Transcript of Loren G. Terveen, Ph.D., Volume II

Date: March 24, 2026
Case: Microsoft Corporation -v- X1 Discovery, Inc. (PTAB)

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EX-2026
U.S. Patent 9,633,139

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1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 ----------
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD
4 ----------
5 MICROSOFT CORPORATION,
6 Petitioner,
7 v.
8 X1 DISCOVERY, INC.,
9 Patent Owner.
10 ----------
11 Case No. IPR2025-00253 -00254 -00255
12 U.S. Patent No. 7,370,035
13
14 DEPOSITION OF LOREN G. TERVEEN, PH.D.
15 APPEARING REMOTELY FROM MINNEAPOLIS, MINNESOTA
16 TUESDAY, MARCH 24, 2026
17 11:00 A.M.
18
19
20 Job No.: 622788
21 Pages 181 - 221
22 Reported by: Adrienne M. Mignano, RPR

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1 Deposition of LOREN G. TERVEEN, PH.D., held
2 via Zoom videoconferencing, pursuant to Notice,
3 before Adrienne M. Mignano, a Registered
4 Professional Stenographic Reporter and Notary
5 Public.
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1 A P P E A R A N C E S
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22

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1 C O N T E N T S
2 EXAMINATION OF LOREN G. TERVEEN, PH.D. PAGE
3 MS. LAROCHELLE 185
4
5
6 E X H I B I T S
7 (Attached to the transcript)
8 EXHIBIT PAGE
9 Exhibit 1 "The Entourage Help Page" from 204
10 the Wayback Machine
11
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1 Whereupon,
2 LOREN G. TERVEEN, Ph.D.,
3 being first duly sworn or affirmed to testify to
4 the truth, the whole truth, and nothing but the
5 truth, was examined and testified as follows:
6 EXAMINATION BY COUNSEL FOR THE PATENT
7 OWNER
8 MS. LAROCHELLE:
9 Q Good morning, Dr. Terveen.
10 **A Good morning.**
11 Q Good to see you again.
12 I'm going to try to keep this
13 relatively short today. So we're here for your
14 deposition in the three IPRs, X1 versus -- or
15 Microsoft versus X1 in the IPR2025-253 for the
16 '035 patent, 254 for the '490 patent and 255 for
17 the '139 patent.
18 Does that all sound right to you?
19 **A Yes.**
20 Q Okay. And you submitted supplemental
21 declarations in each of these three IPR
22 proceedings, correct?

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1 **A Yes.**
2 Q So I want to ask you a few questions
3 about the supplemental declarations. So what
4 I'd like you to do, if you could, is in the
5 exhibit download site, if you could get your
6 three supplemental declarations. So they are
7 titled -- each of them is titled "Supplemental
8 Declaration of Loren G. Terveen." They are
9 Exhibit 1100, I believe, in all three of the
10 proceedings. Sorry, my papers are a mess here.
11 **A Are they reply declarations?**
12 Q So the titles I have are
13 "Supplemental Declaration," and they are
14 Exhibit 1100. I think they are at the bottom of
15 that folder list.
16 **A Yes. Yes, I've seen them. I think**
17 **the file names have "Reply" in them, but yes.**
18 Q I see, okay. So if you could
19 download those three documents for me, and then
20 while you're doing that, I'd like to have you
21 download the three patents as well, the '035
22 patent, the '139 and the '490 patent. Those are

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1 Exhibit 1001 in each of the three IPR
2 proceedings.
3 So just let me know when you have
4 downloaded those six documents.
5 I'm being told that that is the wrong
6 link that Emma provided.
7 MS. MURRAY: Yes. Sorry, let me just
8 get you the right one. We had an initial -- I
9 mean, it's mostly the same documents, but I'll
10 give you the new one because there are some
11 duplicates in the old one.
12 DR. LAROCHELLE: But the documents I
13 asked him to get are there, right?
14 MS. MURRAY: Yes, they are.
15 THE WITNESS: So ignore what I have
16 downloaded so far then, correct?
17 DR. LAROCHELLE: I'm deferring to
18 Emma.
19 MS. MURRAY: Yeah, maybe just ignore
20 and I'll get you the new link, and then this
21 will be easier.
22 THE WITNESS: Sure.

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1 MS. MURRAY: I'm sorry about that.
2 That was my mistake.
3 BY DR. LAROCHELLE:
4 Q Okay. And so just to make sure we're
5 on the same page, we're going to download six
6 documents, the three supplemental declarations,
7 one for each of the IPR proceedings, and the
8 three patents, Exhibit 1001 in each of the three
9 proceedings.
10 **A Okay.**
11 Q And just let me know when you have
12 each of those.
13 **A Yep. I'm waiting to connect.**
14 Q Sure, take your time.
15 (Pause)
16 **A Okay. I've downloaded and extracted**
17 **all six of those files.**
18 Q Okay, perfect. So if you could open
19 up each of your three supplemental declarations,
20 and when you have them open, I want to start
21 with paragraph 19. So if you can page down to
22 that. I believe it's pages 10 and 11 in each of

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1 the documents.
2 **A You said 19, right?**
3 Q Paragraph 19, yes.
4 **A Yep.**
5 Q And we're going to look at the very
6 end, the last sentence of paragraph 19.
7 Just let me know when you're there.
8 **A Getting there.**
9 **Okay.**
10 Q Okay. So the last sentence of
11 paragraph 19 in each of your supplemental
12 declarations states, "Moreover, the patent
13 claims do not require character-at-a-time
14 results because a system that practices the
15 claims does not return results until the user
16 enters a second search string (i.e., the user
17 could enter an entire word without receiving any
18 search results)."
19 Do you see that?
20 **A Yes.**
21 Q And can you confirm for me that that
22 sentence is the same across all three of your

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1 declarations?
2 **A Yes.**
3 Q Thank you. So now I'd like to look
4 at the patents and the patent claims,
5 specifically. So let's look at the '139 patent
6 first. So if you could open that up. And,
7 again, that's Exhibit 1001, and for the '139,
8 that's Exhibit 1001 to the 255 IPR.
9 And once you have that, if you could
10 scroll down to claim 1.
11 **A Sorry, give me a second. You said**
12 **'139 first?**
13 Q The '139, yeah, let's do that one
14 first.
15 **A Let me bring that up.**
16 **Okay. I have it open.**
17 Q Okay. And I want to look at the last
18 limitation of claim 1, and that -- where I want
19 to focus is where it starts, "updating the
20 search results as each successive character of
21 the first partial search string and the second
22 partial search string is received respectively

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1 in the first search field."
2 Do you see that?
3 **A Yes.**
4 Q So I want to try to square that with
5 the language from your declaration where you
6 said that "the patent claims do not require
7 character-at-a-time results because a system
8 that practices the claims does not return
9 results until the user enters a second search
10 string."
11 So would you agree that the claim
12 language where it says "updating the search
13 results as each successive character of the
14 first partial search string is received," you
15 would agree that that describes incremental
16 searching, wouldn't you?
17 MR. THACKER: Objection. Form.
18 **A Could you just -- to make sure I**
19 **heard the part of the claim limitation that you**
20 **were quoting, could you just ask that again.**
21 Q Sure. So the claim language, the
22 limitation, says, "updating the search results

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1 as each successive character of the first
2 partial search string and the second partial
3 search string is received."
4 **A In this case, in this part of the**
5 **claim, this particular limitation is talking**
6 **about a scenario where as a character is typed,**
7 **you are updating search results. So for this**
8 **particular limitation, I would characterize that**
9 **as incrementally updating the search results.**
10 Q Okay. And is there a limitation that
11 says -- I'm sorry, I just want to make sure I
12 understand exactly what your answer was. You
13 said, "this particular limitation." So you
14 agree that this limitation describes incremental
15 or character-at-a-time searching over the first
16 partial search string, correct?
17 MR. THACKER: Objection. Form.
18 **A Well, I think if you -- if we**
19 **continue to read this limitation, "updating the**
20 **search results as each successive character of**
21 **the first partial search string and the second**
22 **partial search string is received respectively."**

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1 And so I think if -- the thing that I
2 want to be careful about is if you look at the
3 preceding limitations, going back two
4 limitations, the limitation reads, "searching
5 for a first one or more documents each including
6 at least one string that corresponds to the
7 first partial search string; and searching for a
8 second or more documents each including at least
9 one string that corresponds to the second
10 partial search string; and then updating the
11 search results."
12 And so the way I would read this is
13 until you have actually received a second
14 partial search string, even though you have
15 received the first partial search string, you
16 know, you don't need to be updating the search
17 results until you receive the second partial
18 search string. So I think that is what I was
19 getting at in the sentence that you asked me to
20 quote and to read in my declarations.
21 Q So I want to drill down on that. Can
22 you point me to where in this claim it says that

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1 you don't do any incremental searching on the
2 first string until you actually have a second
3 string in the search field, which is what I
4 think I understood you to just say?
5 MR. THACKER: Objection. Form.
6 A Well, I think -- the way I think you
7 would understand this claim is it says you have
8 to receive a first partial search string in a
9 first search field and then receive a second
10 partial search string in the first search field.
11 And then, as I said before, you do a search for
12 documents that include at least one string
13 corresponding to the first partial search string
14 and then you do a search corresponding for
15 documents that include at least one string that
16 corresponds to the second partial search string.
17 And it is only then that you can update the
18 search results. Well, and then you update the
19 search result as each successive character of
20 the first partial search string and the second
21 partial search string is received.
22 And so, again, the way I read this

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1 claim is that you have two partial search
2 strings that are being received and -- right,
3 they are received, first, the first partial
4 search string and then the second partial search
5 string, and then you do these searches and
6 updates.
7 And so I think the way I understand
8 this is that you have to receive the second
9 partial search string before you can do the
10 update.
11 Now, once you receive the first and
12 the second partial search string, if you add
13 successive characters onto them, then you can
14 update one character at a time. I would
15 acknowledge that.
16 Q So you would agree that if I typed in
17 C as my first string and then, say, L as my
18 second string, each of those is a partial search
19 string, right, and then I go back and add an H
20 to the first string, are you saying then that
21 would be incremental or not?
22 MR. THACKER: Objection. Form.

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1 A Would that be incremental? I
2 believe, setting aside -- I'm sorry, maybe --
3 just looking at the claim language, I think in
4 that case, looking at the claim language, I
5 think the example you gave is a user already
6 entered a C for the first partial search string
7 and an L for the second partial search string,
8 and then they go back and enter an H on the end
9 of the first partial search string, so now you
10 have CH for the first partial search string and
11 an L. I think what the claim language tells me,
12 that after you entered the H, you would then
13 update the search results.
14 Q Let's turn back, then, to
15 paragraph 13.
16 A In any one of my --
17 Q Any one of them. I believe that the
18 substance is the same across each of the three
19 declarations. So you pick whichever one you
20 want.
21 A I pick '490. It was the one that I
22 happened to be on.

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1 Q Okay, that's fine.
2 **A Okay.**
3 Q In paragraph 13 -- and I'm going to
4 look along in the '490 as well just so we're in
5 the same document. In paragraph 13 you say that
6 "2002-era computers were entirely capable of
7 incrementally searching across a plurality of
8 files, especially with the help of indexes."
9 And then -- let's see, that's not what I'm
10 looking for.
11 Oh, I see. So toward the middle,
12 maybe closer to the end, you say, "The reality
13 is that then-existing databases were much
14 smaller." And you're referring to
15 Mr. Haeberli's database example size of
16 1 gigabyte. Do you see that?
17 **A Yes.**
18 Q You give an example. You say,
19 "E-mail databases were no more than ten
20 megabytes and were often between 2 and 4
21 megabytes." Do you see that?
22 **A Yes.**

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1 Q And then you reference a document
2 here, Exhibit 1095, that I would like you to
3 pull up from the file share, if you could.
4 **A Uh-huh. Let me grab that.**
5 **Okay, I've got 1095.**
6 Q Okay. And you cite page 1 of
7 Exhibit 1095 for the idea that Yahoo's pre-2004
8 e-mail database was 4 megabytes.
9 Do you see that?
10 **A Right, right.**
11 Q And you understand that Yahoo's --
12 the e-mail database that's referred to in this
13 document is for the online Yahoo! Mail system,
14 correct?
15 **A Yes.**
16 Q Are you familiar with the POP, P-O-P,
17 e-mail protocol?
18 **A Yes, I am, although it's been quite a**
19 **long time since I've thought about that, yeah.**
20 Q You're aware that this was -- and, of
21 course, we're in 2026 now, so, you know, more
22 likely to use an exchange server today, but you

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1 are aware that back in the early 2000s POP was
2 the predominant e-mail protocol?
3 MR. THACKER: Objection. Form.
4 **A I would have to take your**
5 **representation, because, as you point out, I**
6 **guess that's, like, 25 years ago, and I don't**
7 **recall that, yeah.**
8 Q Okay. Well, let's pull up
9 Exhibit 1004, if you could.
10 **A 1004, Schwartz, okay.**
11 Q Yes. So this is Exhibit 1004 to each
12 of the three IPR proceedings. This is a book by
13 Steve Schwartz titled, Entourage for Macintosh
14 2001. And when you have that open, if you could
15 go to page 120, please.
16 **A Okay, I have it open. And I will go**
17 **to page 120.**
18 **Okay, I'm there.**
19 Q Okay. And on page 120 -- so this is
20 kind of a user guide to Entourage, the e-mail
21 platform. This is one of Microsoft's
22 references -- primary references in this

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1 proceeding. And at the top of the page, it
2 talks about "Types of E-mail Accounts."
3 Do you see that?
4 **A Uh-huh. Yep.**
5 Q And then the next header down is "POP
6 accounts." And it says, "POP accounts are by
7 far the most common type of e-mail account."
8 Do you see that?
9 **A Uh-huh.**
10 Q So would you agree, based on this
11 reference -- Microsoft's own reference in this
12 case, that POP accounts in the 2001 time frame
13 were the most common type of e-mail account?
14 MR. THACKER: Objection. Form.
15 **A I mean, that is what it says here.**
16 **Beyond that, as I said, I can't recall, but**
17 **that's what this says in this particular**
18 **reference.**
19 Q And the third sentence of this
20 paragraph says, "When your e-mail client
21 (presumably, Entourage) connects with ISP's mail
22 server to check for new mail, it is sent to your

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1 Mac from a POP server. After you've received
2 the new mail, it is automatically deleted from
3 the server."
4 Do you see that?
5 **A Yes.**
6 Q So you would agree that for somebody
7 using Entourage for their e-mail -- they connect
8 to the server, download their e-mail, it's
9 deleted from the server -- that it's likely,
10 almost certain, that their local storage, their
11 e-mail stored locally, is a larger database than
12 whatever is on the server?
13 Would you agree with that?
14 MR. THACKER: Objection. Form.
15 **A Well, I'm not sure I know what you**
16 **mean by that. I mean, this is simply based on**
17 **how many messages -- certainly it's based on how**
18 **many e-mail messages someone would choose to**
19 **download and store as opposed to downloading,**
20 **reading and deleting.**
21 **And, I mean, my recollection is at**
22 **this time it was pretty common for people to,**

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1 **you know, store some messages, get their inbox**
2 **down to zero, maybe having, you know, I don't**
3 **know, a few dozen folders with some number of**
4 **messages in them stored. But it would just**
5 **depend on usage.**
6 **And so I think, you know, many e-mail**
7 **repositories, even if stored locally, would not**
8 **necessarily be bigger than what I said here,**
9 **4 megabytes. Yeah, it just -- it depends.**
10 Q It could be substantially bigger,
11 correct?
12 **A Oh --**
13 MR. THACKER: Objection to form.
14 **A Well, depending on how people**
15 **configure things, it could be larger, it could**
16 **be smaller than four megabytes, yeah.**
17 Q And I just want to go to paragraph --
18 page 121 quickly, just to close this loop here.
19 So on page 121, just to confirm, under
20 "Web-based accounts," the second paragraph talks
21 about Hotmail, also talks about Yahoo! Mail,
22 both offering POP support.

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1 Do you see that?
2 **A Let's see, Yahoo! Mail offers POP**
3 **support. Does it say Hotmail? I'm just looking**
4 **for that.**
5 Q It may not expressly say it, but good
6 enough. You agree it says Yahoo! Mail is an
7 example of a server that has POP support, right?
8 **A It does say that, yes.**
9 Q Were you aware that the maximum
10 e-mail database size in Entourage 2001 was
11 2 gigabytes?
12 MR. THACKER: Objection. Form.
13 **A The maximum -- I don't recall right**
14 **offhand. I guess if you have that, you would**
15 **have to point me to that, yeah.**
16 Q Sure. So in the file download there
17 should be something titled "Entourage Help
18 Page."
19 **A I see that.**
20 Q If you could download that.
21 DR. LAROCHELLE: And we'll need to --
22 this is the only exhibit I'll need to mark, so

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1 we'll mark this as Exhibit 1 to the Terveen
2 deposition --
3 **A Okay.**
4 (Terveen Exhibit 1 marked for
5 identification and attached to the transcript.)
6 Q -- because this is not in evidence.
7 But what you should have is a Wayback
8 Machine archive web page -- Entourage Help Page,
9 and it is titled, "Size Limits"?
10 **A Uh-huh.**
11 Q And then at the bottom, "Entourage
12 2001 has a limit of 2 gigabytes on Databases and
13 Messages files. It does not handle this limit
14 gracefully. You may experience data loss if you
15 hit it."
16 Do you see that?
17 **A Yes.**
18 Q So if you are a user using Entourage
19 2001, downloading your e-mail from Yahoo! Mail,
20 using that as a POP server, you would agree that
21 your actual database size in Entourage 2001 was
22 2 gigabytes and not the 4 megabytes that you

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1 reference in paragraph 13.
2 Do you agree with that?
3 MR. THACKER: Objection. Form.
4 **A I think this is something -- again,**
5 **I'm just reading this document right now, and I**
6 **see "Entourage 2001 has a limit of 2 gigabytes**
7 **on both the Database and Messages file." And,**
8 **let's see -- and I think, as it says, sort of up**
9 **above, that the database file can include things**
10 **other than messages, for example, contacts,**
11 **events. And I'm not sure what all else can be**
12 **included in Entourage.**
13 **So if the -- I guess there is a**
14 **couple things I should be careful about. The**
15 **2-gigabyte limit might not be just for messages.**
16 **And then I think the other thing to point out**
17 **is -- well, maybe two other things -- that, of**
18 **course, is a maximum limit. That doesn't mean**
19 **that people actually are hitting that limit,**
20 **again, in practice.**
21 **And -- what was I going to say? And**
22 **I think if you -- if we go back to my**

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1 **paragraph 13, if I remember, I think**
2 **Mr. Haeberli -- I know I mentioned somewhere**
3 **that he assumed that hard disk capacity was**
4 **about 1 gigabyte, which, a 2-gigabyte e-mail**
5 **database would exceed the hard disk capacity.**
6 **Oh, yeah, right. I see he says -- Mr. Haeberli**
7 **assumed a database size of 1 gigabyte. Yeah,**
8 **okay. Good.**
9 **So let me correct that. He assumed a**
10 **database size of 1 gigabyte. Yeah, I'll just**
11 **come back to say this says that that was a**
12 **maximum database size for Entourage in 2001.**
13 **And I think I'll come back to what I**
14 **said before, that that doesn't mean that any**
15 **particular database size for a mess- -- e-mail**
16 **database size for a particular user was anywhere**
17 **close to that. And if I look at the second**
18 **sentence in this paragraph, I gave an example**
19 **where I said the median size of two e-mails in**
20 **2002 was about 4.4 kilobytes. And if you think**
21 **of an e-mail message being, you know, a couple**
22 **kilobytes in length, you can have hundreds of**

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1 **e-mail messages and still have a pretty small**
2 **e-mail database.**
3 **So I think we can talk about what**
4 **theoretical maximum e-mail database sizes were,**
5 **but I think we also need to really consider what**
6 **were typical or possible e-mail database sizes**
7 **as well.**
8 Q Okay. But you do agree that the
9 maximum e-mail database size in a system like
10 Entourage is substantially larger than the 2 to
11 4 megabytes that you reference in paragraph 13?
12 MR. THACKER: Objection to form.
13 Scope.
14 **A As I said, this is something that I**
15 **have not looked at specifically. You put this**
16 **document in front of me, The Entourage Help**
17 **Page, and all I can say -- all I can do is look**
18 **at what it said there and see that it indeed did**
19 **say in this page from The Wayback Machine that**
20 **"Entourage 2001 has a limit of 2 gigabytes on**
21 **both the Database and Messages file."**
22 Q Okay. You can set that aside for

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1 now. At your first deposition we talked a
2 little bit about the size of an index and how
3 index size might impact the time it takes to
4 search for documents. Do you remember that?
5 **A Yes.**
6 Q Would you agree that -- I'm going to
7 give you a hypothetical. So let's say you have
8 one data set -- maybe it is a set of files,
9 e-mails, whatever it is -- and you have two
10 different systems that can search. And they
11 both do indexed search. One can do an
12 incremental search. The other system only does
13 a delimited search, meaning on full search
14 terms. I think we talked about that at your
15 last deposition as well.
16 Do you understand the hypothetical?
17 **A Yes.**
18 Q So in that hypothetical, would you
19 agree that the index for the system that
20 performs incremental searches is necessarily
21 larger than the index for the system that does
22 delimited searching?

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1 **A No, it does not have to be**
2 **necessarily larger.**
3 Q Can you give an example of an index
4 that would not be larger?
5 **A Yes, I -- you know, this -- yes, I**
6 **touch on this in my supplemental replies. So**
7 **this will be just slightly technical, but if you**
8 **take the case of a standard inverted index,**
9 **where you have the words, the terms that you**
10 **might search for -- and let's say these are**
11 **whole words -- are the keys to the index. And**
12 **the values would contain at least the files that**
13 **those words occurred in and maybe the position**
14 **in each of those files. Could be other things**
15 **as well but at least that.**
16 **If I were receiving a partial search**
17 **string, or let's say I want to search**
18 **incrementally as I receive a search string, as I**
19 **receive characters, I could take the search**
20 **string that I have received so far and compare**
21 **that against the keys in the index, that is, the**
22 **words that had been indexed, and I could find**

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1 **all of the words that that search string so far**
2 **was contained in. And now all of the files that**
3 **they appeared in would be potential matches.**
4 **So it would be -- so the index would**
5 **be a standard inverted index, but the procedure**
6 **I would use for searching it would be a bit**
7 **different.**
8 Q Is this a system that was known in
9 2004, what you just described?
10 **A Yeah, this is the kind of thing that**
11 **I believe Baeza-Yates would talk about. It is**
12 **just a standard sort of thing where, you know,**
13 **you -- you take your search string and you**
14 **compare it to the words in the index, and,**
15 **obviously, you could simply find a -- you can**
16 **find an exact match or you can do this partial**
17 **match thing, so, yeah, I think that was known.**
18 Q So while we're talking about indexing
19 for incremental search, let's turn to
20 paragraph 64. I'm looking at your '490
21 supplemental declaration.
22 **A 64, okay, yes.**

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1 **Okay. Yeah.**
2 Q There you state -- I'm actually going
3 to go to the very last sentence of paragraph 64.
4 You state, "Further, a system that indexes only
5 whole words inherently indexes prefixes because
6 common words that would be indexed in any system
7 (e.g., the word 'a') are prefixes for other
8 words (e.g., 'an,' 'and,' 'Andrew,' et cetera)."
9 Do you see that?
10 **A Yes.**
11 Q I'm trying to understand kind of the
12 scope of what you're stating here. Are you
13 suggesting that every prefix is a common word
14 that would be indexed in any system?
15 **A No. No, I'm not suggesting that.**
16 Q Okay. So let's just take a -- as a
17 quick example, let's consider the word
18 "declaration."
19 **A Uh-huh.**
20 Q And in a prefixing index type system,
21 if you were going to index "declaration," would
22 you agree that you would need to index D, DE,

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1 DEC, DECL, and so on and so forth?
2 MR. THACKER: Objection. Form.
3 **A Well, I think we would have to look**
4 **back to see -- so I want to go back to the**
5 **beginning of paragraph 64. I say, "Moreover,**
6 **the claims do not recite indexing prefixes."**
7 **Okay, so that's the first thing. And even if**
8 **they did, indexing prefixes was known in the art**
9 **so I already explained that.**
10 **And then -- so then coming back to**
11 **your example of the word "declaration," I think**
12 **the question has to be refined a little bit.**
13 **You just presented a scenario where literally**
14 **every prefix is required to be indexed. And so**
15 **I think, by definition, if you state a**
16 **requirement where every single prefix of every**
17 **single word must be indexed, then, by**
18 **definition, it has to be indexed. But that's --**
19 **as I said, the claims don't require that. And**
20 **as I said also, there are techniques known for**
21 **indexing prefixes, so, yeah.**
22 Q Okay. But my question wasn't about

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1 these claims. I was asking about the word
2 "declaration" in a system that indexes prefixes.
3 And so to accomplish true incremental search in
4 a system that uses prefixes, how many entries
5 would the word "declaration" need if you were
6 going to accommodate all of the prefixes?
7 MR. THACKER: Objection. Form.
8 **A I think that question you -- you used**
9 **the term "uses prefixes," and I want to be**
10 **careful about that because just a few minutes**
11 **ago I gave you an example of how you could do**
12 **searches for prefixes in a system that did not**
13 **index prefixes but it would do this matching of**
14 **what could be prefixes to whole words in the**
15 **index.**
16 **So if you mean -- again, if you mean**
17 **a system -- you're specifying a system where**
18 **literally the requirement is that every prefix**
19 **of every word must be somehow indexed, then you**
20 **would have to have a way to index, for**
21 **"declaration," D, DE, DEC, DECL and so on.**
22 **So however many that would be all the**

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1 **way up to "declaration," yeah.**
2 Q Okay. Thank you. You can set that
3 aside.
4 At your first deposition you
5 testified that you relied on the Raskin
6 reference for the idea of incremental search.
7 Do you remember that?
8 **A Yes.**
9 Q When you prepared your initial
10 declarations, did you review the entire Raskin
11 reference?
12 MR. THACKER: Objection. Form.
13 Scope.
14 **A I don't recall if I reviewed it all.**
15 **I obviously -- at the time when I prepared my**
16 **initial declaration, the parts that I relied on**
17 **for my opinion, I cited to.**
18 Q In preparing your supplemental
19 declarations -- yeah, in preparing your
20 supplemental declarations, did you review the
21 entirety of the Raskin reference?
22 **A In preparing my supplemental, I did**

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1 **not review the entirety, but I reviewed -- I**
2 **think perhaps at least reviewed more carefully**
3 **additional parts that I may not have done for my**
4 **initial declaration.**
5 Q Did you cite every portion of the
6 Raskin reference that you reviewed in preparing
7 your declarations?
8 **A I think I cited every -- the parts --**
9 **well, what I certainly tried to do is cite every**
10 **part of the Raskin declaration both in my**
11 **initial -- first in my initial but then in my**
12 **supplemental that I relied on.**
13 Q Who determined which sections of
14 Raskin you would review?
15 MR. THACKER: Objection. Form.
16 Scope.
17 **A Well, I certainly had**
18 **conversations --**
19 MR. THACKER: Loren, before you
20 answer this, I just want to pause and say in
21 advance I object to the extent that this
22 question invokes any privileged or confidential

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1 communications. And, Loren, I would caution you
2 to not divulge any privileged or confidential
3 communications.
4 THE WITNESS: Okay.
5 DR. LAROCHELLE: I'll strike that and
6 reword, if it will make you more comfortable.
7 BY DR. LAROCHELLE:
8 Q Did you determine which portions of
9 Raskin you would review?
10 **A Certainly, yes. And I think one of**
11 **the things for my supplemental that triggered**
12 **that was looking at some of the points**
13 **Mr. Haeberli had made and, you know, looking, I**
14 **guess, a little more extensively at Raskin to --**
15 **I guess actually to provide more details where**
16 **he had questioned things about what Raskin**
17 **taught, yeah.**
18 Q Did you consider whether any portion
19 of the Raskin reference, aside from the pages
20 that you actually cited, might teach away from
21 incremental search across multiple documents?
22 **A Not that I'm aware of, no.**

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1 DR. LAROCHELLE: Can we take a
2 five-minute break --
3 THE WITNESS: Sure.
4 DR. LAROCHELLE: -- and go off the
5 record?
6 MR. THACKER: Sounds good.
7 (A recess was taken.)
8 BY DR. LAROCHELLE:
9 Q Welcome back. So before the break,
10 we were talking about the Raskin reference.
11 Do you remember that?
12 **A Yes.**
13 Q And I asked you whether you
14 considered other portions of the Raskin
15 reference aside from those that you cited,
16 right?
17 **A You did ask me that, yes.**
18 Q And you said that you had -- I want
19 to make sure I understand what you said. You
20 said that you had reviewed other portions and
21 that you cited the portions that you thought
22 were relevant. Is that what you said? Was that

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1 your testimony?
2 **A Yes. Yes, as in I started in the**
3 **chapter that seemed most relevant, for example,**
4 **and I would look through parts of it. And then**
5 **there were parts that did turn out to be**
6 **relevant that I would cite and other parts that**
7 **I had read that I may not have cited, so yeah,**
8 **that's how it worked.**
9 Q Do you recall reading about LEAP,
10 L-E-A-P, in the Raskin reference?
11 **A Not right offhand, no.**
12 Q And that isn't something that you
13 relied on in your declaration, correct?
14 **A Not that I recall. No.**
15 DR. LAROCHELLE: I have no further
16 questions. I pass the witness.
17 MR. THACKER: No redirect.
18 DR. LAROCHELLE: Then we're done.
19 Thank you very much for your time, Dr. Terveen.
20 THE WITNESS: Thank you.
21 MR. THACKER: Thanks, all.
22 (Time noted: 11:56 a.m.)

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1 ACKNOWLEDGMENT OF DEPONENT
2
3 I, LOREN G. TERVEEN, Ph.D., do hereby
4 acknowledge that I have read and examined the
5 foregoing testimony, and the same is a true,
6 correct and complete transcription of the
7 testimony given by me and any corrections appear
8 on the attached Errata sheet signed by me.
9
10 _____
11 (Date) (Signature)
12
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16
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1 CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC
2
3 I, ADRIENNE MIGNANO, Certified
4 Reporter and Notary Public within and for the
5 State of New York do hereby certify:
6 That LOREN G. TERVEEN, PH.D., the
7 witness whose deposition is hereinbefore set
8 forth, was duly sworn by me before the
9 commencement of such deposition and that such
10 deposition was taken before me and is a true
11 record of the testimony given by such
12 witness.
13 I further certify that the all
14 parties were represented by counsel at the
15 deposition.
16 I further certify that the
17 deposition of LOREN G. TERVEEN, PH.D.,
18 occurred remotely via Zoom Videoconference on
19 Tuesday, March 24, 2026, commencing at
20 11:00 A.M. to 11:56 A.M.
21 I further certify that I am not
22 related to any of the parties to this action

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1 by blood or marriage, I am not employed by or
2 an attorney to any of the parties to this
3 action, and that I am in no way interested,
4 financially or otherwise, in the outcome of
5 this matter.
6 IN WITNESS WHEREOF, I have hereunto set my
7 hand this 31st day of March, 2026.
8 My commission expires: June 2026
9
10
11
12 _____
13 ADRIENNE M. MIGNANO, RPR
14 NOTARY PUBLIC
15
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