

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD
3 RESMED CORP,)CASE IPR 2025-00159
4 PETITIONER,)U.S. PATENT NO. 11,375,921
5 V.)CASE IPR 2025-00160
6 CLEVELAND MEDICAL)U.S. PATENT NO. 11,786,680
7 DEVICES, INC.,)MOBILE VIDEOCONFERENCE
8 PATENT OWNER.)DEPOSITION OF
)SANDEEP CHATTERJEE, Ph.D.
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MOBILE VIDEOCONFERENCE DEPOSITION OF SANDEEP
CHATTERJEE, Ph.D., taken remotely before Cheryl A.
Rooney, RPR, CRR, Online General Notary Public within
and for the State of Nebraska, beginning at 9:58 a.m.
PST, on January 27th, 2026.

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A P P E A R A N C E S

(Appearing Remotely)
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1 SANDEEP CHATTERJEE, Ph.D.,
2 having been first duly sworn,
3 was examined and testified as follows:

4 DIRECT EXAMINATION

5 BY MS. FULLER:

6 Q. Good morning, Dr. Chatterjee. How are
7 you today?

8 A. Good morning. I'm doing well.

9 Q. Thank you for being here. Do you
10 understand why you are here today?

11 A. To have my deposition taken.

12 Q. And your deposition taken in
13 connection with your reply declaration submitted
14 in IPR 2024-00159 and 00160; is that correct?

15 A. I do not recall the IPR numbers, but
16 it's the IPR numbers related to the '921 and
17 '680 patents.

18 Q. Is that okay today when referencing
19 your declarations that we call them the '921
20 declaration or the '680 reply declaration?

21 A. Yes, that will be great.

22 Q. And just a little housekeeping before
23 we get started. Do you have your declarations
24 available to you, or would you like them
25 uploaded? Let me know.

1 A. I have printed out a hard copy of the
2 declarations in front of me.

3 Q. And aside from the hard copies of the
4 declarations, what other materials do you have
5 in front of you?

6 A. I have a coffee and a water. And a --
7 it looks like a binder that has the patents,
8 like all of the materials for the IPRs.

9 Q. Okay. Good to know. Then if I
10 reference something outside of your reply
11 declaration you'll have a binder available to
12 you for hard copies of exhibits, for example;
13 correct?

14 A. I believe so. I'm not sure if it has
15 everything, but it's a pretty thick binder. I
16 haven't looked through it. But I know for a
17 fact it has the two reply decs.

18 Q. Okay. Well, we'll cross that bridge
19 if we get there. If you need something that's
20 not available to you in your binder, I can
21 upload it to the chat. Is that all right?

22 A. That sounds great.

23 Q. So in preparing for your deposition
24 today, did you review any materials, exhibits in
25 that preparation?

1 A. I did.

2 Q. And what were those materials that you
3 reviewed?

4 A. I reviewed my two reply declarations.
5 I reviewed Dr. Goodrich's declarations. I
6 obviously reviewed the patents. I reviewed my
7 original declarations. So those are some of the
8 items that come to mind, but there were quite a
9 few documents that I reviewed in preparation for
10 today.

11 Q. Just giving me a ballpark, how much
12 time did you spend in your preparation for
13 today's deposition?

14 A. So do you mean only for preparing for
15 the depo today, not like everything, like from
16 my original declarations, just for preparation
17 for today?

18 Q. Yes, just for preparation for today's
19 deposition.

20 A. I don't know, but probably in the
21 20ish hours, I would think.

22 Q. So Dr. Chatterjee, can you open your
23 '921 reply declaration, and you just spoke that
24 you have that available to you.

25 A. Okay. I have my '921 declaration in

1 front of me.

2 Q. So I'm going to direct you to
3 Paragraph 3 where you state that you've reviewed
4 the patent owner response and the declaration of
5 Dr. Goodrich, and provide opinions to certain
6 arguments made in those documents. Do you see
7 that?

8 A. I do.

9 Q. Why did you only provide opinions to
10 certain arguments? Did you agree with the other
11 arguments that Dr. Goodrich provided?

12 A. No. Dr. Goodrich's analysis and
13 opinions are just wrong, and fundamentally wrong
14 from a technical perspective.

15 Q. So then what made you only submit a
16 reply declaration that addressed certain
17 arguments as opposed to his whole declaration?

18 A. Well, I think some of the arguments
19 that he makes I had previously addressed. For
20 example, even at my deposition -- like for
21 example, his assertions about NAT technology is
22 just plain wrong. And this was addressed
23 earlier, I believe, in my earlier declaration so
24 there was no need to again respond to things
25 that already have been identified as being

1 fundamentally flawed and incorrect.

2 Q. Did you address NAT technology in your
3 opening brief -- or opening declaration?

4 A. I don't believe I did, but I believe I
5 addressed it -- I believe you asked me questions
6 during my deposition in relation to my first
7 declaration.

8 Q. So during your testimony in your --
9 during your first deposition and testimony,
10 that's where you addressed the NAT, network
11 address translation issues; is that correct? Is
12 that what you're saying?

13 A. I believe so, because like I'm saying,
14 what he's saying in his declaration is just
15 fundamentally wrong. Like you can read any
16 basic computer science textbook and that would
17 show that what he's saying in his declaration is
18 wrong. So it was addressed -- you asked me --
19 you or your colleague asked me questions, and I
20 addressed some of those at the deposition.

21 Q. What do you believe Dr. Goodrich
22 opined to in his opinions on network address
23 translation that is fundamentally wrong?

24 MS. ALEXANDER: Objection.

25 Outside the scope.

1 THE WITNESS: Well, for example,
2 I don't have his declaration here in front of
3 me, but he seems to say that if a server is
4 behind a NAT, that it's unreachable, and that is
5 just fundamentally wrong. I've built web
6 servers, I've had web servers that are behind
7 the NAT, and they're clearly reachable. And so
8 the fact that he makes these kind of statements
9 which are fundamentally flawed demonstrates
10 that his -- as I've pointed to in some of my
11 other statements and opinions in my reply
12 declaration, that his opinions and his technical
13 analyses are wrong and flawed.

14 BY MS. FULLER:

15 Q. So you believe that his opinions for
16 NAT is fundamentally wrong, but you did not
17 provide the reasoning in your reply declaration;
18 is that correct?

19 MS. ALEXANDER: Objection;
20 mischaracterizes his testimony.

21 THE WITNESS: Well, what I stated
22 was that I -- you or your colleague asked me
23 questions about NAT, and then on top of that,
24 even the point that he makes about NAT doesn't
25 impact the analysis because he seems to say that

1 NAT is used prevalently. But that doesn't mean
2 that it's used all the time. And so there was
3 really no need for me to respond, even though
4 his opinions are fundamentally wrong and flawed
5 and just picking up a basic computer science
6 textbook would demonstrate that it's wrong. But
7 his opinion doesn't really impact the opinions
8 that I stated because he himself is conceding
9 that NAT is not used a hundred percent of the
10 time. So clearly one of ordinary skill would
11 understand that web servers don't have to be
12 behind the NAT.

13 But what I'm saying is that even his
14 arguments that are not relevant to the analysis
15 here, it just shows that his technical analyses
16 and the technical facts that he believes are
17 correct are fundamentally flawed and incorrect.

18 BY MS. FULLER:

19 Q. Can we turn to paragraph -- let's
20 start at Paragraph 5 of your '921 declaration.

21 A. Okay. I'm there.

22 Q. So in this section is it a correct
23 understanding that you're opining that a POSITA
24 would have implemented Toge's physician-side
25 computer as both a client device and a web

1 server?

2 A. Say that again? I'm not sure I
3 understood your question.

4 Q. So starting off of Paragraph 5, which
5 is under the section Toge and BEO Kumar renders
6 obvious a remote Internet site, is it your
7 opinion that a POSITA would have implemented
8 Toge's physician-side computer as both server
9 and client?

10 A. I'm not sure what you mean by
11 implemented as both a server and a client. What
12 I'm stating is that one of ordinary skill would
13 have known that implementing the physician-side
14 computer as, for example, a web server was well
15 known and common, even at that time period. And
16 then in addition, with regards to the Kumar
17 reference, it expressly talks about the use of
18 web technologies and web pages.

19 And so what I'm stating here is that
20 the physician-side computer could have a server
21 running on it, as well as a client running on
22 that same machine on the physician-side computer
23 in order to, for example, allow that physician
24 to access the data from that server.

25 Q. So when you speak to improving Toge's

1 system based on Kumar's web server teaching, is
2 this in reference to the implementing of server
3 on Toge's physician-side computer? And speak to
4 it in Paragraph 20, for example. Or pardon me,
5 Paragraph 15, a POSITA implementing the improved
6 Toge system.

7 MS. ALEXANDER: Counsel, what's
8 the pending question?

9 BY MS. FULLER:

10 Q. So where you speak to a POSITA
11 implementing the approved Toge system, is that
12 in reference to a physician-side computer that
13 is implemented with a web server?

14 A. I'm not sure I understand your
15 question still.

16 Q. I'll break it down. The improved Toge
17 system, what is improved in the Toge system?

18 MS. ALEXANDER: Objection.
19 Vague.

20 THE WITNESS: So are you -- you
21 first asked me about Paragraph 5. And I think
22 you read from the subtitle that's above
23 Paragraph 5, which states that Toge, in view of
24 Kumar, renders obvious a "remote intranet site
25 where Toge's physician-side computer is

1 implemented as the web server."

2 So in view of what the title is
3 saying, I'm not sure I understand your question.

4 BY MS. FULLER:

5 Q. I'm just trying to understand what is
6 improved in Toge's system.

7 MS. ALEXANDER: Objection.

8 Vague.

9 BY MS. FULLER:

10 Q. So is it a correct understanding that
11 what is improved in Toge's system is its
12 physician-side computer because that is
13 implemented now as a web server in addition to a
14 client?

15 A. I don't understand --

16 MS. ALEXANDER: Same objection.

17 Sorry.

18 THE WITNESS: I didn't understand
19 the last part of your question where you're
20 saying it's implemented as to web server in
21 addition to a client. What does that mean?

22 BY MS. FULLER:

23 Q. Is a physician-side computer in Toge's
24 unmodified system, is that just a personal
25 computer?

1 A. It's a computer. I'm not sure it's
2 limited to a personal computer but it could be a
3 personal computer.

4 Q. And now that it's in the modified
5 system, it would be implemented with a web
6 server based on Kumar's teaching; is that
7 correct?

8 A. Well, just to be clear, when you're
9 saying a web server, it's software that would be
10 running on Toge's physician-side computer.

11 Q. So in running software on Toge's
12 physician-side computer, which is the web server
13 software, is that the improvement that you speak
14 to in Toge's improved system?

15 A. That is one aspect of it, and I think
16 I talk about it in my original declaration, the
17 numerous benefits of that. And I believe it's
18 readily obvious, for example, in Toge. Toge
19 doesn't provide implementation details, and so a
20 POSITA would naturally look to, for example,
21 Kumar, and as I explained earlier, even outside
22 of Kumar, one of ordinary skill would have
23 readily known about web servers and web client
24 technology or web-based technologies, and the
25 fact that it would allow access to the data from

1 multiple devices and from different locations as
2 well.

3 Q. Can we turn to Paragraph 8 of your
4 '921 reply declaration.

5 A. Okay.

6 Q. So you say in the case of client and
7 server both residing on the same computer, that
8 communications from client server are located on
9 the same machine. Are these communications
10 going through a virtual interface on the local
11 machine to allow, for example, the client
12 browser and the local server to communicate with
13 one another?

14 MS. ALEXANDER: Objection.
15 Outside the scope.

16 Jenna, your words are getting clipped
17 a little bit. If you could just enunciate a
18 little better.

19 MS. FULLER: Oh, are they?

20 MS. ALEXANDER: Yes. Thank you.

21 MS. FULLER: Thank you for
22 bringing that to my attention.

23 THE WITNESS: So I'm not sure I
24 understand your question. What do you mean by
25 virtual interface?

1 BY MS. FULLER:

2 Q. I want to understand how the
3 communications from a client to server occur on
4 the same machine. Could you walk me through
5 that?

6 A. How they occur on the same machine?
7 Well, like I mentioned, for example, server is a
8 software, and if we're looking at specifically
9 web server, it's a specific type of software.
10 And a POSITA would know that web servers
11 typically accept connections to port 80 or port
12 443.

13 And so with regards to what I'm
14 talking about in Paragraph 8, a client, for
15 example a web browser, which is an example of a
16 client software, if the client is connecting to
17 the local host, the operating system would
18 deliver that message to port 80 or port 443 of
19 the web server.

20 So what I'm talking about here is that
21 the specific design of having a client and a
22 server on a single machine is so common that
23 there is a shorthand that is used called local
24 host, and anyone who has ever developed
25 software, especially network communication

1 software or web-based software, knows the use of
2 local host.

3 And so I was very surprised in reading
4 in Dr. Goodrich's statements that people don't
5 have clients and servers running on the same
6 machine, and in fact, even his own documents
7 that he cites to disproves his own statements.
8 He cites to one portion of a document, and if
9 you look up like 10, 15 lines above to the
10 document that he's citing to, it even says that
11 clients and servers can be on the same machine.

12 And so what I'm simply stating here is
13 again, like I explained to you at the beginning,
14 that Dr. Goodrich's technical analyses and
15 opinions are fundamentally incorrect,
16 fundamentally flawed, and this is just another
17 example, another datapoint of why Dr. Goodrich's
18 statements and opinions are wrong and flawed.

19 Not only is it possible to have client
20 and server software on the same machine, but
21 it's common to do so, and it's so common that
22 there is a shorthand called local host to allow
23 this kind of communications between clients and
24 servers running on the same machine to happen.

25 Q. So in this local host example, the

1 client browser that's on the machine would send
2 a request for data to the local host server
3 that's on the same client machine, and the local
4 host server would send back the data; is that
5 correct, what's going on in the communication?

6 A. Yes. So for example, if the server is
7 a web server and the client is a web client, for
8 example, a browser, you would type into the part
9 of the browser where you put in the URL, you
10 would put in HTTP://localhost, and then you
11 would put a colon for either port 80 -- even if
12 you don't put the colon, the browser will
13 automatically put in port 80. And it will send
14 the message to the server software listening on
15 that port and the server software will respond
16 to that request, that HTTP request with the
17 data. Which would be, for example, HTML page or
18 HTML formatted web page.

19 Q. And that's the local host server
20 that's on the same machine; correct, that's
21 responding?

22 A. No, it's not a local host server.
23 It's a web server. Local host is simply a
24 shorthand to refer to servers on that machine.

25 Q. So it's a web server on that same

1 machine that's responding to the HTTP request
2 from the client browser; that's a correct
3 understanding?

4 A. On that same machine, yes.

5 Q. Dr. Chatterjee, do you have
6 Exhibit 2020 available to you? Let me know.

7 A. I'm being told that I do have it.

8 MS. ALEXANDER: At the other end,
9 the back are exhibits, these are some of them.

10 THE WITNESS: Oh, okay, I see it.

11 BY MS. FULLER:

12 Q. You have a good team on your side
13 prepping you.

14 A. Yeah. Okay, I have Exhibit 2020 open.

15 Q. Can I direct you to the first page of
16 that exhibit, specifically where it says servers
17 play very important roles in information
18 systems. It's right under the server heading.

19 A. The servers heading, like --

20 Q. Yes, page one. Let me know when you
21 get to that sentence and I'll let you read it.

22 A. So it's the second sentence in that
23 section?

24 Q. Yes.

25 A. Okay. I've quickly scanned through

1 it.

2 Q. So in that sentence it has the term
3 distributed computing environments. Do you see
4 that term?

5 A. I do.

6 Q. Do you have an understanding what
7 distributed computing environments means? And
8 if so, could you elaborate on that?

9 MS. ALEXANDER: Objection.
10 Outside the scope.

11 THE WITNESS: So distributed
12 computing typically refers to computing
13 resources and functionality that's distributed
14 and connected by a network.

15 BY MS. FULLER:

16 Q. And what are the advantages that flow
17 from distributed computing environments?

18 A. Well, it can -- like we've talked
19 about, it can allow access to data from
20 different devices and different locations.

21 Q. So for an example, a client device
22 could access data from a database server that's
23 at a different location? Is that an example of
24 an advantage of a distributed computing
25 environment?

1 A. It could, yes.

2 Q. And do you have an understanding of
3 why a computer could not take advantage of this
4 distributed mobile -- distributed computing
5 environment? For example, why a client device
6 would not be able to access a database server?

7 MS. ALEXANDER: Objection; vague.

8 THE WITNESS: I'm not sure I
9 understand the question. What do you mean, why
10 a client device would not be able to access a
11 database server?

12 BY MS. FULLER:

13 Q. Are there reasons why a computer could
14 not take advantage of the distributed computing
15 environment?

16 MS. ALEXANDER: Objection; vague.

17 THE WITNESS: I'm still not
18 understanding the question. If a client device
19 is meant to be used within that distributed
20 computing environment, I'm not sure your
21 question makes sense.

22 BY MS. FULLER:

23 Q. Well, let's go to -- give me one
24 second. Okay. Let's go to Page 4.

25 A. Of Exhibit 2020?

1 Q. Page 4 of Exhibit 2020, under the
2 heading Servers For Multiple Tiers of Client
3 Server.

4 A. Okay. I'm there.

5 Q. So this states or discusses a
6 single-tier client server application. Do you
7 see that discussion?

8 A. Are you looking above Section 2 or
9 below?

10 Q. I'm looking in the paragraph below
11 Section 2.

12 A. You mean the sentence where it
13 confirms that a client process and server
14 process can be on the same computer?

15 Q. The sentence after that, A single-tier
16 client server application.

17 A. Okay. I'm there.

18 Q. So it talks about a single-tier client
19 server application. And then in the next
20 sentence it says, This kind of application is
21 rarely used today because it will not take
22 advantage of the distributed computing
23 environment.

24 Do you see that?

25 A. I do.

1 Q. Do you have an understanding why a
2 single-tier client server application cannot
3 take advantage of the distributed computing
4 environment?

5 A. Well, it's saying if the application
6 is limited to having the user interface, the
7 business rules, and the data manipulation
8 processes all on one computer. But that's not
9 what we're talking about. We're talking about
10 you have the server and you have the client, and
11 in that typical web server with a web client
12 it's not precluded from having other devices
13 access that server on that machine as well.

14 And so I don't really understand the
15 relevance of what you're pointing me to, to what
16 we're talking about in the combination based on
17 Toge that I opined on.

18 Q. What is your understanding of a
19 single-tier client server application? Is that
20 where a client and server are on the same
21 machine?

22 A. Well, it's talking about where you
23 have the user interface, the business rules, and
24 the data manipulation processes all on one
25 computer. But what we're talking about in the

1 Toge system, in combination with the knowledge
2 of a POSITA or with Kumar, we're talking about a
3 web server and a web client, and clearly there
4 can be other clients that are able to access
5 that web server.

6 And so this is talking about something
7 completely different than what the actual
8 combination that we're talking about in my
9 declarations.

10 Q. A user interface, is that part of a
11 client browser?

12 A. It could be.

13 Q. And then the business rules, what --
14 is that part of a server?

15 MS. ALEXANDER: Objection.
16 Relevance.

17 THE WITNESS: The business rules
18 could be part of the business logic that the
19 server performs.

20 BY MS. FULLER:

21 Q. And the data manipulation processeses,
22 could that also be part of the server?

23 A. Could be part of the functionality
24 that the server performs. But again, like I
25 explained, this is not what we're talking about.

1 We're talking about a web client and the web
2 server, and this is talking about something else
3 where it's not a web client, it's talking about
4 a client which cannot be used on any other
5 device.

6 As we know, a web client by
7 definition, for example, a web browser, can be
8 used on multiple devices. And so you can have a
9 web client on that same machine that is hosting
10 the server, but you can also have web clients on
11 a multitude of other machines as well, and
12 access the server on the physician-side computer
13 in the combination that we're talking about.

14 Q. And the combination we're talking
15 about in which Toge's physician-side computer is
16 operating as a web client, as well as a web
17 server; is that correct?

18 A. Yes. But like I explained, that's not
19 what this is talking about. This is talking
20 about the situation where you don't have or
21 cannot have other clients that are accessing the
22 server.

23 With the web client, a web browser can
24 be run on multiple devices, and by putting in
25 the URL for the physician-side computer, which

1 is running the server, any of those devices can
2 access the data from the physician-side
3 computer. So in the combination, the benefits
4 of distributed computing directly come into
5 play. And I talked about that throughout my
6 original declaration, and I talked about it
7 additionally in my reply declarations.

8 And I just show why what Dr. Goodrich
9 is saying is wrong because he seems to believe
10 that people don't do this, people don't run a
11 web client and a web server on the same machine.
12 In fact, a lot of the management software for
13 managing web servers are in fact run as web
14 clients as well. And even back in the relevant
15 time period, in the 2005 time period, that was
16 the case as well.

17 Q. And that goes back then to your
18 Paragraph 8 that you speak to of communications
19 from clients and servers known as a local host;
20 is that correct?

21 A. Like I explained, local host is a
22 shorthand for a specific IP address which sends
23 the message data to that same machine.

24 Q. So in this Paragraph 8 then, this is
25 how clients and server are then communicating

1 with one another; is that correct?

2 A. It's not that they're designed to
3 communicate like that. This is industry
4 standard technology. You just type in local
5 host into the browser. If the browser is on the
6 same machine as the server, you just type in
7 local host and you're able to access that web
8 server on that same machine.

9 If you have a browser on a different
10 machine you type in the IP address of the
11 physician-side computer that's running the web
12 server and you can equally access the data that
13 is hosted by that web server running on the
14 physician-side computer. This is all industry
15 standard, common -- well-known industry standard
16 technology that has existed from the 1990s.

17 Q. And you speak to -- in your reply
18 declaration you speak to this as shorthand
19 communication known as local host; that's
20 correct?

21 A. I state that local host is a shorthand
22 for IP address 127.0.0.1, and that sends the
23 message to that same machine.

24 Q. Can we go to Paragraph 15 of your '921
25 reply declaration.

1 A. Okay. I'm there.

2 Q. So in this paragraph you say that if
3 clients and server are implemented in the proper
4 way, the principal concern of computer
5 architecture such as security can be addressed.
6 Do you see that?

7 A. Yes, I do cite to some language that
8 talks about implementing in the proper way, yes.

9 Q. How would a POSITA implement a clients
10 and server that are on the same machine in a
11 proper way such that security vulnerabilities
12 for example, web server vulnerabilities, would
13 be mitigated?

14 A. I'm not sure I understand the
15 question. If you have the web browser and the
16 web server on the same machine, you have very
17 few, if any, vulnerabilities. And like I've
18 explained, security is handled by, for example,
19 the use of HTTPS. Again, these are all industry
20 standard technologies. The use of web servers
21 and web pages and web browsers was not new or
22 uncommon. There's a reason why there were web
23 pages and websites for millions of companies,
24 banks, because this was all secure, well-built
25 technology if you did it the correct way.

1 For example, by using the secure form
2 of HTTP for communications, if you're using
3 standard web browser technologies, standard web
4 server technologies. So these are all well
5 understood industry standard technologies that
6 were used throughout the world for different
7 types of businesses, including banks and
8 governments. And I, in fact, was making my
9 mobile banking technology at that time, and we
10 also used web technologies, and clearly web
11 technologies were secure and safe, even to
12 perform banking transactions.

13 Q. In your banking transaction example
14 were you working with a database server that was
15 located at a different location than the client
16 devices?

17 A. There were a large number of client
18 devices that were located remotely, but we
19 also -- like I explained, having a client
20 running on the same server, that's very common.
21 And that's common for doing things like
22 management of the web server, as well as all you
23 have to do was open a web browser on that server
24 where you are running the web server to access
25 the data.

1 And so, yes, exactly what I'm talking
2 about in my combinations for the patents that
3 we're talking about here, that's precisely what
4 was done in the software industry at that time
5 and even before that time, and I myself, in
6 developing one of the first mobile banking
7 systems in the world, if not the first mobile
8 banking system in the world, used the same
9 secure web technologies to do this.

10 Q. When you reference management, what do
11 you mean by management? Is that like for
12 testing purposes?

13 A. It could be for testing. Like you
14 were saying, oftentimes you would simply open up
15 a browser and see that you're able to access the
16 data on the web server, see that it's being
17 displayed correctly. But what I really mean by
18 management is more generically configuring the
19 web server, how you want the web server to
20 behave. Potentially having whitelists or
21 blacklists. So it's more generically managing
22 the web server software and changes to the
23 configuration or data files that the web server
24 might be using.

25 Q. So the configurations, is this like

1 all making a web server ready for deployment?

2 MS. ALEXANDER: Objection.

3 Outside the scope.

4 THE WITNESS: It's not really
5 about making it ready for deployment only.

6 There's ongoing configurations that you -- that
7 people do when running or managing a web server.

8 So like I said, uploading different entries to
9 the whitelist or the blacklist, that's one
10 example. So there's ongoing management that
11 happens all the time for a web server, and
12 oftentimes these web servers, the management of
13 the web server is done by simply opening a
14 browser, which is a client, and typing in a
15 local host and then you're able to access the
16 management dashboard, and then you are able to
17 make the configuration changes, the management
18 changes that I'm talking about.

19 BY MS. FULLER:

20 Q. So going back to the data improving
21 security, are you familiar with SQL injections
22 on databases?

23 A. I am, but I'm not sure I understood
24 the first part of your question where you said
25 database improving security.

1 Q. So I want to go back to the line of
2 questioning with improving the security. And
3 particularly how the clients and server are
4 implemented in the proper way to improve the
5 security. And I just want to kind of get an
6 understanding on that there existed SQL
7 injection attacks; correct? Or there exists SQL
8 kind of malicious attacks.

9 MS. ALEXANDER: Objection.
10 Vague.

11 THE WITNESS: Can you give me an
12 example of what you're talking about? There can
13 be attacks, but I'm not sure I understand what
14 you're talking about, or why the physician in
15 the combined system that we're talking about
16 would do any such attacks. So I'm not really
17 understanding your question.

18 BY MS. FULLER:

19 Q. So SQL injections are web server
20 vulnerabilities; correct?

21 A. I'm not sure what you mean by it's a
22 web server vulnerability.

23 Q. Are web servers vulnerable to SQL
24 injection attacks?

25 A. I don't think web servers in general

1 are vulnerable to any type of attack. A
2 specific web server that may have poor
3 implementation can have vulnerabilities, but the
4 point that I'm trying to make in Paragraph 15 is
5 that if you implement web server technology and
6 web client technology in the proper way -- and
7 again, these are industry standard technologies.
8 There were implementations available to build --
9 or to take advantage of existing web server
10 technologies and web browser technologies. So
11 I'm not sure I understand your question about
12 web servers being, in general, vulnerable to any
13 type of attack.

14 Q. Well, a web server can be injected
15 with a -- or have an SQL injection; correct,
16 where it targets the database?

17 MS. ALEXANDER: Objection; vague.

18 BY MS. FULLER:

19 Q. Does it happen in the art that an SQL
20 injection targets a web server's database?

21 A. Which database are you running? Which
22 immersion are you running? What is the
23 software? I don't understand this question.
24 And I can't answer it without you giving me
25 details about the architecture, the software,

1 what the system is doing, what this alleged
2 attacker is trying to do.

3 Q. What is an SQ injection attack? Can
4 you just provide that to me?

5 A. Well, this is a high level concept
6 that is like an umbrella term that can -- that
7 says that, you know, you can put data into a
8 database and you can corrupt the database by
9 providing bogus data and potentially overriding
10 existing data.

11 But the point that I'm trying to make
12 is that if you develop these systems the correct
13 way -- and it's not hard, even back then in 2005
14 or even before that, these are industry standard
15 technologies. And so -- and then on top of
16 that, the actual combination that we're talking
17 about, we're talking about a web server running
18 on the physician-side computer. So it's a
19 secured computer, as well.

20 So I don't see how the relevance of
21 what you're talking about comes into the actual
22 combination, the actual system that we're
23 talking about in my declarations.

24 Q. Well, if an SQL injection corrupts
25 data, then it's getting on the computer that's

1 running the client and the web server; correct?

2 MS. ALEXANDER: Objection; vague.

3 THE WITNESS: Say that again,
4 it's getting on the client --

5 MS. FULLER: Let me strike that.

6 BY MS. FULLER:

7 Q. You just testified to an SQL
8 injection, in broad strokes, being an attack on
9 the data; correct?

10 A. I explained that it's an umbrella term
11 that could encompass something like that. But I
12 also testified that I don't see the relevance of
13 that to the combination that we're talking about
14 because we're talking about industry standard
15 technologies, which were well known how to
16 implement them properly.

17 And then on top of that in the
18 specific combination that we're talking about,
19 the web server would be running on the
20 physician-side computer, which would be secured
21 as well. So I don't see how these attacks, not
22 only this kind of attack that you're talking
23 about, but any other attack, would be able to
24 happen in the specific combination that we're
25 talking about.

1 So that's where the confusion is
2 coming from. You're not really telling me how
3 this attack is happening, why it's happening.
4 But the fundamental point that I'm making in my
5 declaration is that a POSITA would know how to
6 implement industry standard technologies because
7 it's already well known how to implement these
8 technologies using best practices because these
9 are industry standard technologies and industry
10 standard software.

11 Q. I want to get to two points on that
12 line of questioning. One is you say that the
13 physician-side computer would be secure. Why
14 would it be secure?

15 A. Well, it's the physician-side
16 computer. So it's meant for the physician to be
17 using. I would think that a POSITA would
18 understand from the disclosure of the Toge
19 reference that a physician-side computer would
20 not be open and accessible to the public, for
21 example, in the middle of a parking lot or in
22 the middle of a mall or something.

23 I think a POSITA reading the full
24 disclosure of Toge would understand that the
25 physician-side computer is a computer that is

1 accessible to one or more physicians, and so it
2 would not be accessible to the general public.

3 Q. The physician-side computer has
4 network access, though; correct?

5 A. It does have network access, yes.

6 Q. And with access to the general public
7 network or other devices, doesn't that introduce
8 security issues?

9 A. It does not. That's my point. If the
10 use of web technologies, even in 2005 or even
11 before that, introduced security issues, then
12 nobody would be -- would have been using web
13 technologies at that time.

14 And so the whole point I'm trying to
15 make is that there are correct ways of using
16 industry standard technologies. And even in the
17 2005 and earlier time frame a POSITA would have
18 known those best practices, and regardless,
19 whatever issues there are -- and I think I touch
20 on this in other portions of my reply
21 declaration -- that there would not be these
22 fundamental security vulnerabilities.

23 And one example to just understand
24 this is that web pages and websites were used
25 throughout the world even at that time, and like

1 I mentioned, even for performing secure
2 transactions, governments were using it, banks
3 were using it, even in the healthcare space
4 people were using it. And like I said, I was
5 developing technology myself at this time
6 period, and we had the largest banks all around
7 the world license our technology, and they were
8 using it to serve millions of end users with
9 huge numbers of devices accessing the web
10 servers that were running our web server
11 technology, as well as other application server
12 technologies.

13 So it's just wrong to say that as soon
14 as you have a network connection or as soon as
15 you have a server and a client, that there's
16 vulnerabilities.

17 Q. But you do admit that vulnerabilities
18 exist at that time?

19 MS. ALEXANDER: Objection; vague.

20 THE WITNESS: If you --

21 BY MS. FULLER:

22 Q. I'm just trying to understand whether
23 you're saying there's no vulnerabilities
24 whatsoever, or that there are vulnerabilities,
25 but a POSITA would know how to implement the

1 architecture in the proper way to mitigate.

2 A. Well, I'm not even sure that what you
3 said in that second part is correct. I don't
4 think that there are vulnerabilities and that a
5 POSITA would know how to mitigate. What I'm
6 trying to say is that there were best practices
7 that were known. And in fact, even my book,
8 which was published in 2004, talks about the
9 best practices in how computers communicate.

10 So if you use the best practices, if
11 you use encryption technology that existed at
12 that time, and you developed these systems using
13 the industry standard best practices, which were
14 well known and publicized in many books,
15 including my own book from 2004, then you would
16 be able to develop a network-based system that
17 is secure and safe to use. And I provided the
18 example, the fact that there were a multitude,
19 millions of websites that were available and
20 used even at that time period to demonstrate
21 that web technologies, if they're developed the
22 right way, are secure and safe to use.

23 Q. So then let's drill down, then, on the
24 specific implementation of the physician-side
25 computer implemented as a client and a web

1 server. Can you give me concrete examples of
2 the proper ways that such implementation would
3 be done to mitigate the security concerns?

4 A. I think I disagree with your premise
5 of the security concerns. Because you're
6 like -- you're talking about the solution that
7 I'm talking about where you have -- on the
8 physician-side computer you're running the web
9 server, as well as the client. And then you
10 also have the ability to have other devices
11 access that web server.

12 And so what -- I think I've explained
13 this to you already that if you use standard
14 encryption technologies, for example, HTTPS was
15 well known way before 2005. In fact, my book
16 talks about HTTPS and the encryption that it
17 allows if you use things like proper
18 authentication, for example, having a password
19 and a user name to allow authorized people to
20 get access to the data that the web server has,
21 these were all well known concepts long before
22 2005, and a POSITA would have known about these
23 concepts. And again, like I mentioned, these
24 are best practices, they were published heavily,
25 including in my own book, and a POSITA would

1 have implemented these industry standard
2 technologies using the best practices and using
3 even third party software that was available.

4 And I'll give you another example.

5 Long before 2005 I worked at a company called
6 Bluestone Software, which was acquired by
7 Hewlett Packard. Bluestone developed Java 2
8 Enterprise Edition application server
9 technology, which incorporates a web server in
10 it.

11 The reason people use software from
12 Bluestone as well as from other competing
13 companies like BEA and others is that you didn't
14 have to worry about security issues. You would
15 simply license the Bluestone application server
16 or the BEA application server, or even IBM had
17 its own technology called WebLogic, you could
18 just license that software, and that server
19 software, you could run it on your own machine
20 or you could rent a machine and you could run
21 BEA or IBM or Bluestone Software on it, and it
22 handled all of the security authentication,
23 authorization, everything that I'm talking
24 about, all this plumbing was provided for you by
25 these third parties, and all you had to do is

1 develop your website on top of it. You have to
2 specify, well, I want to have a blue-colored
3 page that has this log-in that asks for your
4 user name and password, what designs you want.
5 That's all you have to do.

6 Even by 2005 this technology was
7 available, it was available to people in the
8 industry. They didn't have to build it from
9 scratch. They could simply license it and
10 develop a website on it, and the security
11 issues, the authentication issues, authorization
12 issues would all be handled for them using these
13 software that already had these issues worked
14 out.

15 Q. So what you just spoke to is where
16 a -- you are using the software that is run on a
17 server; correct, and that software then will
18 provide the security?

19 A. Yes. It provided the plumbing, so the
20 basic concept of having these application
21 servers is -- they were known as middleware
22 because it was understood long before 2005 that
23 whenever you're building anything for the web
24 you have to build these same technologies for
25 security, for authentication, for authorization,

1 and even other things. Everyone had to build
2 it. So rather than everyone having to build it
3 from scratch, you could simply license
4 technology from BEA, IBM, or Bluestone, and you
5 could just use that software and not worry about
6 the plumbing, like the middleware functionality,
7 because it was common to anyone using web-based
8 technologies.

9 Q. So a person that is implementing a web
10 page or implementing a web server would then
11 just use this IBM software; correct?

12 A. Yes, they could license the IBM
13 software. You would have to pay for it.
14 Whereas the Bluestone Software was -- I believe
15 there was a free license. And for support you
16 could pay for more. But yes, it's that the
17 basic middleware was provided by third parties.
18 And again, web technologies are industry
19 standard technologies. These are not some
20 custom technology that somebody is making in
21 their garage. These were industry standard
22 technologies, they were robust technologies that
23 incorporated security, authentication,
24 authorization, all of these other
25 functionalities that we've talked about, and all

1 you had to do is build whatever functionality
2 you had for your web page, for your website,
3 without having to worry about these underlying
4 security issues.

5 MS. FULLER: We've been going for
6 about an hour on the record. So let's go off
7 the record, Cheryl. Let's take a five-minute
8 break, Dr. Chatterjee. Does that work?

9 THE WITNESS: Sounds great.

10 MS. ALEXANDER: Okay. So 11:05.

11 (11:00 a.m. - Recess taken.)

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1 (At 11:07 a.m., with parties present
2 as before, the following proceedings were had,
3 to-wit:)

4 BY MS. FULLER:

5 Q. Dr. Chatterjee, in the 2005 time frame
6 was it well known to run a web server on a
7 physician's computer?

8 A. In 2005 and even before that, it was
9 well known to run a web server on any type of
10 computer.

11 Q. Do you have any examples that you are
12 aware of where a web server was run on a
13 physician computer?

14 A. So when you say "physician computer,"
15 you're talking about the disclosure from Toge of
16 a physician-side computer; correct? That's how
17 I understand your question.

18 Q. Correct.

19 A. Yes. So like I mentioned, even at
20 that time period I was developing systems, and
21 we were not only working in banking but also in
22 healthcare as well, because the systems that we
23 were doing in mobile banking were directed to
24 villages in remote areas throughout the world,
25 in countries throughout the world. And so there

1 was a need for healthcare and telemedicine type
2 of services as well.

3 And so yes, there were examples of
4 people running web servers on, for example, PCs
5 in a doctor's office, and then people could
6 access that PC based on other devices.

7 So like I mentioned, long before 2005
8 it was well known and understood that using web
9 server technology -- because again, like I
10 talked about, there is all of this
11 infrastructure was available, and it was easy to
12 develop custom web pages and websites, and that
13 builds upon this underlying middleware that was
14 available that a lot of people developed custom
15 applications based on these industry standard
16 web technologies, not only in the banking space,
17 but in the healthcare space, even in logistics
18 management.

19 We were also working on transportation
20 and logistics, and there were PCs that could run
21 web server software in an office, like a
22 trucking type of office. And then the truck
23 drivers could connect into that web server and
24 update it or provide information. And for
25 example, that PC running the web server, it

1 would capture different information from those
2 different truck drivers and have it available in
3 that central location, which was that PC running
4 that web server software.

5 Q. Are these computers that you are
6 providing examples on, were they also operating
7 as a personal computer to an end user, or just a
8 computer in the office that was the server?

9 A. I think there were both. For example,
10 like I talked about for each of those examples,
11 for the medical example, the healthcare example,
12 we're talking about villages, for example, in
13 India or Mexico that they don't have a hundred
14 machines lying around. So this would be a
15 single PC that would be running the web server
16 and then the doctor or like I was mentioning,
17 logistics management, the office, logistics
18 management company owner or somebody, they would
19 be accessing that same computer.

20 So that same computer that is running
21 the web server was also running other kinds of
22 software, and there was client software,
23 including a web browser that could be run and
24 connect into those as well. This was all very
25 standard technology. And that's the point that

1 I make, that it's really very surprising that
2 Dr. Goodrich has testified through his
3 declaration that this was not done, or that
4 there were problems with having a client and
5 server on the same machine, because it was used
6 oftentimes -- and I've pointed to documentation
7 that confirms that, and in fact, like I
8 mentioned at the beginning of the deposition,
9 that even Dr. Goodrich's -- the documentation
10 that he himself points to contradicts him where
11 it says that you can run client and server
12 software on the same machine.

13 Q. Let's go to Paragraph 7 of your
14 declaration where you cite to Exhibit 2020,
15 Page 4. Do you see that?

16 A. I do.

17 Q. So in the first parenthetical you
18 cite, In a typical client server based
19 application, the client process and server
20 process can be on the same computer.

21 Do you see that?

22 A. I do.

23 Q. Then it says, The 2-tiered client
24 server structure is the simplest client server
25 structure that is still in use for many

1 applications today.

2 Do you see that?

3 A. I do.

4 Q. Is a 2-tier client server structure,
5 is that where the client and server are on
6 different machines?

7 A. They could be on different machines,
8 but they can also be on the same machine.

9 Q. What is a 2-tier client server
10 structure?

11 A. Well, if you look at the first quote,
12 it's simply saying that you can run the client
13 process and the server process on the same
14 machine. A 2-tier client server would be that
15 you have a client, which is the user interface,
16 and then you have a server that has both the
17 business logic as well as the data manipulation,
18 and then of course you can have a 3-tier where
19 you have the data manipulation broken out as
20 well.

21 And so it's simply saying that the
22 2-tier is the simplest client server structure
23 where you have the client providing the user
24 interface and the server providing the business
25 logic and the data manipulation.

1 Q. So in the 2-tier, the user interface
2 is on the client and then the business logic is
3 on the server; is that correct?

4 A. And the data manipulation is also on
5 the server.

6 Q. And this is the simplest client server
7 structure that's still in use today? I guess we
8 can go to Exhibit 2020 to discuss this.

9 A. Okay. I'm at Exhibit 2020.

10 Q. It says, The 2-tier client server
11 structure is the simplest client server
12 structure that is still in use for many
13 applications today. That is on Page 4 of
14 Exhibit 2020 under the 2-tier client server
15 architecture.

16 A. Okay.

17 Q. So is this 2-tier client server
18 architecture used for web-based applications
19 where web clients are accessing web servers?

20 A. I think it can be. I don't think this
21 is -- this paper seems to be talking about
22 server classification. So web servers and web
23 clients are one examples of servers and clients.

24 So I think to the extent that your
25 question is whether web clients and web servers

1 can follow what this document is talking about,
2 they can.

3 Q. So following this document, the 2-tier
4 architecture would be what would be implemented
5 in a web server application such as the Toge
6 system where the client and the server are on
7 different computers?

8 MS. ALEXANDER: Objection.
9 Vague.

10 THE WITNESS: I think that's
11 where there's a fundamental misunderstanding or
12 confusion. Having a client on the
13 physician-side computer does not preclude having
14 clients on other devices.

15 For example, I have a client on my
16 laptop, which is a browser, and I also have a
17 browser on my cell phone. Just because I have a
18 browser on my laptop does not preclude the fact
19 that I have or I can have a browser on my cell
20 phone.

21 And so I can run a web server on my
22 laptop and have a web client on my laptop and
23 still have a web client on my cell phone, and my
24 wife can have a web client on her laptop and her
25 cell phone and they all, all of those web

1 clients, can access the web server running on my
2 laptop.

3 BY MS. FULLER:

4 Q. And this would be in a web-based
5 architecture that this would be allowed?

6 A. I'm not sure what you mean by "this
7 would be allowed," but yes, you can use web
8 technologies -- web technologies simply refers
9 to industry standard protocols like HTTP, HTML.
10 So it's just talking about these protocols, and
11 HTML -- yeah, I think I mentioned HTTP, HTML.

12 So there could be other such client
13 server architectures that you can develop as
14 well that follow that same logic of what I
15 explained of having a server and a client
16 running on my laptop, and having clients run on
17 my cell phone, my wife's laptop, my wife's cell
18 phone, and they can all access the server on my
19 laptop.

20 So one example of that scenario is
21 using web technologies, but even nonweb
22 technologies can use that. But for purposes of
23 my declarations and the combinations that I'm
24 talking about with regards to Toge, together
25 with the knowledge of a POSITA and Toge with

1 Kumar, we are talking about web-based
2 technologies, and yes, this was all commonly
3 used, well-known concepts and technologies.

4 Q. And going back to your Paragraph 8 of
5 your '921 reply declaration, that's where you
6 use the example of this is shorthand known as a
7 local host; is that correct?

8 A. I did talk about local host in my
9 reply declaration, yes.

10 Q. So for a client to -- client browser
11 to access a web server on the same machine, it
12 would just do HTTP local host; is that correct?

13 A. They would use HTTPS://localhost and
14 then they can even put a forward slash and put
15 in other path entries as well, or they can just
16 do local host and that will hit the web server
17 running on the default port. So yes, that's all
18 they have to do.

19 Q. Okay. So that's all they had to do
20 for a client device to access a web server
21 running on a computer; is that correct?

22 A. On that same computer, and at the same
23 time other computers could simply type in
24 HTTPS:// and use the IP address of that first
25 computer, and they could also access the web

1 server as well.

2 Q. So they would have to type in that IP
3 address of the computer to be able to access the
4 server on that machine?

5 A. Well, that's how Internet
6 communications works, it uses TCP/IP. You could
7 use URL, which gets resolved to an IP address.
8 You don't have to type in an IP address per se.
9 You can type in a URL, like CNN.com or
10 Google.com. Those get resolved. But URL is
11 simply an easy way to remember a URL. And then
12 those get resolved to an IP address.

13 Q. So if a physician computer is
14 operating behind -- in a private network, a
15 device that's outside the private network in the
16 public network, they would have to know the IP
17 address of the computer to be able to access the
18 web server operating on that computer?

19 A. No, they would not. In fact, they
20 will not know because that's on a private
21 network. And so this is what we talked about
22 when we talked about the NAT earlier, that a NAT
23 or some other type of router would simply
24 convert the incoming IP address or URL, and then
25 it would simply route it to the web server,

1 whatever the IP address was. And that's what
2 these home routers or NATs do. And that's
3 precisely what I explained to you in the
4 morning. Like even my home, I can literally run
5 a web server on my laptop, connect it to my
6 network within my home, which is on a private
7 network, and you can access my web server by
8 simply typing in the URL or the IP address, and
9 the router, including the NAT on my home router,
10 would forward that request to the web server.

11 Q. Can we go to Paragraph 20 of your
12 declaration.

13 A. Okay. I am at Paragraph 20.

14 Q. So in this paragraph you state, When
15 the physician's web client is active, it could
16 continuously query the server to see if new data
17 has been received. When you say active, are you
18 meaning that there is an active session?

19 A. I'm just saying when the physician is
20 using it, as meaning when it's active.

21 Q. So when the physician is logged into
22 the website and the application is open; is that
23 correct?

24 A. What do you mean that the application
25 is open?

1 Q. That there's a connection between the
2 web server and the client browser.

3 A. Well, this is talking about it could
4 continuously query the server. So it's not
5 talking about leaving that connection open, but
6 I think other parts of my reply declaration talk
7 about you -- implementing push-type data, and
8 that was also well known long before the 2005
9 time period, that you could keep that connection
10 open and then the server would provide the data
11 as soon as new data came in.

12 Q. In the HTTP/1 protocol at the time of
13 the 2005 invention, did that terminate after a
14 certain amount of time?

15 A. That's simply based on configuration.
16 This is what we talked about earlier about
17 managing the web server. You could connect
18 using, for example, a client running on that
19 machine that's running the web server, to manage
20 the web server. And you could configure how
21 long to keep that connection open, and then like
22 I explained, that even with HTTP/1 the concept
23 of long polling was well known and that would
24 simply -- the client would make a request to the
25 server, and then the server would wait until new

1 data comes in, and then it would respond to that
2 client request based on the new data. And then
3 as soon as that new data was delivered to the
4 client, the client would make a new request.
5 And so that technology was well known even at
6 HTTP/1.0.

7 So like I mentioned in my reply
8 declaration, there were different ways that a
9 POSITA would have known, even at 2005 and even
10 earlier, how to get this kind of data to the
11 client.

12 Q. Did web servers in the 2005 time frame
13 have a push application available to them to
14 push the data to a client device on another
15 machine?

16 A. I'm not sure what you mean by "push
17 application available to them." But the
18 technology, like I just explained to you, where
19 you're -- the client is making a request to the
20 server, then that connection remains open, and
21 then as soon as new data comes into the server,
22 the server immediately provides that new data to
23 the client. And that certainly existed at
24 HTTP/1.0.

25 Q. But going to what you just spoke to is

1 that there had to be an active -- the web client
2 is active to be able to receive that new data;
3 is that correct?

4 A. Well, I'm not sure like what you're
5 saying by active. Like I was mentioning what I
6 mean by active is like, for example, the
7 physician sitting down in front of the computer.
8 But it doesn't have to be like that. Like I
9 just mentioned with regards to the long polling
10 technology, which was known at 2005 and even
11 before that, what would happen is that the
12 client software would simply make a request to
13 the server, the server would not respond
14 immediately, the server would respond whenever
15 new data comes in, and then it would send that
16 new data to the client, and then in response to
17 that, the client would again make an --
18 immediately make another request. So that was a
19 way of doing effectively push technology using
20 the pull of HTTP.

21 And then I also talk about other ways
22 that a POSITA would have known, for example,
23 continuously polling as well.

24 Q. So the effective way to push using
25 HTTP would be a long pull, is that what you're

1 saying?

2 A. One example of that, yes.

3 Q. Where there's a request for the data,
4 and then there is a wait until new data comes
5 in? I'm just trying to get an understanding of
6 what a long pull is.

7 A. Yes. Long polling, it's where the
8 client makes a request of the server, the server
9 waits to respond until new data comes in. And
10 then when that new data comes in, it immediately
11 sends it to the client, based on that
12 connection, and then as soon as a client
13 receives it, it makes another request to the
14 server.

15 And so clearly you can understand that
16 in that concept, again, which was known in 2005
17 and even before that, the client would be
18 receiving the data as soon as it comes in.

19 Q. And to receive the data, there's an
20 active session between the client and the web
21 server; correct?

22 A. In long polling there would be the
23 active connection. And if you look at how push
24 technologies work even now, that's the same way
25 it works. Again, I think we've talked about

1 this technology is not magic. You have to have
2 a connection between the client and the server
3 in order to even get a push. So it works the
4 same way even now where you have that connection
5 that's available, and then when there's new data
6 that comes in, it's provided to the client.

7 Q. Upon a request for that data, just
8 delivered at a later time; correct?

9 MS. ALEXANDER: Objection.
10 Mischaracterizes his testimony.

11 THE WITNESS: Are you talking
12 about how --

13 BY MS. FULLER:

14 Q. The long pull?

15 A. -- the push --

16 Q. Your long pull testimony. Long
17 polling.

18 A. Yeah, for long polling, it's not
19 delivered at a later time, it's delivered
20 immediately upon the new data coming in.

21 Q. So there's a request for the data and
22 then it's delivered when the new data comes in?

23 A. Yes. And then the client immediately
24 turns around and makes a new request, and then
25 the same thing happens again. And this was one

1 way, even back in 2005 and before that, to have
2 data delivered immediately, new data delivered
3 immediately, as soon as it came in.

4 Q. What were the reasons why a client
5 device would implement a long polling request?

6 A. Well, just for that same exact reason,
7 to get data when it comes in. For example, if
8 you have a website that is aggregating data or
9 aggregating information when new data comes in,
10 you would want the client to get that.

11 And so even back then there were news
12 sites that -- like, for example, portals that
13 would aggregate news and other types of website
14 data. And so long polling was used to allow
15 those kind of updates to be sent out immediately
16 as soon as the new data became available.

17 Q. Dr. Chatterjee, can we turn to
18 Paragraph 24 of your '921 declaration.

19 A. Okay. I'm there.

20 Q. You know what, I'm going to have you
21 back up for a second. I'm going to have you go
22 to Paragraph 22.

23 A. 22?

24 Q. Yes.

25 A. Okay.

1 Q. In writing your opinion, did you apply
2 or come to an understanding of what the plain
3 and ordinary definition of retransmit is?

4 MS. ALEXANDER: Objection. Calls
5 for a legal conclusion.

6 THE WITNESS: So say that again.
7 Because this section I'm talking about, what
8 Dr. Goodrich is stating, I'm explaining that
9 it's wrong, but then even if you adopt that
10 wrong understanding, it would still be obvious,
11 based on references and the knowledgeable of the
12 POSITA that I talk about.

13 BY MS. FULLER:

14 Q. In writing your declaration, did you
15 apply a definition to the term retransmit?

16 A. I think we -- that it would be
17 understood that you're simply transmitting
18 whatever you're retransmitting. You're simply
19 getting it and you're transmitting it.

20 Q. And so are you saying that
21 transmitting and retransmitting are one and the
22 same?

23 A. No. I'm saying that within the --
24 what we're looking at with regards to the
25 claims, it would be that you're receiving it and

1 then you're retransmitting it. So even the
2 retransmit is a transmit. But it's simply
3 saying that you're getting it and then you're
4 retransmitting it, or transmitting it.

5 Q. So when a device gets it and then
6 retransmits it, is that acting as an
7 intermediary device to forward the data on to an
8 end device?

9 A. So what do you mean by acting as an
10 intermediary? It could. It's getting the data
11 and then it could do something with that data
12 and then it could send it, again. So I'm not
13 really sure what you mean by an intermediary.

14 Q. It's an intermediary device that
15 receives the data -- first receives the data,
16 and then just pushes the data onward to an end
17 device. That's what I mean by an intermediary
18 device.

19 A. So I'm not really sure -- like when
20 you're talking about pushes the data, I don't
21 think retransmit is limited to pushing data. It
22 simply means to a POSITA that you're getting
23 that data, and that you could do something with
24 that data, and then you're sending that data.

25 Q. And when you're sending that data, are

1 you waiting for a device to request that data or
2 are you just automatically pushing it on?

3 A. So I think that the term retransmit is
4 not so limiting that it would be one of those.
5 I think retransmit could include different ways
6 of sending that data forward, like I talked
7 about. And that's precisely what I've talked
8 about in this section of my reply dec. where I
9 say that Dr. Goodrich's understanding of the
10 term seems to be overly restrictive and wrong,
11 but that even if you assume that overly
12 restrictive and wrong understanding, it's still
13 obvious based on the combinations that I talk
14 about in my declarations.

15 Q. Well, you testified earlier that to --
16 in your first deposition that retransmit is --
17 pardon me, give me one second -- is receiving
18 the data and then sending it to another device;
19 correct?

20 A. I believe that's consistent with what
21 I just explained to you, yes.

22 Q. And it's different from transmit,
23 where in transmitting, a device first receives
24 the data -- pardon me, where it's transmitting a
25 device, transmits the data by itself.

1 A. Are you reading --

2 Q. Let me rephrase that. Retransmitting,
3 you testified, is receiving data and then
4 sending to another device, and you stand by that
5 testimony today; correct?

6 A. And I believe what I explained to you
7 right now is consistent with that, yes.

8 Q. And then transmitting, a device
9 transmits the data by itself. You testified to
10 that in your first deposition.

11 MS. ALEXANDER: Objection.
12 Outside the scope. Jenna, do you have something
13 you'd like to point Dr. Chatterjee to in terms
14 of this --

15 MS. FULLER: We can open
16 Exhibit 2018 if that's available to you. If
17 not, I can upload it.

18 THE WITNESS: Okay. What page on
19 2018?

20 MS. FULLER: Page 38, Line 24
21 through 25.

22 THE WITNESS: So it seems like
23 you are asking me outside of the '921 with
24 regards to this.

25 BY MS. FULLER:

1 Q. I'm just trying to see if you stand by
2 your testimony, your first deposition testimony
3 today, that in transmitting -- that transmitting
4 is receiving -- pardon me. Transmitting, a
5 device transmits the data by itself. That was
6 your testimony in your first deposition; is that
7 correct?

8 MS. ALEXANDER: Objection.
9 Mischaracterizes his testimony.

10 THE WITNESS: Yeah, I mean, if
11 you read Page 38, starting at Line 11, I'm
12 saying, well, again, I'm understanding your
13 question to be limited to this sentence in a
14 vacuum, and as I've explained to you a couple of
15 times, I've not memorized everything in the
16 '921, and if there is other disclosure about
17 that question.

18 And so I think I answered for you at
19 my first deposition that it was only based on
20 that one sentence, I guess, that you were
21 pointing me to, and in a vacuum, not remembering
22 everything that's in the '921.

23 But again, to the extent your question
24 right now is whether I stand by my testimony in
25 the first deposition? I a thousand percent

1 stand by it.

2 Q. So when a device is retransmitting, it
3 first receives data from another device, and
4 then retransmits it to the end device; is that
5 correct?

6 A. That could be one example, and again,
7 in a vacuum, based on what we've been talking
8 about with regards to what I testified to in my
9 first deposition.

10 Q. What are other examples, beyond the
11 one we just spoke of?

12 A. Well, I think you talked about
13 receiving it from another device, and we've been
14 spending a lot of time this morning talking
15 about how you can have different software
16 running on to the same device, and how it was
17 well known.

18 So you can even receive data from a
19 different piece of software running on that same
20 device and then potentially retransmit it as
21 well. So that would be another example.

22 Q. And in retransmitting it, the device
23 is simply forwarding it to the end device;
24 correct?

25 A. I think that's one example. But I

1 think, like we've talked about, and if you look
2 at the '921, there's clear disclosure even in
3 the '921 that there could be processing of the
4 data. And so even -- if you're coming back to
5 the '921 and what's -- what a POSITA would
6 understand in the context of the '921, it's not
7 limited to simply getting it and forwarding it.
8 Because like I just explained, even in the '921
9 there is disclosure of optional processing of
10 the data.

11 Q. So where a device gets it in -- let's
12 try this example -- processes the data, after it
13 processes the data, it then would forward it to
14 the end device?

15 A. It could. That's one example. There
16 are a lot of different examples. But yes, it
17 could forward it. But even when you say forward
18 it, it's kind of unclear because how technology
19 works is that you're getting these electrical
20 signals that are coming in, and then you're not
21 forwarding those electrical signals. The
22 computer will process those electrical signals
23 that are coming in, it will take them from the
24 analogue signals that are coming in, digitize
25 them, and then, you know open the packet up,

1 look what's inside the packet, and then it would
2 generate new electrical signals to send it out.

3 So it's not like -- it's not how
4 computers work, electronic computers work is how
5 I explained it, that you have these signals that
6 are coming in and then signals that might be
7 going out, and there could be some delay or lag
8 in between the signals coming in or going out,
9 and -- but it's not -- like I just want to be
10 clear when you're using the term forward it,
11 it's not just taking those same electrical
12 signals that are coming in. Because those
13 electrical signals are terminated when they get
14 to that device. Or if they're not electrical
15 signals, if it's on a Wi-Fi, there are RF
16 signals that are coming in and they're
17 terminated and new signals are generated.

18 Q. So these new signals that are
19 generated, that's what is being then forwarded
20 on to the end device, if I understand what
21 you're saying?

22 A. Yes. For example, the packets that
23 might go over a physical Ethernet network would
24 be generated, and they would go over the network
25 to their destination.

1 Q. So in retransmitting, a device
2 receives data from another device, can process
3 it or not process the data, and then forward on
4 processed or unprocessed data to another device;
5 is that what you're testifying to?

6 MS. ALEXANDER: Objection.
7 Mischaracterizes his testimony.

8 THE WITNESS: So I think I just
9 explained to you -- I want to be clear about --
10 you keep on using the term "forward it," and I
11 want to explain to you, and I think I did
12 explain to you, that how things work in reality
13 with technology, that you're getting the
14 signals, you're terminating the signals, you're
15 performing processing potentially, and then
16 you're generating new signals, either electronic
17 signals or RF signals or optical signals or
18 something, and that's one example.

19 But you can also have that data sit
20 there for some time and then send it on.
21 There's nothing in the term retransmit,
22 especially in the context of the '921. But as I
23 explained, even if you take Dr. Goodrich's
24 incorrect and overly limiting understanding of
25 the term, it's still disclosed by -- it's still

1 obvious in view of the combinations that I
2 talked about in my declarations.

3 BY MS. FULLER:

4 Q. So your opinion that it's still
5 obvious, even under the construction, is based
6 upon processing of the data; is that correct?
7 I'm looking at Paragraph 25 of your '921.

8 A. On 25 I'm simply stating that with
9 respect to processing data sent or stored is the
10 same data received. And so I'm explaining
11 similar to what I explained for you that when
12 the data comes in, the packet is inspected and
13 then different things can happen to the actual
14 payload, the actual data within the packet. It
15 can be stored and then later retransmitted. It
16 can be -- like I explained to you with regards
17 to long polling, the data can come in and then
18 it's immediately provided in response to long
19 polling. So there are a lot of different ways
20 and things that can happen to that data. I'm
21 simply explaining how -- what actually happens
22 with technology in real life.

23 Q. Okay. And then Paragraph 26 you
24 alluded to that it is your automatically push
25 data that has been received, where the data

1 would come in and then be pushed to another
2 device?

3 MS. ALEXANDER: Objection; vague.

4 THE WITNESS: Well, what I'm
5 stating in Paragraph 26 is that the Toge/Kumar
6 system is not limited to a pull system and could
7 be implemented to automatically "push data that
8 has been received."

9 And I think I've explained to you in
10 quite a bit of detail today why even in 2005 a
11 POSITA would have understood that and known
12 that, for example, with long polling.

13 Q. Was push protocols for web servers
14 available in 2005?

15 A. What do you mean by push protocols?
16 Like are you distinguishing between what I just
17 explained?

18 Q. Like a push protocol in an HTTP/2.
19 HTTP/2 has a push protocol where data is sent to
20 a server and can be pushed to an end device.

21 A. So that protocol is different, but in
22 terms of pushing data, to the extent you're
23 talking about pushing data meaning that as soon
24 as that data is available it's provided to one
25 or more clients, I explained to you in quite a

1 bit of detail that the long polling achieves
2 that same thing. Alternatively, I also
3 explained to you that continuous polling
4 achieves that same thing.

5 So they're different protocols, but
6 they can achieve the same end result of
7 providing data to clients immediately upon the
8 server receiving.

9 Q. And then long polling, there is a
10 client request for the data; correct?

11 A. And even in all push protocols, there
12 is a connection that has to be open. Maybe
13 you're having a misunderstanding about how push
14 protocols work, even in 2026. You have to have
15 a connection between the client and the server
16 in order for the data to be, quote unquote,
17 pushed.

18 Q. I was not speaking to a connection, I
19 was speaking to the request in a long polling,
20 there's a request for the data by the client;
21 correct?

22 A. I'm not sure what you mean by a
23 request for the data, even in push -- even in
24 modern 2026 push protocols you have to identify,
25 I want this data. It's not that the server

1 could magically figure out that you want some
2 data and somebody else wants some other data.
3 These are simply different protocols, but they
4 achieve the same end result of getting data to
5 clients immediately upon being received by the
6 server.

7 Q. And in your querying, the web server
8 example that you also spoke to, that's where the
9 web browser client is active on the computer; is
10 that correct, for the querying?

11 MS. ALEXANDER: Objection.
12 Mischaracterizes his testimony.

13 THE WITNESS: So like I explained
14 to you, when I use the term active, I meant, as
15 an example, the physician sitting in front of
16 the computer and doing some work, but it doesn't
17 even have to be like that. Like I've explained
18 to you, the long polling, it works by the data
19 is received and then immediately the client in
20 long polling will send another request. And so
21 the physician doesn't even have to be sitting
22 there in front of the computer. The data would
23 show up using long polling, or even continuous
24 polling.

25 BY MS. FULLER:

1 Q. So in the long polling, a client would
2 send a GET request to the server, and then the
3 server would send the data when it shows up?

4 A. That is one example, yes, of using
5 long polling.

6 Q. Are there other examples?

7 A. Well, like I explained to you, there
8 is continuous polling, where the client can
9 issue a GET request and then it will get that
10 data and then it will again issue another GET
11 request. So it's a continuous polling example.

12 Q. Are there HTTP time-outs for long
13 polling that would terminate the request?

14 A. So again, like I explained already, I
15 think I answered this question before, where I
16 explained that these are configurable. And so
17 for -- and a POSITA knew that these were
18 configurable, and if the time-out is set to a
19 certain amount, when the time-out happens, the
20 client simply sends a new request.

21 So with long polling, like I said, the
22 end result is that the client gets the data as
23 soon as a server has it, and it's simply using
24 one protocol, one mechanism by which to do it,
25 continuous polling is another way, and then, you

1 know, there are different types of protocols
2 that are used, but they all achieve the same
3 request -- the same end result of getting the
4 data to the client as soon as the server has it.

5 MS. FULLER: Dr. Chatterjee,
6 let's go off the record.

7 (Discussion was had off the record.)

8 MS. FULLER: Let's do a quick
9 five-minute break.

10 (11:57 a.m. - Recess taken.)

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1 (At 12:02 p.m., with parties present
2 as before, the following proceedings were had,
3 to-wit:)

4 MS. FULLER: Dr. Chatterjee,
5 thank you for your time today. I have no
6 further questions.

7 THE WITNESS: Thank you.

8 MS. ALEXANDER: I have no further
9 questions.

10 COURT REPORTER: (Requests orders
11 for the record.)

12 MS. ALEXANDER: We'll take a
13 rough. Standard turnaround.

14 MS. FULLER: Thank you all.

15 (2:02 p.m. - Adjournment.)

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