understand that the patent owner believes it
18 should be April 4th, 2008. So I searched for
19 prior art, prior to both of those dates.

20 Q You say you believe that February 25th,
21 2019, would be the appropriate priority date.

22 What is that opinion based on?

1 MR. ANDERSON: Objection. Form.

2 A I have a discussion of priority dates
3 starting in paragraph 54 of my declaration, so
4 it's a lengthy section, and that's where I'm
5 discussing why -- the priority dates.

6 So there's a lot there. I don't know
7 that you want me to read all of that aloud, but
8 there's several pages of that discussion there in
9 my report.

10 Q Did you read the institution decision
11 in this proceeding?

12 A Yes, I did.

13 Q Did you read the portions of the
14 institution decision where the board found, at
15 least preliminarily, that the claims were entitled
16 to the April 4th, 2008 priority date?

17 A Yes, I did.

18 Q Do you think the board was wrong?

19 MR. ANDERSON: Objection. Form.

20 A Well, I describe my opinions about -- I
21 recognize that the board makes decisions and that
22 given the board's decision about the priority

1 date, my combination of Dilley, Pai, and Wang,
2 that's all prior to the priority date. Those
3 references are before the April 4th, 2008 priority
4 date. So I accept the decision of the board in
5 that they get to set the rules, so that's their
6 right to do that, certainly.

7 Q I'll direct you to paragraph 31 of your
8 declaration. It says "I understand that one must
9 determine what differences, if any, existed
10 between the claimed invention and the prior art."

11 Do you see that?

12 A Yes, I see that.

13 Q Did you do that analysis as part of
14 forming your opinions in this declaration?

15 A For the grounds that are based on
16 obvious, I did that, and all of the things that
17 are described in this section about obviousness.

18 Q Did you review your declaration as part
19 of your preparation for your deposition today?

20 A Yes, I did.

21 Q When did you most recently review it?

22 A I looked at it yesterday.

1 Q Did you also review the prior art
2 references that were cited in your declaration?

3 A Yes, I did.

4 Q When did you most recently review
5 those?

6 A This morning.

7 Q Did you review the '573 patent as part
8 of your preparation for your deposition today?

9 A Yes, I did.

10 Q When did you most recently review that?

11 A Earlier this morning.

12 Q As you reread your declaration and the
13 prior art references and the patent, what
14 differences did you determine to exist between the
15 patent and those prior art references?

16 A Well, my declaration is, roughly, 150
17 pages long. And in the different grounds that are
18 based on obviousness, where I talk about, for
19 example, the combination of Dilley, Pai, and Wang,
20 I have many pages of detailed discussion about the
21 prior art and the patent. So there's quite a bit
22 of discussion throughout my declaration, but it is

1 a lengthy declaration.

2 Q Can you think of any difference that
3 came to mind as you were rereading all those
4 materials this morning? I'm not asking for every
5 single one in your declaration.

6 A As I was reading the references this
7 morning, I was just focused on the references as I
8 reviewed it today. As I said, there's detailed
9 discussion throughout my declaration about where I
10 analyze the prior art and how they relate to the
11 patent, and I'm happy to discuss any details of
12 the declaration.

13 Q But there's not a single difference
14 among -- between the patent and any of the prior
15 art that comes to mind as you are sitting here
16 right now?

17 MR. ANDERSON: Objection. Form.

18 A Well, my grounds with Dilley, Pai, and
19 Wang are based on obviousness. It's not
20 anticipation, so there is, like, a length -- like
21 I said, there's many, many pages of, maybe even a
22 hundred pages of analysis of this throughout my

1 declaration, and I'm happy to talk about any of
2 those details.

3 Q But you can't think of an example, just
4 one example, sitting here right now?

5 MR. ANDERSON: Objection. Form.

6 A I'm not sure what the point of this
7 exercise is. When I -- as I said, there's a lot
8 of content in my declaration, so I'm happy to talk
9 about any of those -- those things.

10 Q The 537 patent [sic] uses the term
11 "popularity service."

12 Do you recall?

13 A I'm not sure if I misheard you, but I
14 think you said the 537 patent. I'm assuming you
15 mean the '573 patent?

16 Q '573 patent, sorry.

17 A I don't have that patent in front of
18 me, but it definitely talks about popularity, and
19 I believe it does use the exact term "popularity
20 service." That sounds correct.

21 Q What is a popularity service?

22 A I assume you're asking in the context

1 of the '573 patent, and it is related to resources
2 that are delivered through a content delivery
3 network. So it is a service that is keeping track
4 of the popularity of those resources.

5 Q What do you mean by the word
6 "resources," in your previous answer?

7 A Well, there are many synonyms for what
8 I meant for resources. It is an item that is
9 being requested through a content delivery
10 network, for example, content delivery networks
11 are especially useful for providing larger objects
12 because they consume more bandwidth, both network
13 bandwidth and server bandwidth. So, for example,
14 things like large images or videos, those are
15 things that are typically served by content
16 delivery networks.

17 That's not an exhaustive list at all,
18 but those are some examples of the type of thing
19 that I meant by "resource," but I didn't mean to
20 attach specific meaning to the term "resource," I
21 just meant an item that was requested through the
22 content delivery network.

1 Q Had you heard the term popularity
2 service used in the way that it is used in the
3 '573 patent prior to reading the '573 patent?

4 MR. ANDERSON: Objection to form.

5 A Well, I would actually prefer to look
6 at the '573 patent again before I answer that
7 question.

8 Q It should be among the -- it should be
9 Exhibit 1001. If we could load that into the
10 chat.

11 PLANET DEPOS TECHNICIAN: Okay. Please
12 stand by.

13 (Exhibit 1001 marked for identification
14 and retained by counsel.)

15 PLANET DEPOS TECHNICIAN: All right.
16 It should be available now.

17 A Okay. I have the '573 patent now.
18 Could you, please, repeat the question?

19 Q Had you heard the term popularity
20 service used in the way that it is used in the
21 '573 patent prior to reading the '573 patent?

22 MR. ANDERSON: Objection. Form.

1 A Well, popularity is a well-known
2 concept in data management in different contexts,
3 where you're -- in various types of caching, one
4 is trying to put the most frequently accessed or,
5 in other words, most popular content into caches,
6 and services are certainly well-known things. The
7 '573 patent talks about popularity service and
8 what they -- what they mean with -- by that, in
9 the context of the patent.

10 So I was aware of the term "popularity"
11 and I was aware of services. I -- in terms of
12 specific details of what the '573 patent says that
13 it's doing with the popularity service, that
14 depends on the detail in the patent.

15 Q The '573 patent also uses the term
16 "popularity designation."

17 Do you recall that?

18 A I see that the claims of the '573
19 patent use the phrase "popularity designation."

20 Q Had you heard the term "popularity
21 designation" used in the way that it is used in
22 the '573 patent prior to reading the '573 patent?

1 MR. ANDERSON: Objection. Form.

2 A Well, the word popularity, as I
3 mentioned before, is a term that appears in
4 various contexts and a person of skill in the art
5 would have heard the term popularity and
6 designation as another common word in the
7 language, in the English language, and so on. But
8 in order to understand what terms mean in a
9 patent, such as the '573 patent, you need to read
10 the claims and the specification to understand the
11 meaning of particular terms.

12 Q As far as you know, though, the exact
13 term "popularity designation" was not commonly
14 used in the art in the way that you say that
15 popularity was; is that correct?

16 MR. ANDERSON: Objection. Form.

17 A Well, I'm not sure if I'm understanding
18 the question exactly, but as the term "popularity
19 designation" is being used in the claims, they're
20 talking about, essentially, labeling whether
21 something is popular or not popular. And that
22 concept is certainly a familiar concept. But

1 there are days of how -- as always, with terms
2 that appear in a patent, to understand their
3 meaning, you need to read the claims and the
4 specification.

5 Q Can you look at page 14 of your
6 declaration. On page 14, you have annotated
7 Figure 3 of the '573 patent, correct?

8 A Yes. That's correct.

9 Q This figure shows a tiered structure
10 that includes different tiers that you have marked
11 with different colors; is that right?

12 A Yes. That's correct.

13 Q You have in red the CDN origin tier,
14 right?

15 A Yes.

16 Q What is the CDN origin tier?

17 A The content provider, their machine,
18 their servers, are often called the origin
19 servers, and you can see that at the very top of
20 the figure, that's labeled content sources/origin
21 servers, the content delivery network, you can see
22 the dashed box that surrounds those three tiers in

1 red, purple, and green. It's arranged -- it's
2 shown hierarchically. And of these layers, the
3 CDN, CDN stands for content delivery network, the
4 origin, CDN origin tier is the layer that is
5 closest to the origin server.

6 Q And the next tier below that is the
7 parent server, correct?

8 A Yes. Tier 2 is -- consists of parent
9 servers or parent server groups.

10 Q What are parent servers?

11 A These are servers within the content
12 delivery network's hierarchy that are above the
13 edge servers. The edge servers are the ones
14 closest to users. The parent servers sit above
15 them in the hierarchy, but they sit below the CDN
16 origin tier.

17 Q Is there anything structurally
18 different between a parent server and an edge
19 server?

20 A The hardware, the CPUs, the memory, the
21 disc and so on, might be similar or they might be
22 different from between parent servers and edge

1 servers. It's -- that's -- they could either be
2 the same or different.

3 The configuration, they are different,
4 in terms of the configuration of the hierarchy of
5 communication in the content delivery network.
6 But the -- the actual pieces of hardware that you
7 buy to serve as a parent server, as opposed to
8 edge servers, they might be the same or they might
9 be different.

10 Q Why might they be different?

11 A Well, that would just be up to the
12 person configuring the content delivery network.
13 They don't need to be the same, so they could be
14 different.

15 Q The popularity service shown in
16 Figure 3 of the patent is located in the parent
17 server group.

18 Do you see that?

19 A Yes. That's where it's shown in this
20 figure. Yes.

21 Q Why is the popularity service in the
22 parent server group rather than someplace else?

1 MR. ANDERSON: Objection. Form.

2 A In this figure, Figure 3, from the '573
3 patent, I believe they just placed it here,
4 somewhat arbitrarily. The '573 patent says that
5 there's flexibility regarding where the popularity
6 service is located. So, for example, in column 4,
7 lines 32 through 43 of the '573 patent, they
8 discuss that the popularity service could be
9 located in different places.

10 Q Is there a reason the popularity
11 service is located in the parent server group in
12 Figure 3 specifically?

13 A Well, for example, in column 5,
14 lines 44 through 46, this is a section of the '573
15 patent that's referring to Figure 3, and it says
16 "although shown in a parent tier, the popularity
17 service may be located anywhere in the system,
18 including in the edge tier."

19 So to answer your question, it is
20 saying that it does not need to be located in the
21 parent tier, they just happen to be showing it
22 there as an example.

1 Q When the popularity service is in the
2 parent tier, as shown in Figure 3, does that
3 location confer any advantages?

4 A Well, the answer to that would depend
5 on design decisions made by the engineers who were
6 creating the content delivery network. They may
7 have reasons, based on their overall design, to
8 want to locate popularity service functionality in
9 different locations within the hierarchy. So
10 there may, potentially, be advantages to having it
11 in the parent tier or in the edge tier. It would
12 really just depend on the details of the design.

13 Q Can you turn to paragraph 44 of your
14 declaration.

15 A Okay.

16 Q In paragraph 44 you say "When the
17 resource is unavailable from the first server or
18 peer server, for instance, for less frequently
19 accessed content, the '573 patent will evaluate
20 the content's popularity using a popularity
21 service."

22 Do you see that?

1 A Yes, I see that.

2 Q What will actually evaluate the
3 content's popularity?

4 A It would be some functionality within
5 the content delivery network.

6 Q But you did not mean to say that the
7 '573 patent is actually doing anything, right?
8 It's a piece of paper, not part of a computer
9 network?

10 A Yes, I was not saying that the piece of
11 paper would do the evaluation. It may have been
12 more precise for me to have said that the system
13 or method described by the '573 patent will
14 evaluate the content's popularity, using a
15 popularity service.

16 Q Do you know what it is within the
17 system or method described that does the
18 evaluating?

19 A I mean, it would be performed by
20 software running on one of the servers, and
21 that's -- there are different design choices
22 regarding which components are involved with this.

1 Q In the next paragraph, paragraph 45,
2 you describe that for unpopular resources, the
3 request is redirected to an origin server or the
4 CDN's origin tier.

5 Do you see that?

6 A Yes.

7 Q And then, in the next sentence, you say
8 "When a resource is somewhat popular, the client's
9 request is redirected to a parent server."

10 Do you see that?

11 A Yes.

12 Q And then, "When a resource is popular,
13 the first server retrieves the content and serves
14 the request itself," correct?

15 A Yes.

16 Q Does it matter where the popularity
17 service is located in how those three actions are
18 carried out?

19 MR. ANDERSON: Objection. Form.

20 A As I mentioned before, there's -- the
21 '573 patent describes that there is flexibility
22 in -- regarding where the popularity service is

1 implemented. I mentioned before, there's a
2 discussion of this, for example, let's see, I
3 believe it was in content 5, but I mentioned this
4 before. So there's flexibility, in general,
5 regarding where the popularity service is
6 implemented, but this section here is just
7 describing different pieces of the flowchart shown
8 in Figure 5, where decisions are made based upon
9 popularity.

10 Q Does paragraph 45 identify three
11 different popularity designations?

12 A The '573 patent, starting near the
13 bottom of column 6, at around line 65, and
14 continuing through column 7, down to, around,
15 line 24, talks about the 3 different cases that
16 I'm summarizing here in paragraph 45.

17 And they can also be seen as three
18 different color-coded pathways in the flowchart in
19 Figure 5. There is the red pathway, which is for
20 unpopular content, that's something where the
21 popularity count is below an initial lower
22 threshold. So I refer to that as unpopular.

1 Then there's a middle level, which I
2 had referred to as somewhat popular, and that's
3 content where the popularity count falls between
4 the lower first threshold and the higher second
5 threshold.

6 And then, there's content that has a
7 popularity count exceeding the higher second
8 threshold, and I refer to that as popular content.

9 So you could view those unpopular,
10 somewhat popular, and popular descriptions, as
11 corresponding to popularity designations.

12 Q Is that how you viewed those words when
13 you put them in your declaration?

14 A Well, what I just described is what I
15 intended when I wrote that, that paragraph, yes.

16 And I was just trying to describe
17 what's in Figure 5 and, also, the description that
18 I just referenced, that the -- starting near the
19 bottom of column 6, going into column 7 of the
20 '573 patent. So it's illustrating two different
21 thresholds. So, in this case, there are things
22 that fall below the first threshold, things that

1 are between the two thresholds, and things that
2 exceed the second threshold.

3 So I was trying to capture that in
4 paragraph 45.

5 Q I just wanted to clarify your last
6 answer because you said you could view them as
7 something. And sometimes I don't care how I could
8 view something, I want to know how you actually
9 did view something.

10 MR. ANDERSON: Objection. Form.

11 Q Well, I guess my question is --

12 A I've lost track of the question there.
13 Can you repeat the question, please.

14 Q Yes. That you were using the words
15 "unpopular, somewhat popular, and popular" as
16 shorthands for popularity designations, as
17 popularity designations are disclosed in the '573
18 patent?

19 MR. ANDERSON: Objection. Form.

20 A I was using those three terms to try to
21 explain the three cases labeled cases 1, 2, and 3,
22 between column 6, line 65 and column 7 -- through

1 column 7, line 24, where it talks about three
2 different, essentially, categories of popularity.
3 There's unpopular, medium popular, and popular.
4 Again, I'm just adding -- I'm just trying to
5 explain that there's -- the '573 is describing
6 things that fall in different places, with respect
7 to those thresholds. That's what I'm describing
8 there.

9 I'm not using the word "popularity
10 designation" in paragraph 45. I'm trying to
11 describe what's shown in Figure 5 and what is
12 described in the section of the patent that I just
13 mentioned.

14 Q Were you not using the term popularity
15 designation because you understand popularity
16 designation to refer to something else?

17 MR. ANDERSON: Objection. Form.

18 A I have the text that I have in that
19 paragraph because I'm trying to summarize what is
20 discussed, again, at the -- starting at the bottom
21 of column 6, around line -- at line 65 through
22 column 7 through -- down to line 24, where it's

1 discussing three different categories or buckets
2 of popularity, which are illustrated in Figure 5.

3 So I was trying to describe those three
4 pathways that I highlighted in red, purple, and
5 green. That's what I'm describing here.

6 Q Do those three different pathways
7 correspond to three different popularity
8 designations?

9 A It's possible that those could be
10 considered to be different popularity
11 designations. But in that section of the patent,
12 and in the discussion of that figure, it's not
13 using that phrase "popularity designation," but it
14 is describing how it's separating out three
15 different cases based on thresholds and the
16 popularity count.

17 Q So when you say "it's possible that
18 those could be considered to be different
19 popularity designations," is that how you consider
20 them or do you not?

21 MR. ANDERSON: Objection. Form.

22 A As I said a minute ago, this section of

1 the '573 patent between columns -- the bottom of
2 column 6, starting at line 65, through column 7,
3 down to line 24, they -- this section does not use
4 the term "popularity designation."

5 It is describing different
6 categories -- or cases of popularity. I believe
7 popularity designation only appears in the claims,
8 it does not appear here in the specification. And
9 I was summarizing what's described here, in that
10 particular part of the specification, and, also,
11 the figure.

12 Q When you say "it's possible that those
13 could be considered to be different popularity
14 designations," would a person of ordinary skill in
15 the art consider them to be different popularity
16 designations?

17 A Well, I was not asked to provide claim
18 construction opinions regarding the '573 patent.
19 So from the question, it sounds like you're asking
20 me for a claim construction opinion on the term
21 popularity designation.

22 I believe that term only appears in the

1 claims. The section that we've been discussing in
2 paragraph 45 of my declaration is discussing a
3 section of the specification where it talks about
4 popularity falling into one of three different
5 buckets.

6 Q In order to render your opinion on
7 obviousness in your declaration, you had to have
8 an understanding of the term popularity
9 designation, correct?

10 A I'm sorry, could you repeat the
11 question, please?

12 Q In order to render your opinion on
13 obviousness in your declaration, you had to have
14 an understanding of the term popularity
15 designation, correct?

16 A Well, the term popularity designation
17 does appear in the claims. So I just used the
18 plain and ordinary meaning of that term, given the
19 context of the claims and the specification.

20 Q What is the plain and ordinary meaning
21 of that term, given the context of the claims and
22 the specification?

1 A Well, it just says that it's some
2 designation associated with the requested resource
3 that indicates popularity. Now, that could mean
4 different things, but it's something that allows
5 the system to determine -- the claims talk about
6 there being different popularity thresholds. So
7 it would be something that would allow the system
8 to make some comparison -- or allow it to
9 determine where it fell relative to some
10 thresholds.

11 Q Can you look to paragraph 180 of your
12 declaration.

13 A Do you know what page that's on in the
14 PDF?

15 Q It's numbered page 63. I don't know if
16 that corresponds to the PDF page.

17 Oh, maybe that's what's on the bottom,
18 page 69.

19 A Okay. What was the paragraph number
20 again?

21 Q 180.

22 A Okay.

1 Q This is within the section of your
2 declaration where you discuss the Dilley
3 reference; is that correct?

4 A Yes. That's correct.

5 MS. KELLY: Can we put Exhibit 1003
6 into the chat.

7 PLANET DEPOS TECHNICIAN: Yes, please
8 stand by.

9 MR. ANDERSON: Counsel, we're right
10 about an hour. Do you want to take a break soon,
11 if that makes sense?

12 MS. KELLY: Sure. We can do that now.

13 PLANET DEPOS TECHNICIAN: Okay. And
14 the exhibit is in the chat as well.

15 (Exhibit 1003 marked for identification
16 and retained by counsel.)

17 MS. KELLY: Do you want to do
18 five minutes, 10 minutes?

19 THE WITNESS: Five minutes is fine with
20 me.

21 MS. KELLY: Okay.

22 MR. ANDERSON: Five minutes works.

1 (Recess taken from 10:36 a.m. to
2 10:45 a.m.)

3 BY MS. KELLY:

4 Q I think we left off with paragraph 180
5 on page 69 of -- PDF 69 of the declaration.

6 A Okay.

7 Q In the final sentence of that
8 paragraph, you say "As part of the cache
9 hierarchy, the edge server can determine from
10 where to request the content and can send the
11 request to a parent server or to the origin server
12 accordingly."

13 Do you see that?

14 A Yes.

15 Q You phrase it that the edge server can
16 determine and can send. Is that because the
17 disclosure of Dilley contemplates something else?

18 A The point of this sentence is that the
19 edge server is part of a hierarchy. With a cache
20 hierarchy, the way that things work is that you
21 start with the part of the hierarchy that is
22 closest to the user or the requester. And if you

1 don't find the content there, then you forward
2 the -- you send the request onto a higher level in
3 the hierarchy. That's what I'm capturing there.

4 I think you were asking, in your
5 question, if there was some special meaning to the
6 word "can," and that's not what I intended. I was
7 just describing how cache hierarchy normally works
8 within a content delivery network.

9 Q And is your understanding of how a
10 cache hierarchy normally works based on your
11 education and experience with cache hierarchies?

12 A I do have very extensive research
13 experience in cache hierarchies. It was the
14 subject of my Ph.D. thesis in the early 1990s, and
15 I've done quite a lot of work on that topic
16 throughout my career. And, in fact, that was what
17 was cited when I was made an ACM fellow. So that
18 that was part of what informed my understanding,
19 that's correct.

20 Q So then, I guess, the explanation that
21 appears in that sentence comes from your extensive
22 experience and knowledge with cache hierarchies,

1 as opposed to the exact language of Dilley cited
2 in column 8, lines 11 through 48; is that fair?

3 MR. ANDERSON: Objection. Form.

4 A No, that's not fair. I cited that part
5 of Dilley for a reason. I was explaining what's
6 described in Dilley column 8, paragraph -- line 11
7 through 48.

8 Q And that explanation is based on your
9 understanding of how cache hierarchies normally
10 work, correct?

11 MR. ANDERSON: Objection. Form.

12 A I think that's what I just answered,
13 unless I missed a difference in the question. So
14 I was explaining the -- in this paragraph, I'm
15 explaining the Dilley reference, and that's based
16 upon reading the Dilley reference.

17 It's true that I also have extensive
18 experience and have done research on cache
19 hierarchies, so that makes it easy for me to
20 understand the Dilley reference. I've also worked
21 on content delivery networks. And so, I'm just
22 explaining what the Dilley reference is in this

1 section of it that I cite, which is column 8,
2 lines 11 through 48.

3 Q Can you go to PDF 78 of your
4 declaration?

5 A Okay.

6 Q You have annotated Figure 2 of Dilley
7 on that page to draw a box around what says "hot
8 object cache."

9 Do you see that?

10 A Yes.

11 Q What is the hot object cache in this
12 figure showing?

13 A It's used to store popular objects that
14 are being managed and served by the content
15 delivery network.

16 Q So in Dilley, does the word "hot"
17 correspond to the '573 patent's use of the word
18 "popularity," or does hot mean something else?

19 MR. ANDERSON: Objection. Form.

20 A Well, as I said a minute ago, the hot
21 object cache is used to store popular objects,
22 objects that are being accessed frequently.

1 The -- I think you asked how this relates to the
2 concept of popularity in the '573 patent. The
3 '573 patent is talking about popularity, and hot
4 objects store objects that are popular.

5 But I think in the -- as I recall the
6 exact wording of your question, you're asking
7 about popularity as a concept, which is not
8 exactly the same thing as something being hot.
9 Something being hot in the Dilley reference is
10 referring to popular objects in the Dilley
11 reference.

12 Q When you say "popularity as a concept
13 is not exactly the same thing as something being
14 hot," what is the difference between popularity as
15 a concept and something being hot?

16 A Well, what I meant is, when you asked
17 about the term "popularity," popularity, in
18 general, is as described in the '573 reference,
19 and as a person of ordinary skill in the art would
20 understand, also, popularity is a spectrum or a
21 range where you can have things that are very
22 popular, very unpopular, and there's a whole set

1 of different things in between, potentially. So
2 it's a metric, and the -- you had asked before
3 about hot objects that would be -- things that
4 would be in the hot object cache, and those would
5 be things that would be particularly popular. So
6 popularity as a metric, it could include things of
7 any type of popularity.

8 But hot objects or very popular objects
9 are in a particular -- are on the popular side of
10 that spectrum.

11 Q Is a hot object a particular popularity
12 designation?

13 A The '573 patent in the claims, for
14 example, in claim 2, it says that a popularity
15 designation might be something that -- it says the
16 popularity designation associated with the
17 requested resource indicates that the requested
18 resource is not popular. Claim 3 says that
19 wherein the popular designation associated with
20 the requested resource indicates that the
21 requested resource is popular.

22 So those are some examples from the

1 '573 claims, where they say popular and not
2 popular are examples, potentially, are examples of
3 popularity -- popularity designations.

4 So if something is the -- as I recited
5 before, from Dilley column 4, so around lines 50
6 through 62, it is discussing the fact that the CDN
7 software 206 creates and manages a "hot object
8 cache 212 for popular objects being served by the
9 content delivery network."

10 So, here, it is using -- it's
11 describing things in the hot object cache as being
12 popular objects, and that is consistent with claim
13 3 in the '573 patent, where it says that the
14 popularity designation can indicate that the
15 requested resource is popular.

16 Q What is the difference between a hot
17 object cache and a popularity service?

18 MR. ANDERSON: Objection. Form.

19 A The hot object cache, as described in
20 Dilley, it is something maintained by the content
21 delivery network software, and it is for -- it is
22 described as being cache or storage that is used

1 for popular objects being served by the content
2 delivery network.

3 You also asked about a popularity
4 service. So popularity -- a popularity service --
5 well, the concept of popularity, as we were
6 discussing earlier, we -- if you were -- so it is
7 advantageous to put more popular objects in the
8 layers of the content delivery network that are
9 close to the users. So the -- you want the hot
10 object cache to be containing the most -- the
11 popular objects, that's how it is described in
12 Dilley.

13 So there's this -- the concept of
14 popularity is -- that's how -- there is a
15 connection between what you place. You want your
16 popular objects to be in the hot object cache.

17 Q Is that the end of your answer?

18 A Yes.

19 Q So I heard, in your answer, a
20 discussion of the hot object cache and the concept
21 of popularity. But I didn't hear anything about
22 service and the work that word is doing in the

1 term "popularity service."

2 Is there more you can say about that?

3 MR. ANDERSON: Objection. Form.

4 A I'm sorry, I'm not following -- the
5 question's very open-ended. So the term "service"
6 is a term that appears in many different contexts.
7 And popularity service is something that's
8 discussed in the '573 patent. As I discuss in my
9 declaration, the Dilley reference is explicitly
10 discussing here, in column 4, that the hot object
11 cache is meant to contain popular objects.

12 The popularity service, as discussed in
13 the '573, is a service that keeps track of
14 popularity information for objects, and it --
15 then, if you were -- when you're maintaining a hot
16 object cache, you want popular objects to be in
17 the hot object cache.

18 I go on and talk more about the -- you
19 know, my ground number 2 involves a combination of
20 Dilley and Pai and Wang. So I'm happy to talk
21 about all of those things.

22 Q You would agree that a service is

1 different than a cache, right?

2 MR. ANDERSON: Objection. Form.

3 A Not necessarily.

4 Q Under what circumstances would a
5 service and a cache be the same thing?

6 A Well, caching is sometimes viewed as a
7 service. So, for example, a content delivery
8 network, in general, can be considered to be a
9 service. A service is something that's available,
10 for example, on a distributed system, where you
11 can send it a request and it can send you a reply
12 back.

13 So that -- it is common to hear. The
14 term "caching service" does appear in the field.
15 And, also, caching can use a service. So, for
16 example, if I am maintaining my hot object cache,
17 it may -- that's just a piece of software that may
18 include services, and it may include services
19 related to popularity.

20 So there is not a -- I forget the
21 wording of your question, but that's -- services
22 and caching are not incompatible concepts.

1 Q The services and caching, using it as a
2 verb, I guess, is part of what the question is
3 getting to, right? Because a cache is different
4 than the act of caching, correct?

5 A Well, not necessarily. When the term
6 "cache" is used, especially in that cache involves
7 software, then what we're really referring to is
8 the functionality that can perform caching. So
9 that includes both storage and the software or our
10 functionality that's needed to make that -- to
11 manage that storage.

12 So I -- I would not agree with your
13 characterization that the term cache and the act
14 of caching, sometimes those are used
15 interchangeably, because to implement a cache,
16 that involves actions, it's not just a piece of
17 disc storage or something like that.

18 Q And you would characterize caching as a
19 type of service or containing services? What is
20 the relationship between caching and service?

21 MR. ANDERSON: Objection. Form.

22 A I think I answered that question

1 before, so I guess I'll refer to my previous
2 answer, unless there was something different about
3 this question that I didn't catch. But I think
4 that's the same question that I answered a few
5 minutes ago.

6 Q I guess I wasn't clear in your answer
7 whether a cache is -- caching is an example of a
8 service or it's something that contains, perhaps,
9 multiple services?

10 A Sorry, this question's too abstract for
11 me to be able to give you a concrete answer.

12 As I said, when you posed the question
13 before, you were saying, as I recall, something to
14 the effect of, are caching and services unrelated
15 or have nothing to do with each other, I forget
16 the exact wording. And my answer was, that's not
17 necessarily true. There are, in some
18 circumstances, there are caching services and,
19 also, when caches are maintained by software, as
20 they would be in a content delivery network, that
21 software uses services.

22 So it would be inaccurate to say -- to

1 say there is some strong dividing line where
2 caching and services are never related to each
3 other. I think that that was the question that
4 you asked before, or at least that's my
5 understanding of the question.

6 Q In paragraph 204 of your declaration,
7 the first sentence says "In view of Dilley's
8 suggestion of a popularity service."

9 Do you see that?

10 A Yes, I see that.

11 Q How does Dilley suggest a popularity
12 service?

13 A Dilley is describing a content delivery
14 network that is using metadata to control various
15 types of policies about how to place data
16 throughout its hierarchy. For example, in column
17 3 of Dilley, starting between lines 2 and 9, it's
18 talking about how metadata is used for various
19 control options and parameters to talk about -- to
20 control -- determine how an edge server handles a
21 request for an object.

22 Also, in column 4, around lines, say,

1 23 through 46, it is discussing details about how
2 the metadata is used to control, like, at around
3 line 27, metadata is used in herein refers to set
4 of all controls options and parameters for the
5 object, and such information may be provided to
6 the CDN content servers in various ways. And this
7 is what controls the placement of data within the
8 hierarchy. And there are many -- a number of
9 places in Dilley where it discusses popularity.
10 And that it is important to place popular objects
11 in the tiers that are close to the user.

12 So that's -- those are examples of how
13 Dilley is suggesting that popularity is important
14 and that it is discussing a fairly sophisticated
15 approach to handling the placement of that data
16 within a hierarchy. For example, Figure 6, which
17 is something that I discuss in my declaration,
18 is -- has a step 628, where it's examining
19 metadata and using that to determine where to
20 locate things, and popularity metadata would be an
21 obvious thing for a popularity service to be
22 maintaining for objects, particularly because

1 Dilley says explicitly, in a number of places,
2 that the levels of hierarchy that are close to the
3 user, it's important to use those for popular
4 content.

5 Q So I note that the sentence does not
6 say Dilley discloses a popularity service or
7 describes a popularity service, it says
8 "suggestion."

9 And I was just wondering if you could
10 explain your choice of that word "suggestion."

11 A Can you remind me what paragraph
12 you're -- is this paragraph 201 or --

13 Q 204. But the word "suggests" also
14 appears in 201, as you observe.

15 A Well, in paragraph 201, I said that
16 Dilley teaches -- or at least suggests a
17 popularity service --

18 Q Right.

19 A -- so what I meant is that a person of
20 ordinary skill in the art would be given that
21 Dilley described the importance of popularity for
22 placing the right content in the right location.

1 Then it doesn't provide detail on the inner
2 workings of such a popularity service, but it
3 certainly suggests that a popularity service would
4 be useful, given how Dilley works, and that is, in
5 fact, the reason why my combination also includes
6 the Pai reference, which provides details on how
7 such a popularity service would be -- would be
8 implemented and incorporated with Dilley.

9 Q If you go to paragraph 206 of your
10 declaration, you say "A POSITA would have,
11 accordingly, implemented what Pai expressly
12 discloses by providing a dynamic popularity-based
13 media distribution system with multiple levels to
14 Dilley's popularity service." And then there is a
15 parentheses with an "e.g."

16 Do you see that?

17 A I see that.

18 Q What is that example an example of?

19 MR. ANDERSON: Objection. Form.

20 A Well, I may not have written that
21 completely precisely. I'm not sure that the e.g.
22 is necessarily there, but I'm going on to just

1 elaborate on what I said earlier in the sentence.

2 Q I guess my question is, are you saying
3 that providing this cache hierarchy is an example
4 of Dilley's popularity service? Is an example of
5 what a POSA would have implemented? Is it an
6 example of what Pai discloses? I'm just -- what
7 is that e.g. modifying in the previous phrase?

8 A Well, I apologize, the declaration is
9 150 pages long, so I'm not sure if the -- my
10 favorite English professor would have enjoyed
11 reading this with an e.g. there. I may not have
12 punctuated that accurately, so I don't think we
13 want to read too much into the e.g., but the
14 teachings of Pai are describing details of a
15 dynamic, popularity-based media distribution
16 system, and those teaching, in my combination, I'm
17 incorporating into Dilley.

18 And just to continue on that thought.
19 The part of that paragraph that happens to be
20 within the parentheses is speaking specifically
21 about Dilley.

22 But, again, as I said before, there was

1 not some specific intention with that punctuation,
2 with e.g., arguably, maybe I should have
3 punctuated that slightly differently.

4 Q Is a cache hierarchy a type of
5 popularity service?

6 A A cash hierarchy is something that
7 caches store -- they store replicated copies of
8 information to try to reduce the latency and,
9 also, filter out bandwidth when a user is
10 accessing information so that they don't, for
11 example, overwhelm an origin server. And you
12 talked about a popularity service. And, actually,
13 now, I'm sorry, I've lost details of -- can you,
14 please, repeat the question again?

15 Q Is a cache hierarchy a type of
16 popularity service?

17 A Not necessarily.

18 Q When is it not?

19 A I could have a popularity service that
20 isn't doing any caching. If I simply wanted to
21 keep track of how popular something is, you could
22 keep track of the popularity of YouTube videos or

1 something like that, for example, or any type of
2 resource that people are asking for, and that
3 wouldn't necessarily have anything to do with
4 caching.

5 Cache is -- they may be -- you may have
6 a system that is doing caching and tracking
7 popularity, but there are scenarios where you
8 could be keeping track of popularity where there's
9 no caching that's occurring.

10 Q What is the role that metadata plays in
11 Dilley's caching system?

12 A As I mentioned earlier, in column 3 of
13 Dilley, beginning in line 2, running through
14 line 9, there's a discussion of metadata, and it
15 says that metadata, as used herein, metadata is
16 information about the content provider's content.
17 It says -- it goes on to say it is a set of
18 control options and parameters that determine how
19 an edge server handles a request for an object.
20 There's also more detail -- there's also a
21 discussion of this in the middle of column 4, for
22 example, starting at around line 23, going

1 through, around, line 46 of column 4. But the
2 metadata is additional information that is used to
3 keep track of whatever is needed to control the
4 placement and the policies related to managing
5 objects in the content delivery network.

6 Q Is metadata used to determine where to
7 cache content in Dilley?

8 A So the metadata, there's an extensive
9 discussion of metadata throughout the Dilley
10 reference. It is used to, for example, in column
11 3, from line 7 through 9, it's talking about how
12 metadata tags are used to enable the tiered
13 distribution service or feature and to specify a
14 policy or a type of cache -- or hierarchy parent
15 to be used.

16 So it is being used to locate data
17 within the hierarchy, and it's also used to, in
18 general, to control the placement and management
19 of the hierarchy within the content delivery
20 network.

21 Q And does that include using metadata to
22 determine where to cache content?

1 A Yes, that would be one of the uses.
2 For example, in column 4, starting at line 27, it
3 says "Refers to the set of "all control options
4 and parameters for an object (coherence
5 information, origin server identity information,
6 load balancing information, customer code, our
7 control codes)," and this information is used to
8 specify the policy and to -- the policies for and
9 to manage the data within the hierarchy.

10 Q Is metadata used to determine where to
11 fetch content in Dilley?

12 A Yes. For example, in column 6, there's
13 an example, and it says that this is a
14 representative -- it says this starting at
15 line 23, it says the syntax described here is
16 merely representative, but it has an example of a
17 metadata tag, beginning at line 25, it says the
18 metadata tag uses hierarchy, turns on the cache
19 hierarchy feature, and it goes on to describe
20 that, essentially, if you -- it says the default
21 setting for the cache hierarchy is OA, which means
22 that you go directly to the origin server. So

1 that's an example of skipping over the
2 hierarchy -- or lower levels of hierarchy and
3 going directly to the origin server. So that's
4 one example of it specifying where to locate the
5 data, in that case, going to the origin server, as
6 opposed to trying to locate it within the
7 hierarchy.

8 Q Is determining where to fetch content
9 and determining where to cache content two
10 different operations?

11 A You asked -- can you, please, repeat
12 the question?

13 Q Are determining where to fetch content
14 and determining where to cache content two
15 different operations?

16 A They may or may not -- they may be
17 determined -- that may be something that happens
18 as part of the same operation or it could be
19 separated. But the -- they -- there's a
20 relationship between where you decide to place
21 data within a cache hierarchy and where you fetch
22 data in a cache hierarchy. You typically try to

1 fetch data from the closest place where -- the
2 cache that's closest to you. And the two things
3 can be closely related to each other.

4 Q Were you speaking generally just now or
5 describing Dilley specifically?

6 A I was speaking generally. Your
7 question wasn't framed as being specific to
8 Dilley, so I was speaking generally.

9 Q In Dilley, specifically, is determining
10 where to fetch content and determining where to
11 cache content two different operations?

12 A I'm not sure what you mean by
13 "operations."

14 I don't know if -- yeah, I don't know
15 what you mean, specifically, by "operations."

16 If you can clarify that, I'm happy to
17 answer the question.

18 Q In Dilley, is determining where to
19 fetch content a different determination than
20 determining where to cache content?

21 A Well, Dilley's describing a system that
22 it can implement a number of different policies.

1 So, for example, in paragraph -- in column 4, it's
2 the part that I mentioned before, starting at
3 around line 27, it mentions quite a few different
4 control options and parameters that the metadata
5 can be keeping track of, things related to load
6 balancing, coherence. These are all connected
7 with decisions of where you would want to cache
8 data. And when you try to locate data, you want
9 to locate it in the closest part of the cache
10 hierarchy that's -- the portion of the cache
11 hierarchy that is closest to the user because that
12 minimizes latency.

13 So Dilley describes, as framework, it
14 can support a wide variety of different control
15 decisions related to where cache -- where data is
16 placed within the hierarchy. And then, for a
17 particular request, that request, again, will try
18 to find a close copy, but the request also often
19 triggers updates of the policies or decisions.
20 Because once you request data, that, for example,
21 indicates that the data is being actively used.
22 So sometimes that involves moving the data, even

1 due to that request.

2 So the decisions about placing data and
3 decisions of fetching data are often very
4 connected to each other, closely connected to each
5 other, and Dilley enables a wide range of
6 different options.

7 Q Do you rely on your understanding of
8 Dilley's use of metadata to determine where to
9 cache content in your obviousness analysis?

10 MR. ANDERSON: Objection. Form.

11 A Can you repeat the question, please?

12 Q Sure. I can rephrase it.

13 You previously testified that you
14 understood Dilley to use metadata to determine
15 where to cache content.

16 Did that understanding play any role in
17 your obviousness analysis relying on Dilley?

18 MR. ANDERSON: Objection. Form.

19 A Sorry, I'm just having trouble
20 following the question.

21 Can you say that one more time?

22 Q You previously testified that you

1 understand Dilley to use metadata to determine
2 where to cache content.

3 Did that understanding of Dilley play
4 any role in your obviousness analysis?

5 MR. ANDERSON: Objection. Form.

6 A Well, my obvious analysis is a
7 combination, in ground 2, I'm starting with
8 Dilley, and then I'm including teachings from Pai
9 and Wang. So the Dilley -- the claims and the
10 specification from Dilley were part of these --
11 the things described in Dilley were things that I
12 discussed in my analysis, during my obviousness
13 grounds.

14 Q Does your ultimate conclusion of
15 obviousness, based on Dilley, Pai, and Wang, rely,
16 in any way, on Dilley's use of metadata to
17 determine where to cache content?

18 MR. ANDERSON: Objection. Form.

19 A Well, what I rely on is what's
20 disclosed in Dilley, and Dilley talks about
21 metadata and how that enables different policies.
22 So what I rely on is Dilley, and then the

1 teachings of Dilley, and then I include, as I
2 described in my many pages of analysis, how the
3 teachings of Pai and Wang are combined with
4 Dilley.

5 Dilley does discuss metadata, and
6 that's something that I talk about in my analysis.

7 Q If Dilley did not use metadata to
8 determine where to cache content, would that
9 change anything about your obviousness analysis?

10 MR. ANDERSON: Objection. Form.

11 A Well, my analysis is based on Dilley,
12 it's not based on a hypothetical modification of
13 Dilley. So my opinions are all based on what
14 Dilley actually says.

15 Q Right. And I'm trying to determine
16 whether or not your understanding of what Dilley
17 says about using metadata to determine where to
18 cache content was important or not important to
19 your ultimate conclusion of obviousness.

20 Did you rely, in any way, on Dilley's
21 use of metadata to determine where to cache
22 content in reaching your conclusion on

1 obviousness?

2 MR. ANDERSON: Objection. Form.

3 A I mean, I rely on the things that I
4 discuss in my analysis. And my analysis is quite
5 lengthy. I discuss, in my analysis, how Dilley
6 makes use of metadata.

7 Q And is one of the things you discuss in
8 your analysis about how Dilley makes use of
9 metadata, the use of metadata to determine where
10 to cache content?

11 MR. ANDERSON: Objection. Form.

12 A Well, I would probably need about, I
13 don't know, an hour or so to go back through my
14 declaration to search for exactly what you
15 asked -- the way you phrased the question, you're
16 asking whether something exists in my analysis,
17 and I would have to go re-read it to determine
18 that. But my analysis is based on what I describe
19 in the analysis.

20 So it's been about an hour. I don't
21 know if there's a break coming up sometime soon?

22 Q Do you want to go another 15 minutes

1 and then do a break for lunch?

2 A That's fine.

3 Q Alternatively, we could do a break now,
4 and then, you know, have a late lunch, if that
5 would be your preference.

6 A I mean, I'd prefer to have a break now.
7 It could be a lunch break or lunch could be at a
8 different time.

9 Q Either is fine with me.

10 MS. KELLY: Counsel, do you have a
11 preference?

12 MR. ANDERSON: Do you expect a lot more
13 questioning after the break? We can take a lunch
14 break now?

15 THE WITNESS: I'd probably vote for
16 lunch now, but...

17 MS. KELLY: Sure. Do we want to do
18 30 minutes? Do you want longer?

19 THE WITNESS: How about 40 minutes?

20 MS. KELLY: Sure. So that means we're
21 coming back at 12:20.

22 THE WITNESS: That sounds fine.

1 MR. ANDERSON: Okay.

2 MS. KELLY: All right. I'll see you
3 then.

4 THE WITNESS: Okay.

5 MR. ANDERSON: Thank you.

6 (Recess taken from 11:45 a.m. to
7 12:22 p.m.)

8 BY MS. KELLY:

9 Q Dr. Mowry, did you have any discussion
10 with your counsel about your testimony during our
11 break?

12 A No, I did not speak with him at all.

13 Q You have the Dilley reference in front
14 of you still, correct?

15 A Yes.

16 Q Can you turn your attention to column 6
17 of Dilley, lines 10 through 14. It says "Most
18 objects are fetched using a default mechanism
19 where the edge server contacts the origin server
20 to handle a request that cannot be serviced in the
21 edge region."

22 Do you see that.

1 A Yes, I do see that.

2 Q In that section, is Dilley providing
3 some details on how to retrieve content from the
4 origin server?

5 A So it's saying that there are objects
6 that do not use the hierarchy, and for those
7 objects, they would directly contact the origin
8 server to get a response to their request.

9 Q And is that an example of a way that
10 Dilley teaches to retrieve content from the origin
11 server?

12 A Yes. That's correct.

13 Q Can you look at column 8, lines 22 to
14 38 of Dilley.

15 A Okay.

16 Q And this portion of Dilley, is it
17 describing an edge server query guide process,
18 where metadata is used to identify where to go to
19 get the object?

20 MR. ANDERSON: Objection. Form.

21 A Can you, please, repeat the question?

22 Q In this portion of Dilley, is it

1 describing an edge server query guide process
2 where metadata is used to identify where to go to
3 get the object?

4 A You used the phrase "edge server query
5 guide process."

6 That is not -- that phrase does not
7 appear here. It's talking about an edge server
8 querying its associated guide processes, but it's
9 not talking about edge server query guide process
10 as -- so I don't know if that was an accidental
11 misstatement in your question, or maybe I didn't
12 understand the question properly.

13 Q So is your understanding of this
14 portion of Dilley, that it is describing an edge
15 server querying its associated guide process in
16 which metadata is used to identify where to go to
17 get the object?

18 MR. ANDERSON: Objection. Form.

19 A Well, it's describing something in
20 Figure 6, and I discuss this figure in my
21 analysis. So box 620, in Figure 6, is the step
22 that's being partly described in this section you

1 referred to in the specification, where it is
2 seeing if this object is a candidate for the cache
3 hierarchy, and if so, then if it is using the
4 cache hierarchy, so if you see the yes option in
5 step 622, in Figure 6, after that, in step 628,
6 there's a step where it examines metadata.

7 Q Is this process, illustrated in
8 Figure 6 and described in lines 22 to 38, an
9 example of a way that an edge server can obtain an
10 object directly from an origin server?

11 MR. ANDERSON: Objection. Form.

12 A Can you, please, repeat the question.

13 Q Is the process illustrated in Figure 6,
14 and described in lines 22 to 38 of column 8, an
15 example of a way that an edge server can obtain an
16 object directly from an origin server in Dilley?

17 A Well, it's describing that if -- in
18 this example, if the object has a metadata that
19 says that it should not use the hierarchy, then
20 the request for data will go to the origin server,
21 it will bypass the rest of the hierarchy.

22 Q Is that a similar process to the

1 process described in column 6, lines 30 to 61 of
2 Dilley?

3 MR. ANDERSON: Objection. Form.

4 A The lines in column 6, that you
5 mentioned are talking about the OA option for use
6 hierarchy, I don't see that -- that OA being
7 referenced in column 8. It is discussing a
8 situation where when the OA setting is set for use
9 hierarchy, it says the edge server is to go direct
10 to the origin server, specified in the ARL.

11 Q Is that an example of an edge server
12 using a metadata OA tag to contact the origin
13 server directly?

14 A So it's starting at line, I don't know
15 if it's 30 or 31, just based on the formatting.
16 It says OA indicates that the edge server is to go
17 direct to the origin server when that OA parameter
18 is set, and it goes on to say this is,
19 essentially, the equivalent of turning the cache
20 hierarchy off.

21 Q If you look at column 7, lines 14 to
22 18, of Dilley, it discusses Dilley's use of

1 metadata to determine the name of a server to go
2 to.

3 Is that a fair characterization of
4 those lines in Dilley?

5 A Can you just repeat the line numbers
6 you said? Starts at 14 and how far did you say to
7 look?

8 Q 14 to 18.

9 A Yes, it's saying the application of the
10 metadata determines the server region where you're
11 sending your request to either fetch or validate
12 the object.

13 Q Does it discuss options other than
14 fetching or validating the object in this section?

15 A In that sentence, let me see. It
16 doesn't -- I don't see anything else in that
17 sentence.

18 Q Are there options other than fetching
19 or validating the object for this operation in
20 your understanding of Dilley?

21 A I'm not seeing another option being
22 discussed in the text immediately around that --

1 the sentence that you pointed me to.

2 Q Does any other portion of Dilley come
3 to mind right now, where it does discuss another
4 option?

5 A Well, beginning at column 6, near the
6 bottom, like, on line 64, it says that this is an
7 example, just to provide a concrete example. And
8 then it goes into this paragraph that we were just
9 discussing. So this is one example of how the
10 system might work.

11 So it's just discussed as one example
12 here. I'd have to go through the rest of it and
13 see what else it says. But this is being
14 described as one concrete example of how it might
15 operate.

16 I don't interpret this as limiting how
17 the functionality would work, but they're showing
18 one example of how it might work.

19 Q Can you look at column 8, lines 22 to
20 38 -- well, really 58, column 8, lines 22 to 58.

21 A Okay.

22 Q Does this portion of Dilley discuss a

1 situation where metadata points to a parent server
2 and the parent server does not have the requested
3 object?

4 MR. ANDERSON: Objection. Form.

5 A Okay. Sorry. That was a long section
6 of text that I was just reading through.

7 Can you, please, repeat the question.

8 Q Does this portion of Dilley discuss a
9 situation where metadata point to a parent server
10 and the parent server does not have the requested
11 object?

12 A Well, around line 38 it says, it starts
13 talking about how the guide process examines the
14 use hierarchy metadata and the process, the guide
15 process constructs a list of one or more parent
16 regions or dedicated parent region. So it's the
17 guide process that is constructing this list of
18 parent regions or a specific parent. It has
19 consulted metadata in the process in order to
20 construct that list. It doesn't say that it is
21 coming only from the metadata, but it is -- it is
22 examining the metadata while it is determining

1 this. It says it sends -- later, around line 44,
2 it says it sends the request to a server in the
3 parent region.

4 Starting at line 53, it says the parent
5 serves the request either from its cache, if it
6 has it, or by making a request to the origin
7 server. Preferably, it will not make a request to
8 another server. So those are things that are
9 described in that section.

10 So the metadata has had -- the guide
11 process is the thing that decided which specific
12 parent regions or region to send the request to.
13 And further down the column, it discusses that the
14 parent may -- may have the content or may not have
15 the content.

16 Q In your previous answer, you said
17 "Preferably it will not make a request to another
18 server."

19 Is the word "another" in that sentence
20 referring to the origin server?

21 MR. ANDERSON: Objection. Form.

22 A Sorry, did you just ask whether -- can

1 you repeat the question, please?

2 Q Sure. In your previous answer, you
3 said "Preferably, it will not make a request to
4 another server."

5 And I wanted to know what "another
6 server" was referring to?

7 A Well, I was just quoting portions of
8 the line that begins -- the sentence that begins
9 at line 55 in column 8. So it says "Preferably, a
10 parent will not make a request to another server
11 in the hierarchy, rather, its guide process, by
12 default, will return only to the origin server as
13 a valid destination."

14 So what it's describing there is that
15 it -- in this case, you asked what is meant by
16 "another server in the hierarchy," and I don't
17 remember if you asked about the origin server.
18 But what it's saying is, at this point, it's going
19 to go to the origin server.

20 But I also want to emphasize that this
21 whole sentence begins with the word "preferably."

22 So they're describing something that

1 they think would be a desirable property, but it's
2 not saying that it only works this way. So I
3 think the point of this is that they're concerned
4 about latency, and you want to minimize, probably,
5 the number of times that you try to locate content
6 unsuccessfully in the hierarchy.

7 So what they appear to be describing is
8 that if the edge server doesn't have it and then
9 the parent that it gets sent to next also doesn't
10 have it, then they're saying it might be a good
11 option to -- or it says "preferably." At that
12 point, you go to the origin server and presumably,
13 this is because they're concerned about latency.
14 Because if you kept querying more and more parents
15 or other servers, that might end up taking a long
16 time, possibly.

17 Q If you look at paragraph 257 of your
18 declaration -- it's actually 256, on PDF 104.

19 A Okay.

20 Q In this paragraph, you state that
21 having a parent server redirect an edge server to
22 fetch content from the origin server would

1 decrease latency as it would remove the parent
2 server from acting as a middleman.

3 Do you see that?

4 A Yes.

5 Q How does having the parent server
6 redirect the edge server to fetch the content from
7 the origin server remove it from acting as a
8 middleman?

9 A The reason why it removes it from
10 acting as a middleman is that you don't have to --
11 content delivery networks are designed to transfer
12 large objects, typically, so large images, video
13 files, things that are big, and it takes time to
14 transmit them over the network, and there's also a
15 processing time at different servers.

16 When the parent server directs the --
17 uses the redirect to have the edge server contact
18 the origin server directly, then this large, say,
19 video file is, then, communicated through the
20 network directly from the origin server to the
21 edge server, and that large file transfer bypasses
22 the parent server. Otherwise, what would happen

1 is the parent server would need to contact the
2 origin server, presumably, and you would transfer
3 the file from the origin server to the parent
4 server, and then only after its received it,
5 typically, it would, then, start transferring it
6 to the edge server.

7 So that would typically take more time.
8 It would also involve storing this large file in
9 the cache storage of the parent server.

10 So it would be better, both in terms of
11 latency, and as I also mentioned later, it just
12 removes an unnecessary step where something could
13 potentially go wrong if there's a network glitch,
14 or something that causes the transfer to fail,
15 you've eliminated an unnecessary step by skipping
16 over transferring this large file by way of the
17 parent server. Because now you just transfer it
18 directly from the origin server to the edge
19 server.

20 Q Look at -- go back, I guess, and look
21 at paragraph 216 on PDF 84.

22 A Okay.

1 Q And in this paragraph, you describe
2 certain features of Wang's hierarchical caching
3 system; is that right?

4 A Yes. If we're going to be discussing
5 Wang, is it possible for me to get the Wang
6 reference?

7 Q Sure.

8 MS. KELLY: It's Exhibit 1005.

9 PLANET DEPOS TECHNICIAN: All right.
10 Please stand by.

11 (Exhibit 1005 marked for identification
12 and retained by counsel.)

13 A Okay.

14 Q In paragraph 216, you discuss Wang's
15 paragraph 123 as describing the service manager
16 returning attributes of a resource, correct?

17 A Yes.

18 Q You include, as an example of one of
19 those attributes, an indication of whether a
20 resource is cacheable or not, correct?

21 A Yes.

22 Q And you say that "If a resource is

1 marked as not cacheable, a POSITA would have
2 understood this to be an instruction to not
3 cache."

4 Do you see that?

5 A Yes, I see that.

6 Q The words "instruction to not cache" do
7 not appear in Wang, correct?

8 A Yes. That's correct.

9 Q How is it that a POSITA would equate
10 something being marked as not cacheable with an
11 instruction to not cache?

12 A It's an indication that it's not
13 cacheable, so the cache hierarchy would not
14 attempt to cache the object. As it says, it would
15 then just -- it would HTTP-redirect the subscriber
16 to the origin server. It's simply going to bypass
17 the hierarchy in that case. So you can view it as
18 an instruction to not cache that resource at level
19 1.

20 Q How do you get from an indication to
21 something being an instruction?

22 MR. ANDERSON: Objection. Form.

1 A I don't think I'm following the
2 question.

3 So it is an indication to not cache it,
4 so I just explained what's described in Wang,
5 which is that the caching engine will, then,
6 redirect the subscriber to the origin server. So
7 it is -- when it sees this indication, it does not
8 cache it. The alternative would be to cache it.

9 Q How does that translate into an
10 instruction to not cache?

11 MR. ANDERSON: Objection. Form.

12 A The '573 patent uses the phrase
13 "instruction to not cache," or some variation of
14 that, instruction not to cache. Let me just look
15 up what it uses. Excuse me a second. I need to
16 look at the claims.

17 So the claims of the '573 patent
18 discuss an instruction to not cache a resource.
19 And this -- what's described here in Wang would --
20 I said, you know, a POSITA would have understood
21 this to be an instruction not to cache the
22 resource. It has received this indication that it

1 should not be cacheable. Also, what's being
2 described here in Wang is exactly the same as what
3 is being described in the '573 patent
4 specification. So I can jump back to that part.

5 But in column 7, beginning at line 25
6 through line 30, there's a discussion of, to the
7 extent that there's any discussion at all, in the
8 '573 patent specification, relating to something
9 that could possibly be an instruction not to
10 cache. The discussion that is here is identical
11 to what's in Wang.

12 Q Can you look back at Dilley column 7,
13 lines 31 to 40. In this section, Dilley is
14 describing a parent server requesting -- sorry --
15 instructing an edge server to request content,
16 correct?

17 A Sorry, I was reading the paragraph.
18 Can you, please, repeat the question.

19 Q In this section, Dilley is describing a
20 parent server instructing an edge server on where
21 to request content, correct?

22 A Can you -- can you be -- repeat the

1 lines. I'm failing to see what you're referring
2 to in what I thought you pointed me to. You said
3 lines 31 through, what?

4 Q 40.

5 A 40? So which sentence? What are you
6 pointing to? I'm not seeing what you're referring
7 to.

8 Q So does this portion of Dilley discuss
9 a parent server and instructing an edge server
10 about where to get content?

11 A So you're not pointing me to something
12 here. I don't see that phrase that you're asking
13 about here. I don't know if that's the point of
14 the question.

15 Q Well, what does this section of Dilley
16 describe, in your understanding?

17 A It's in the middle of a much larger
18 section. I'm going to have to go back and read
19 the surrounding paragraphs here.

20 Sorry, can you repeat the question,
21 please.

22 Q What does this section of Dilley

1 describe, in your understanding?

2 A From lines 30 through 40 -- 31 through
3 40?

4 Q Yes.

5 A It says an edge server contacts either
6 a core region or a dedicated parent region as a
7 function of the given object server metadata, so
8 it's somehow based on the metadata. That's,
9 basically, what it's saying there.

10 Q What is a "core region"?

11 A Well, it's another set of, for example,
12 Figure 4 says is a -- it's showing that a given
13 edge server may communicate with an intermediate
14 core region or a dedicated parent region. So the
15 core region is some collection of other servers.

16 Q Are those other servers above a given
17 edge server on the hierarchy?

18 A So there's some discussion of core
19 region in column 5, starting at around line 38 or
20 so. Says a given region 408 includes a cluster of
21 parent servers, for example, it says may be
22 collocated in large hosting data centers in

1 well-connected core portions of the Internet,
2 representative core locations include, without
3 limitation, well-connected data centers.

4 So a core region is, it's a collection
5 of nodes that have some -- they're well-connected
6 with each other.

7 Later in the bottom of -- in column 7,
8 at around line 44 or so, starting, maybe, around
9 40, it says that "An edge server contacting an
10 intermediate core region or a parent region should
11 also be appreciated. The core region may be
12 backed up by a single region so that the hierarchy
13 is as follows."

14 So you asked about, is the core
15 region -- can you repeat the question, please?
16 You're asking about the core region in the
17 hierarchy?

18 Q Yes. Is the core region composed of
19 servers that are above the given edge server on
20 the hierarchy?

21 A Well, I mean, to be honest, it
22 doesn't -- it isn't very clear about whether they

1 are -- hold on a second here. I have to look at
2 one thing here.

3 Are they above it in the hierarchy? In
4 Figure 4, what we see is there are these edge
5 regions 402A, 402 -- well, it doesn't actually
6 have a number on it. It's probably a typo. And
7 then there's 402N. Those are edge regions. And
8 the -- I believe what it's referring to is the --
9 a core region is a set of servers within a region
10 and they also talk about parent regions.

11 But, for example, you could be talking
12 to peers within -- so, like, 404A, within 402A,
13 could be talking to 404B or 404C, and so on.

14 So there are different regions that are
15 illustrated here in Figure 4.

16 The other nodes, within the same edge
17 region, those are -- I would characterize those
18 more as peers. But other -- rather than being
19 strictly higher up in a hierarchy, as I recall,
20 the '573 also talks about accessing peers that you
21 can -- that another, like, when a particular edge
22 server doesn't have content, it sometimes gets it

1 from a peer server.

2 I may have lost track of the question,
3 but I was attempting to answer the question.

4 Q That's okay. What would qualify the
5 core region as being intermediate, as that word
6 intermediate is used?

7 MR. ANDERSON: Objection. Form.

8 A So are you asking me to define --
9 define how the term -- what intermediate means in
10 that particular -- which column are we talking
11 about again? Which sentence are you referring to?
12 Is it column --

13 Q The core -- yeah, the core region is
14 described as being intermediate.

15 A Can you point me --

16 Q I was wondering --

17 A Can you point me to where that is,
18 exactly.

19 Q So column 7, at around line 40, it says
20 "An edge server contacting an intermediate core
21 region or a parent region."

22 And I was asking, in your

1 understanding, how is the core region intermediate
2 in the hierarchy?

3 A Well, for example, in column 2, the --
4 in line 11, it uses the word "intermediate."

5 It talks about intermediate nodes.
6 And, in this case, it's just discussing other
7 nodes within the hierarchy. So in that column 7
8 that you pointed me to, where it says "While the
9 above description shows an edge server contacting
10 an intermediate," and it says "core region or a
11 parent region."

12 So it just means, I don't know that --
13 you asked, what's the significance of intermediate
14 there? I think an intermediate just refers to
15 something within the hierarchy. I don't think it
16 has some special modification of core region.
17 Because as it's used in other parts here, I wasn't
18 asked to provide claim construction opinions, as I
19 said before, but there are -- as I see
20 intermediate, as it's used in column 2, it's used
21 there several times, and it simply means something
22 else within the hierarchy. So it just means a

1 core region.

2 I think you could delete the word
3 "intermediate" and it would have no practical
4 difference, in terms of what the sentence means.

5 Q On PDF 90 of your declaration, you
6 begin your opinion that limitation 1B is found in
7 a combination of Dilley, Pai, and Wang, correct?

8 A That is what I say in paragraph 231 of
9 my declaration, yes.

10 Q In your proposed combination of Dilley,
11 Pai, and Wang, what is the thing that is accessing
12 the popularity service recited in this limitation?

13 MR. ANDERSON: Objection. Form.

14 A Well, I don't -- I don't really -- I
15 don't really follow the question. Dilley
16 describes a content delivery network, where it is
17 controlling the placement of data, and it's
18 discussing how metadata can be used to implement a
19 wide variety of different policies, and it's also
20 discussing popularity and how it's important to
21 put popular content close to the user. And then
22 Pai is teaching add -- much more detail on how one

1 would implement a popularity service that is used
2 for exactly its purpose of placing data within the
3 hierarchy of the content delivery network based on
4 the popularity.

5 So in that combination, the content
6 delivery network, the part of Dilley that controls
7 the hierarchy, would be -- the components of
8 Dilley that implement the policies, those things
9 would be accessing the popularity service, as
10 taught by Pai.

11 Q In your proposed combination of Dilley,
12 Pai, and Wang, what is the thing that determines a
13 popularity designation?

14 A So there's a lengthy discussion between
15 paragraphs 237 and 241 of my declaration, where I
16 go into detail about how Pai -- that Pai teaches
17 how to dynamically determine popularity values to
18 determine popularity. And there's a lot of
19 discussion in my report about Pai. It, in fact,
20 uses the same concept of two threshold levels that
21 were described in the '573 patent. There's a
22 lower threshold and a higher threshold, so you end

1 up with three different categories. And those
2 categories are also illustrated in Pai, although I
3 don't think I actually have a copy of Pai here.

4 But Pai has a figure where it shows
5 using two thresholds, basically, to separate out
6 content into three categories which, roughly
7 speaking, are unpopular, highly popular, and, say,
8 medium popular. I'm not quoting literally, I'm
9 just saying that there are these ones that -- the
10 same set of three different categories, and
11 that -- that that -- anyway, like I said, there's
12 a lengthy discussion in my -- in those paragraphs
13 of my declaration that go through details,
14 including I reference Figure 6 of Pai, for
15 example, that walks through how it identifies
16 these different levels of popularity for the
17 popularity designations.

18 I was wondering if we're approaching a
19 break anytime soon?

20 Q Yes.

21 MS. KELLY: Why don't we go ahead and
22 take a five or ten-minute break.

1 THE WITNESS: Okay. Ten minutes would
2 be great, if that's okay.

3 MS. KELLY: Sure.

4 THE WITNESS: Great.

5 (Recess taken from 1:28 p.m. to
6 1:40 p.m.)

7 MS. KELLY: Well, I think you read my
8 mind, Dr. Mowry. I do not have any further
9 questions.

10 THE WITNESS: Okay. Thank you.

11 MR. ANDERSON: Just one second. Let
12 me -- yeah, no further questions from me either.

13 PLANET DEPOS TECHNICIAN: All right.
14 If that concludes, we'll just mark our
15 off-the-record time.

16 (Off the record at 1:41 p.m.)
17
18
19
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21
22

1 CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC

2 I, Judith E. Bellinger, Certified Reporter
3 and Notary Public within and for the Commonwealth
4 of Virginia do hereby certify:

5 That TODD C. MOWRY, PH.D., the
6 witness whose deposition is hereinbefore set
7 forth, was duly sworn by me before the
8 commencement of such deposition and that such
9 deposition was taken before me and is a true
10 record of the testimony given by such witness.

11 I further certify that the adverse party,
12 GOOGLE LLC, was represented by counsel at the
13 deposition.

14 I further certify that the deposition of
15 TODD C. MOWRY, PH.D., occurred virtually
16 on Tuesday, February 24, 2026, commencing at
17 9:32 a.m. EST.

18 I further certify the inspection, reading
19 and signing of said deposition was not discussed
20 on the record.

21 I further certify that I am not related to
22 any of the parties to this action by blood or

1 marriage, I am not employed by or an attorney to
2 any of the parties to this action, and that I am
3 in no way interested, financially or otherwise, in
4 the outcome of this matter.

5
6 IN WITNESS WHEREOF, I have hereunto set my
7 hand this 27 day of February, 2026.

8
9 My commission expires:
10 September 30, 2028

11
12 
13 _____

14 NOTARY PUBLIC IN AND FOR THE
15 Commonwealth of Virginia

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