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Transcript of John Richard Black, Jr., Ph.D. (IPR2023-00459)

Date: April 3, 2024

Case: Netskope, Inc. -v- Fortinet, Inc. (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

Netskope Exhibit 1018

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2 _____
3
4 BEFORE THE PATENT TRIAL AND APPEAL BOARD

5
6 NETSKOPE, INC.,

7 Petitioner,

8 vs.

9 FORTINET, INC.,

10 Patent Owner.

11 _____
12 PTAB Case No. IPR2023-00459

13 U.S. Patent No. 10,084,825

14
15 DEPOSITION OF JOHN BLACK, JR., Ph.D.

16 Wednesday, April 3, 2024

17 11:34 a.m. EST

18
19 Job No.: 531921

20 Pages: 1 - 94

21 Stenographically Reported By:

22 Alison C. Webster, CSR-6266, RPR, RMR, CRR, RDR

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6 Deposition of JOHN BLACK, JR., Ph.D., produced as a
7 witness at the instance of the Petitioner, and duly sworn,
8 was taken in the above-styled and numbered cause on Friday,
9 March 22, 2024, from 11:34 a.m. to 2:02 p.m. Eastern Time,
10 before Alison C. Webster, RPR, CRR, RMR, RDR, CSR-6266
11 (Michigan); License No. 14559 (California); License No.
12 084.004953 (Illinois); License No. 23001848 (Washington),
13 reported by stenographic method, via videoconference,
14 pursuant to the Federal Rules of Civil Procedure and the
15 provisions stated on the record or attached hereto.
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22

A P P E A R A N C E S

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T A B L E O F C O N T E N T S

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E X H I B I T I N D E X

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(Exhibits not offered.)	

1 DEPOSITION OF JOHN BLACK, JR., Ph.D.

2 Wednesday, April 3, 2024

3
4 STENOGRAPHER: The attorneys participating
5 in this deposition and the witness have verified that
6 he is John Black, Jr., Ph.D. In lieu of an oath
7 administered in person, the witness will visually
8 affirm his testimony in this matter is under penalty
9 of perjury.

10 The parties and their counsel consent to
11 this arrangement and waive any objections to this
12 manner of reporting or admissibility of the
13 transcript.

14 Would counsel please state their appearance
15 and any objections to proceeding in this manner,
16 starting with scheduling counsel. 11:34:00

17 MR. KLEIN: Andrew Klein on behalf of 11:34:00
18 petitioner Netskope, Inc., and I have no objection. 11:34:05

19 MR. LU: Quincy Lu on behalf of patent 11:34:07
20 owner Fortinet. I have no objections. 11:34:11

21 STENOGRAPHER: Dr. Black, would you please
22 raise your right hand.

1 Do you swear or affirm the testimony you
2 are about to give in this matter will be the truth,
3 the whole truth, and nothing but the truth?

4 DR. BLACK: I do.

5 STENOGRAPHER: Thank you.

6 You may proceed.

7 MR. KLEIN: Good morning, Dr. Black.

8 THE WITNESS: Good morning, Mr. Klein.

9 JOHN BLACK, JR., Ph.D.,
10 was thereupon called as a witness herein, and after
11 having first been duly sworn to testify to the truth,
12 the whole truth and nothing but the truth, was
13 examined and testified as follows:

11:09:41

14 EXAMINATION

11:09:41

15 BY MR. KLEIN:

11:09:41

16 Q. So we're going to first start talking about the '825
17 patent, so I just want to make sure you know which IPR
18 we're talking about first.

11:34:30

11:34:34

11:34:38

19 A. Thank you for clarifying. That's what I was told to
20 expect.

11:34:39

11:34:41

21 Q. Yeah. And in your expert report that you submitted in
22 connection with the '825 patent, you discuss a few

11:34:42

11:34:47

1	different topologies. Correct?	11:34:51
2	A. I do.	11:34:54
3	Q. And I wanted to go through the topologies you	11:34:54
4	discussed to see if we can agree on what those	11:34:59
5	topologies are and what they look like. And so I	11:35:02
6	wanted to first start with the bus topology which you	11:35:05
7	mentioned in your report. What is that?	11:35:09
8	A. A bus, in computer lingo, is a backplane or a	11:35:12
9	connection line. It is sort of the substrate. And	11:35:18
10	then each of the computers or devices or whatever the	11:35:22
11	context is, connects to that bus.	11:35:28
12	So everything -- you can imagine sort of a	11:35:31
13	horizontal line going across the top of a piece of	11:35:33
14	paper, and then each device or computer component has	11:35:36
15	a single wire connecting to that bus and that	11:35:40
16	provides sort of the substrate for each of them to	11:35:43
17	intercommunicate.	11:35:45
18	Q. And is a bus topology typically a line?	11:35:46
19	A. It's often drawn that way. I -- you know, when you	11:35:52
20	see it implemented it might actually have some	11:35:55
21	corners and curves on a motherboard or the cables	11:35:57
22	obviously could be curved when they're laid out.	11:36:01

1	Q. And are all the devices connected to the bus	11:36:05
2	interconnected?	11:36:08
3	A. Yeah. They have a pathway to one another, so they	11:36:13
4	are interconnected in that sense.	11:36:15
5	Q. What do you mean, "a pathway to one another"? You	11:36:18
6	mean they can just talk to each other some way?	11:36:20
7	A. Right. There is a -- there is a pathway. There is a	11:36:22
8	path between every pair of devices via the bus.	11:36:26
9	Q. Okay. But so if we have, let's say, a bus, and	11:36:33
10	there's three devices, there's one up here, one down	11:36:36
11	here, and then one over here, are the two devices on	11:36:39
12	the end interconnected?	11:36:43
13	A. If I understand you properly, it sounds like the two	11:36:47
14	on the ends are both connected to the bus. And so,	11:36:50
15	yeah, they could talk to each other via the bus.	11:36:52
16	Q. Okay. And you also mentioned a ring topology. Right?	11:36:56
17	A. Right.	11:37:05
18	Q. What does a ring topology look like?	11:37:06
19	A. So typically, there, each computer is connected to	11:37:10
20	two others in a ring. So the simplest case would be,	11:37:16
21	let's say you have three computers, A, B, and C; A	11:37:19
22	connects to B, B connects to C, C connects back to A	11:37:23

1	again. So they form sort of this ring diagram, if	11:37:27
2	you draw it like that.	11:37:30
3	Q. Okay. And then you mentioned a point-to-point	11:37:31
4	topology too. Correct?	11:37:36
5	A. Yes.	11:37:38
6	Q. And what does that look like?	11:37:39
7	A. Point-to-point is typically restricted to just two	11:37:42
8	computers with a single connection between them;	11:37:45
9	there's no complexity, there's no switching, there's	11:37:48
10	no multi-computer interconnection. It's as simple as	11:37:53
11	you can get. It's two tin cans with a string.	11:37:56
12	Q. And when you talk about connections, are you talking	11:37:59
13	about physical connections between them or logical	11:38:01
14	connections between them?	11:38:04
15	A. You can talk about both. Right? So you can say,	11:38:08
16	what does the physical connection look like, that	11:38:12
17	might actually be tangible and might actually be just	11:38:14
18	over-the-air because we have wireless networks as	11:38:17
19	well.	11:38:17
20	But then also in networking we will talk	11:38:19
21	about computers being connected in a logical sense.	11:38:24
22	And so networking people usually try to make clear	11:38:29

1 what the context is that they're describing before 11:38:32
2 they start the conversation with words of, like, 11:38:36
3 connection, to say, you know, are we in this logical 11:38:39
4 domain. 11:38:42

5 If you're in the data center with pliers 11:38:43
6 and wires and connecting things together, now you're 11:38:45
7 talking about physical connections. 11:38:47

8 Q. So when you're talking about point-to-point, and 11:38:49
9 you're saying there is one connection in this 11:38:52
10 topology, is that in context -- in that context, is 11:38:54
11 that just a single wire or is that a single logical 11:38:58
12 connection or both? 11:39:03

13 A. So if you're talking in the physical context, 11:39:04
14 point-to-point typically means an actual wire between 11:39:09
15 the two things that you can touch, or perhaps a 11:39:11
16 wireless connection. But if you're in the logical 11:39:15
17 context, a point-to-point topology for a logical 11:39:19
18 network could actually go across the world and have 11:39:23
19 lots of intermediate hops that are transparent 11:39:30
20 because you're thinking about the logical connection 11:39:32
21 and not the underlying implementation of the 11:39:34
22 connection. 11:39:36

1	Q. So in that last little bit of testimony we were	11:39:37
2	talking about, you have multiple hops but it's a	11:39:41
3	single logical connection between two devices. Is	11:39:43
4	that still point-to-point?	11:39:45
5	A. If that's the only connection that's made. If there	11:39:49
6	are no other connections between these two, let's	11:39:51
7	say, interfaces, one is talking to the other, the	11:39:53
8	other is talking to one, and that's it, then	11:39:56
9	logically that is a point-to-point connection, even	11:39:59
10	though under the covers it might have a lot of	11:40:01
11	complexity to what's going on.	11:40:04
12	Q. Okay. So a point-to-point is really just the fact	11:40:06
13	that there's two devices communicating directly with	11:40:10
14	each other and they're not talking to anybody else or	11:40:14
15	there's no third party in the conversation?	11:40:19
16	MR. LU: Objection. Vague.	11:40:20
17	A. Right. Now, that's a point-to-point connection. I	11:40:23
18	wouldn't call that a point-to-point topology unless	11:40:26
19	you've actually built a network where that's the only	11:40:29
20	connection in the network, but I would say that's a	11:40:31
21	point-to-point connection.	11:40:34
22	BY MR. KLEIN:	11:40:35

1 Q. So what was the distinction you are making there 11:40:35
2 with -- between a point-to-point connection and a 11:40:38
3 point-to-point topology? 11:40:40

4 A. So you can have two computers that are connected 11:40:44
5 together logically in the way that you described, 11:40:46
6 where they talk only to one another. But normally 11:40:48
7 that's not a network, that's just a connection across 11:40:51
8 a network between two computers. 11:40:54

9 But you could build a virtual network that 11:40:57
10 has its own address space, that it's logically 11:40:59
11 insulated from everything else around it, and you 11:41:02
12 could do that just between two computers with a 11:41:08
13 single connection, so then you would have a 11:41:10
14 point-to-point topology of a network implemented. 11:41:12
15 That's less common than what we were talking about 11:41:17
16 before. Point-to-point connections are extremely 11:41:19
17 common. 11:41:22

18 Q. So can you explain that a little bit more about what 11:41:22
19 exactly is the point-to-point topology? 11:41:25

20 A. Sure. So when you have a network, a network is a set 11:41:27
21 of computers, two or more, that have connections 11:41:31
22 between them somehow. The "somehow" is called the 11:41:38

1	topology.	11:41:40
2	Q. Uh-huh.	11:41:42
3	A. So if you have a network that has only two members,	11:41:42
4	two computers, two devices, and a single connection,	11:41:48
5	the topology is called point-to-point. That's the	11:41:50
6	entirety of your network.	11:41:53
7	Now, the simplest case is where you	11:41:54
8	physically do this and you have two computers in a	11:41:57
9	single wire and that's easy enough that everybody can	11:42:00
10	understand it. But you can, these days, build virtual	11:42:02
11	networks that are basically simulating that physical	11:42:05
12	world in software by pretending that you have this	11:42:10
13	single wire between them but you're implementing it	11:42:16
14	via software by tunneling, by using encryption, by	11:42:18
15	using what's called a VPN.	11:42:22
16	You can build a separate software	11:42:24
17	simulation of a network that way, and then the	11:42:29
18	network, in essence, exists because the computer	11:42:34
19	believes it's on a separate network, it behaves as	11:42:37
20	though it's on a separate network; it thinks the only	11:42:39
21	other computer is the -- is the other computer on the	11:42:42
22	other end of this single connection. So you would	11:42:44

1	have a point-to-point topology of that simulated	11:42:46
2	network, even though physically it's not going to look	11:42:50
3	like a single wire in that case.	11:42:55
4	Q. So can you have multiple logical connections between	11:42:57
5	two computers over a single wire?	11:43:01
6	MR. LU: Objection. Vague.	11:43:07
7	A. So certainly if we're talking about TCP/IP, something	11:43:08
8	like a TCP/IP connection, you can have multiple	11:43:18
9	logical TCP/IP sessions or connections over the same	11:43:22
10	wire between two computers.	11:43:27
11	BY MR. KLEIN:	11:43:30
12	Q. Now, in that scenario, would that be point-to-point	11:43:30
13	connection or point-to-point topology?	11:43:34
14	MR. LU: Objection. Form.	11:43:38
15	A. It would be multiple point-to-point connections. The	11:43:40
16	topology is still up in the air. You can have a	11:43:45
17	point-to-point connection between two computers, you	11:43:48
18	can have multiple point-to-point connection between	11:43:52
19	two computers and the topology could still be	11:43:54
20	anything.	11:43:57
21	You could do it over the Internet, which	11:43:57
22	is this massive, you know, interconnected topology.	11:43:59

1	You could do it over a single physical	11:44:03
2	line point-to-point topology. So saying -- you have	11:44:06
3	multiple connections doesn't tell you what the	11:44:09
4	underlying topology looks like.	11:44:13
5	Q. So if I have two computers and there's a single	11:44:14
6	physical wire between them but there are multiple	11:44:20
7	TCP/IP sessions between those two computers, would	11:44:25
8	that be a point-to-point topology?	11:44:28
9	MR. LU: Objection. Incomplete	11:44:33
10	hypothetical.	11:44:36
11	A. The physical topology would be point-to-point, and	11:44:36
12	even though you have -- you can still have multiple	11:44:39
13	connections over that single wire.	11:44:41
14	BY MR. KLEIN:	11:44:45
15	Q. And is that because there's just a single wire going	11:44:45
16	between the two computers or a single connection?	11:44:47
17	MR. LU: Objection. Vague.	11:44:53
18	A. Right. The network topology in your example is	11:44:54
19	point-to-point and it doesn't mean you can only have	11:44:57
20	a single session occurring over that single	11:45:01
21	connection.	11:45:03
22	BY MR. KLEIN:	11:45:15

1	Q.	Have you heard of a mesh topology?	11:45:29
2	A.	Yes.	11:45:32
3	Q.	And what is a mesh topology?	11:45:33
4	A.	A mesh -- it's been a while since I looked. I don't	11:45:39
5		know if there's a strict definition out there, but in	11:45:43
6		the examples I've seen, a mesh is often a topology	11:45:46
7		where, for example, you have a set of end computers,	11:45:51
8		and each of them is connected -- every given computer	11:45:57
9		is connected to all $n-1$ other computers. So there's	11:46:01
10		a full pairing of connections.	11:46:05
11		This doesn't scale very well because you	11:46:08
12		have n times $n-1$ minus over two total connections. So	11:46:11
13		you've got a lot of connections as the number of	11:46:14
14		elements grows.	11:46:18
15		You can also take, let's say, ten computers	11:46:18
16		on the top of the picture, ten on the bottom, and each	11:46:23
17		one on the top connects to all ten on the bottom. So	11:46:26
18		that's fewer connections, but I've seen that called a	11:46:29
19		mesh as well.	11:46:32
20	Q.	Okay. So there's a lot more interconnections between	11:46:36
21		the devices in the topology.	11:46:38
22		MR. LU: Objection. Vague.	11:46:41

1	A. It conjures that idea. Right? Like, for example, I	11:46:42
2	wouldn't consider two computers and a wire to be a	11:46:46
3	mesh. Usually it -- it has this flavor of lots of	11:46:50
4	interconnections between number nodes.	11:46:54
5	BY MR. KLEIN:	11:46:58
6	Q. Have you heard of a star topology?	11:46:59
7	A. Yes.	11:47:02
8	Q. And what is a star topology?	11:47:02
9	A. That's typically a topology where you have some	11:47:06
10	central network device, typically a router or a	11:47:09
11	switch, and then each member of the network connects	11:47:13
12	directly to that central component and it is	11:47:18
13	responsible for switching or routing or forwarding	11:47:21
14	packets as they come in and need to be forwarded on.	11:47:25
15	Q. Have you heard of a tree topology?	11:47:31
16	A. Yes.	11:47:39
17	Q. And what does a tree topology look like?	11:47:39
18	A. In a tree, you typically have a root of the tree.	11:47:44
19	And in computer science we draw trees upside-down, so	11:47:49
20	the root's usually at the top of the picture. And	11:47:52
21	then you have various lines coming down from the root	11:47:55
22	to intermediate nodes or leaf nodes, we call them	11:47:59

1	analogously, like, parts of a tree; so branch nodes,	11:48:05
2	leaf nodes. But basically there's a node, it has	11:48:09
3	lines coming down, there may be further nodes,	11:48:11
4	further lines going down, and so forth. So it sort	11:48:16
5	of looks like an upside-down tree.	11:48:18
6	Q. And have you heard of a fabric topology?	11:48:21
7	A. Yes.	11:48:25
8	Q. And what is that?	11:48:25
9	A. Well, as I state in my declaration, to me -- well,	11:48:29
10	"fabric" in the general sense or do we mean "fabric"	11:48:34
11	in the way that it's used in the '825 patent? I	11:48:37
12	guess I should ask that.	11:48:41
13	Q. Well, let's start with "fabric" in the general sense.	11:48:43
14	A. "Fabric," in the general sense, again, conjures this	11:48:46
15	idea of sort of lots of connections because it's	11:48:49
16	supposed to be analogous to the textile version of	11:48:52
17	the word where you've got lots of threads interwoven.	11:48:55
18	And so, again, it should be something with many nodes	11:49:01
19	and many different paths within those nodes	11:49:06
20	interconnecting the nodes.	11:49:09
21	Q. Is a -- well, strike that.	11:49:12
22	And then what do you mean "fabric" in the	11:49:18

1	context of the '825 patent?	11:49:21
2	A. So in the '825 patent, the fabric is of the so-called	11:49:23
3	network security appliances. And there I would say	11:49:26
4	that the word "fabric" is used to describe several, I	11:49:28
5	would say three or more of these NSAs, these network	11:49:32
6	security appliances, that are all interconnected via	11:49:34
7	multiple paths.	11:49:39
8	Q. Is a tree topology a fabric topology or are they	11:49:41
9	completely separate topologies?	11:49:46
10	MR. LU: Objection. Vague.	11:49:54
11	A. I would say that a tree that has at least three	11:49:54
12	network security appliances and has multiple paths	11:50:03
13	for things coming in and out of it would be a fabric.	11:50:06
14	BY MR. KLEIN:	11:50:09
15	Q. What do you mean by "paths coming in and out of it"?	11:50:11
16	You mean just that -- the ends of those	11:50:14
17	three devices or all three of the devices have a	11:50:16
18	connection to each other?	11:50:20
19	A. Yeah. So if all three are connected to each other,	11:50:23
20	it's not a tree anymore. You can't do that with a	11:50:26
21	tree. Right? So the network security appliance tree	11:50:28
22	would be, let's say, a root with two children, two	11:50:34

1	leaf nodes, and as long as it was possible to go	11:50:37
2	through, pass through that fabric by coming in, let's	11:50:41
3	say, in the root and out one of the leaves, but	11:50:46
4	there's another path now, which is in the root and	11:50:50
5	out the other leaf, those are two separate paths now.	11:50:52
6	So I think it constitutes a fabric in that case.	11:50:56
7	Q. Because there's multiple ways in and out of the	11:50:59
8	topology? Is that what you're saying?	11:51:02
9	A. Right. If we instead draw a tree like this, we say	11:51:04
10	root, branch, leaf, and that's it, and then the only	11:51:08
11	path through that is traffic has to arrive at the	11:51:12
12	root, pass through the branch, and exit the leaf,	11:51:17
13	that's a single path. And if that's the only path	11:51:20
14	available, then to me that's not a fabric in the	11:51:23
15	context of the '825.	11:51:25
16	Q. And then going back to the hypothetical you just had,	11:51:26
17	you said you had a root, a branch, and a leaf, was	11:51:29
18	that right, in a single line?	11:51:32
19	A. Correct.	11:51:35
20	Q. So what if you have what you just said, so you have	11:51:35
21	the root, the branch, and the leaf, but then you add	11:51:39
22	another branch connected to the root and it's not	11:51:43

1	connected to anything else, is that now a fabric?	11:51:47
2	MR. LU: Objection. Vague. Incomplete	11:51:50
3	hypothetical.	11:51:56
4	A. As long as traffic can pass through different paths.	11:51:56
5	So now let's say traffic A goes root, branch, leaf,	11:52:00
6	and exits the fabric, and then another, traffic B,	11:52:05
7	arrives at the root and now goes to that second	11:52:11
8	branch that you added and exits. Now you have an	11:52:13
9	interconnected network with three or more nodes that	11:52:17
10	has multiple paths because we just described two	11:52:22
11	different paths there.	11:52:24
12	BY MR. KLEIN:	11:52:26
13	Q. But the traffic passing through the fabric is only	11:52:26
14	going to go through one pathway. Right?	11:52:32
15	MR. LU: Objection. Vague.	11:52:38
16	A. For a given example, a given instance of a single	11:52:40
17	packet traveling through, it will generally just	11:52:48
18	travel through one path. But if that's the only	11:52:51
19	option that every single packet has in the future as	11:52:53
20	well, then I don't think you have a fabric because	11:52:56
21	you just have this, like, bucket brigade linear	11:52:59
22	arrangement of nodes.	11:53:02

1	BY MR. KLEIN:	11:53:04
2	Q. So is a fabric its own specific type of topology?	11:53:04
3	What I mean -- what I mean by that is, we	11:53:13
4	talked about the bus topology and the ring topology	11:53:15
5	and point-to-point and mesh, star, and tree	11:53:17
6	topologies. Is a fabric topology another type of	11:53:22
7	topology like those others, or is there a different	11:53:26
8	type of relationship?	11:53:29
9	MR. LU: Objection. Vague.	11:53:33
10	A. I wouldn't say that it's disjoint. Like we just	11:53:36
11	described a way that a tree topology could be a	11:53:38
12	fabric, so I wouldn't say it's something that's yet	11:53:41
13	again separate from every other example that you	11:53:44
14	listed.	11:53:47
15	BY MR. KLEIN:	11:53:47
16	Q. I didn't follow that. Say it again. So it's	11:53:50
17	something different?	11:53:53
18	A. I would say it's not something that's disjoint, like	11:53:53
19	completely unlike any other topology that you listed	11:53:57
20	because we just gave an example where a tree topology	11:54:00
21	could constitute a fabric.	11:54:03
22	Q. Uh-huh. So I just want to make sure I've got right	11:54:07

1	exactly what you're saying.	11:54:14
2	So a fabric is another type -- another	11:54:15
3	specific type of topology, but it's not exclusive.	11:54:20
4	Meaning, you have -- you could only have a fabric	11:54:23
5	topology, and that's to the exclusion of all the other	11:54:26
6	topologies.	11:54:29
7	A. Agree. Correct. Yes.	11:54:30
8	Q. Okay. So just to flesh that out a little bit more, so	11:54:32
9	if we have three computers in a line, is that a	11:54:39
10	fabric?	11:54:47
11	MR. LU: Objection. Asked and answered.	11:54:48
12	A. It could be --	11:54:51
13	MR. LU: And vague. Sorry.	11:54:52
14	THE WITNESS: Sorry.	11:54:55
15	A. It could be if traffic can enter, let's say, the	11:54:56
16	middle node in that line and then go left and out,	11:54:59
17	but it could also enter the middle and then go right.	11:55:02
18	As long as there are separate paths that the traffic	11:55:05
19	can follow, then yes. But if traffic can only enter	11:55:07
20	on the left side and go to the second node and the	11:55:13
21	third node and exit and that's it, then I wouldn't	11:55:17
22	say that's a fabric.	11:55:19

1	BY MR. KLEIN:	11:55:20
2	Q. Okay. So the fabric is -- is it fair to say that the	11:55:21
3	fabric is about the number of pathways available	11:55:24
4	through the topology?	11:55:28
5	MR. LU: Objection. Vague.	11:55:31
6	A. I mean, I would say that multiple pathways are	11:55:33
7	required. I wouldn't say there's a specific number.	11:55:36
8	BY MR. KLEIN:	11:55:38
9	Q. Yeah.	11:55:39
10	A. Multiple pathways.	11:55:39
11	Q. So at least two pathways through the topology.	11:55:40
12	A. At least two.	11:55:43
13	Q. Okay. And so if we take that line of computers and	11:55:44
14	then we now put them in a triangle, so we have one at	11:55:50
15	the top and then one at the top left and then one at	11:55:53
16	the bottom right, is that a fabric?	11:55:56
17	MR. LU: Objection. Incomplete	11:56:00
18	hypothetical.	11:56:03
19	A. It is if traffic can enter, let's say, at the top of	11:56:03
20	your picture and exit left, but also it could enter	11:56:07
21	and exit right. But if the traffic can only enter on	11:56:11
22	the left side -- left leaf node, go to the root and	11:56:15

1	go out the right-hand leaf node and that's it, then	11:56:19
2	no.	11:56:23
3	BY MR. KLEIN:	11:56:24
4	Q. Okay. All right. So I think I'm getting this.	11:56:24
5	So if we've got the -- back to the straight	11:56:27
6	line, we have A, B, and C, and traffic can enter A and	11:56:29
7	then exit through B, or enter A and exit through C,	11:56:36
8	that would be a fabric because there's different	11:56:41
9	pathways through the fabric?	11:56:43
10	A. That -- yeah, that -- if that's possible, what you	11:56:47
11	just described, then it qualifies under the	11:56:50
12	definition I gave because you did describe two	11:56:52
13	different paths and you have at least three	11:56:54
14	appliances and they all are interconnected. So it	11:56:58
15	checks all the boxes, and I would say yes.	11:57:01
16	Q. Okay. So now how does a fabric relate to the physical	11:57:04
17	infrastructure of a network, if it does at all?	11:57:09
18	A. Well, once again, with topologies, you can talk about	11:57:15
19	the physical topology or the logical topology. If	11:57:17
20	we're talking about the physical topology, then a	11:57:20
21	fabric -- you would look at the topology of a given	11:57:24
22	network and ask yourself the question that we've just	11:57:28

1	been asking for the last few minutes and say, does	11:57:30
2	this topology support transfer through various	11:57:33
3	different pathways; and if yes, then I would say	11:57:39
4	you've got yourself a fabric.	11:57:42
5	Q. And then would your answer be the same if we're	11:57:48
6	talking about the logical connections between devices	11:57:50
7	if there's multiple paths in and out of the fabric or	11:57:54
8	is it just looking at the physical connections?	11:57:57
9	A. The way I look at it is, you know, as soon as you're	11:58:02
10	in the logical world, it really is the same thing.	11:58:05
11	It's -- as long as you sort of just focus on the	11:58:08
12	software-simulated world that you're living in and	11:58:13
13	you have all the same requirements that we just	11:58:17
14	described now in logical sense, so you would ignore	11:58:19
15	whatever wires are lying around and just ask which	11:58:25
16	are the security appliances, are there multiple	11:58:28
17	paths, is everything connected, are there at least	11:58:31
18	three of them; yes, yes, yes, that's a fabric.	11:58:33
19	Q. And in your report you talk about the fabric stemming	11:58:37
20	from this concept of things being interwoven. Right?	11:58:43
21	A. I do.	11:58:49
22	Q. And is that element of being interwoven talking about	11:58:49

1	the physical wires or the logical wires or both?	11:58:57
2	A. I mean, it's not a strict borrowing from clothing,	11:59:01
3	fabric, textile fabrics. Right? So it's not	11:59:07
4	requiring that it be arranged in exactly the same	11:59:12
5	way. It's just taking this concept of there's some	11:59:14
6	nominal amount of complexity that's required before	11:59:17
7	you call something a fabric.	11:59:20
8	And so my belief, my understanding and	11:59:21
9	what I think a POSITA would think, is that you have	11:59:26
10	at least some level of complexity, and I've described	11:59:28
11	what I think is like the most trivial examples that	11:59:31
12	you would still call a fabric are these three-node	11:59:35
13	examples that we've been talking about.	11:59:38
14	Q. And complexity in what sense; how the devices are	11:59:39
15	connected or something else?	11:59:45
16	A. And just the agility and the ability of traffic to	11:59:47
17	pass through via different paths. So something	11:59:51
18	that's very rigid and linear and step by step like an	11:59:54
19	assembly line, that doesn't have this characteristic.	11:59:57
20	But something where the network sort of can handle	12:00:01
21	packets coming at it from all directions and still	12:00:05
22	send things in the right direction via multiple	12:00:09

1	paths, that does have that characteristic.	12:00:11
2	Q. So then is a fabric -- no -- strike that.	12:00:15
3	Then is a bus topology basically a fabric	12:00:37
4	topology because there's multiple connections through	12:00:41
5	the topology?	12:00:45
6	MR. LU: Objection. Vague.	12:00:47
7	A. I would say that if you had, let's say, going to our	12:00:52
8	example again, three appliances arranged in a bus	12:00:57
9	topology and it's possible for traffic to enter on	12:01:01
10	one node, let's say -- let's call them A, B, and C.	12:01:05
11	So we've got three appliances called A, B, and C,	12:01:10
12	they're in a bus topology, and traffic enters on A	12:01:13
13	and comes into appliance A and then is routed to B	12:01:18
14	and exits, that's one path.	12:01:22
15	BY MR. KLEIN:	12:01:24
16	Q. Uh-huh.	12:01:25
17	A. If it comes into A and then exits at C, that's	12:01:25
18	another path. So, yes, that would be a fabric in	12:01:28
19	that instance.	12:01:31
20	Q. Is there ever an instance when a bus topology would	12:01:32
21	not be a fabric?	12:01:35
22	A. I mean, I think if you just had, for example, two	12:01:43

1	computers connected to a single bus then everything	12:01:47
2	would, you know, come in one place and go out the	12:01:51
3	other. You have a single path, it's the only path	12:01:54
4	available, then that wouldn't qualify.	12:01:56
5	Q. Does that ever happen, though, a bus with just two	12:01:59
6	devices? Wouldn't you just do point-to-point at that	12:02:02
7	point?	12:02:04
8	A. Sure, but --	12:02:06
9	MR. LU: Objection. Form.	12:02:06
10	A. -- for example -- for example, my -- the computer I'm	12:02:07
11	sitting next to has a bus and if you -- this is a bus	12:02:13
12	on the motherboard, it's the same topology, though.	12:02:16
13	So you have a long -- you have a bunch of slots that	12:02:19
14	you can plug cards into and they're all connected via	12:02:26
15	a bus, and if you only put two cards in, you still	12:02:31
16	have a bus topology, but there are really only two	12:02:33
17	things talking to each other.	12:02:36
18	So essentially, I guess, it ends up being	12:02:37
19	a point-to-point connection only is possible, even	12:02:40
20	though the topology is a bus topology.	12:02:42
21	BY MR. KLEIN:	12:02:45
22	Q. So would you actually consider that a point-to-point	12:02:45

1	topology or would you consider it a bus topology, it	12:02:49
2	just happens to be two devices?	12:02:52
3	MR. LU: Objection. Form.	12:02:53
4	A. I would still consider it to be a bus topology	12:02:55
5	because it's wired that way and it has the ability to	12:02:58
6	take more and more devices, if you should -- should	12:03:00
7	add them.	12:03:03
8	BY MR. KLEIN:	12:03:25
9	Q. All right. Dr. Black, in your, I guess, declaration,	12:03:25
10	you construe a cooperative security fabric as "a	12:03:31
11	topology of network security appliances that cooperate	12:03:36
12	to inspect incoming and outgoing traffic along	12:03:40
13	multiple interconnected paths." Right?	12:03:44
14	And this is paragraph 45 of your report, if	12:03:46
15	I want to double-check me.	12:03:49
16	A. All right. That sounds right from memory, but I'll	12:03:53
17	just look real quick.	12:03:54
18	Q. Yep.	12:03:57
19	A. Okay. I see it. That sounds like -- that's correct,	12:04:09
20	yes.	12:04:13
21	Q. So your construction requires inspecting incoming and	12:04:13
22	outgoing traffic. Right?	12:04:19

1	A.	Right.	12:04:21
2	Q.	What constitutes incoming traffic?	12:04:21
3	A.	In the context of the '825, incoming traffic is	12:04:26
4		traffic that originates from outside of the network;	12:04:30
5		for example, Internet traffic that is arriving to the	12:04:34
6		network.	12:04:37
7	Q.	Okay. Outside -- in your general understanding as a	12:04:37
8		POSITA, what does "incoming" mean? Is that the same	12:04:41
9		thing or does it mean something different?	12:04:44
10		MR. LU: Objection. Vague.	12:04:49
11	A.	I mean, if you just walk up and say the word	12:04:49
12		"incoming," I don't know because there's no context.	12:04:51
13		If you say "incoming to a network," then it -- that	12:04:54
14		is the same thing; it means it's traffic external	12:04:59
15		from the network that's arriving to the network.	12:05:02
16		That's inbound or incoming traffic.	12:05:04
17	BY MR. KLEIN:		12:05:07
18	Q.	And that's all I was getting at. I was trying to see	12:05:07
19		if there's any daylight between the '825 -- your use	12:05:09
20		of "incoming" in your construction and your ordinary	12:05:12
21		use of "incoming" in networking, if there's any	12:05:14
22		daylight or if it's the same thing.	12:05:17

1	A. I just want to be clear that when I say "incoming" in	12:05:20
2	that definition that you read, I'm talking about	12:05:24
3	traffic external from the network arriving to the	12:05:28
4	network and not incoming to some internal component	12:05:31
5	from some endpoint that's also a member of the	12:05:36
6	network. You could say that's incoming to the	12:05:38
7	router, but that's within the network.	12:05:41
8	So I just want to be clear that when I say	12:05:42
9	"incoming," I mean external to the network coming in.	12:05:44
10	Q. Okay. And would VPN traffic coming from a remote site	12:05:47
11	constitute incoming traffic if it's going back to the	12:05:52
12	main enterprise office?	12:05:57
13	A. It would be --	12:06:01
14	MR. LU: Objection.	12:06:03
15	Sorry.	12:06:04
16	Objection. Incomplete hypothetical.	12:06:05
17	A. It would be incoming in a sense where I said it's	12:06:07
18	within the network. Like, you can still talk about	12:06:11
19	incoming packets within a network. So in a sense	12:06:14
20	that a packet is arriving at a VPN node, that is	12:06:18
21	incoming traffic, but it's not incoming in a sense of	12:06:21
22	the definition that you read because it's not	12:06:24

1	something coming from outside the network into the	12:06:27
2	network, it's still within the private network.	12:06:29
3	BY MR. KLEIN:	12:06:32
4	Q. And then your construction requires outgoing traffic.	12:06:34
5	Right?	12:06:38
6	A. Yes.	12:06:39
7	Q. And so what is outgoing traffic?	12:06:40
8	A. Outgoing traffic is the reverse. It's traffic that	12:06:44
9	originates within the private network and is destined	12:06:48
10	to depart, is to go to the outside of the network.	12:06:52
11	Q. So in -- under your construction of a CSF, can a CSF	12:06:56
12	process internal traffic?	12:07:14
13	A. No, at least not in the '825. It doesn't ever	12:07:20
14	process traffic that is strictly internal. It's	12:07:23
15	neither ingoing nor outgoing traffic.	12:07:26
16	Q. And your construction separately requires multiple	12:07:29
17	interconnected paths. Right?	12:07:36
18	A. Right. I'm sort of just importing that from what we	12:07:40
19	talked about with fabric itself, that a CSF has to be	12:07:43
20	a fabric.	12:07:48
21	Q. And like you mentioned, we went through this a little	12:07:48
22	bit before so you don't need to go through the whole	12:07:52

1	testimony again, but can you explain what you mean by	12:07:54
2	"interconnected paths," focusing on the	12:07:57
3	"interconnected" part?	12:07:59
4	A. So you have to have three or more appliances and they	12:08:01
5	all have to be able to communicate with one another.	12:08:06
6	In other words, you couldn't have appliance A	12:08:09
7	connected to B and then completely distinct C	12:08:12
8	connected to D and call that a fabric because there's	12:08:15
9	no interconnection between the A-B network and the	12:08:17
10	C-D network.	12:08:22
11	Q. But then if you drew a line or if you drew a	12:08:23
12	connection, you said you had A-B and C-D, if you drew	12:08:25
13	a line between B and D, a connection between those	12:08:29
14	two, would that now have multiple interconnected	12:08:32
15	paths?	12:08:35
16	MR. LU: Objection. Incomplete	12:08:36
17	hypothetical.	12:08:39
18	A. It would now be interconnected. But to have multiple	12:08:39
19	paths, once again, you would have to have the ability	12:08:42
20	that traffic arrives, let's say, at B and exits at A,	12:08:46
21	but it also might exit at D. Those would be two	12:08:50
22	different paths. Then you would have a fabric.	12:08:53

1	BY MR. KLEIN:	12:08:55
2	Q. So there has to be interconnected paths and multiple	12:08:59
3	paths through the fabric; is that right?	12:09:04
4	A. Interconnected devices and multiple paths. I	12:09:07
5	wouldn't say "interconnected paths." I don't think I	12:09:11
6	understand what that means.	12:09:13
7	Q. Yeah, that's fair. Okay. So interconnected devices	12:09:16
8	and multiple paths.	12:09:18
9	A. Right. Or to be more precise, interconnected	12:09:21
10	appliances and multiple paths.	12:09:24
11	Q. So your construction of CSF is not stated in the	12:09:37
12	claims. Right?	12:09:41
13	A. Those words are not stated in the claims of the '825,	12:09:45
14	no.	12:09:48
15	Q. And your construction is not copied from the	12:09:48
16	specification. Right?	12:09:54
17	A. It's not a verbatim copy. I believe it's embodied in	12:09:56
18	the specification, but it's not a verbatim copy,	12:09:58
19	like, here's the definition set forth and then it's	12:10:03
20	stated in a way that I stated it, no.	12:10:05
21	Q. Well, where does the specification talk about --	12:10:08
22	strike that.	12:10:08

1 Where does the specification say the CSF is 12:10:12
2 limited to inspecting incoming and outgoing traffic? 12:10:15
3 A. I don't think it says that explicitly, but every 12:10:22
4 example, every embodiment, that's what it's doing. 12:10:24
5 It states that is the purpose. It makes sense 12:10:27
6 because the traffic that's originating from the 12:10:29
7 external world, for example, is suspicious, whereas 12:10:32
8 traffic internal to the network is usually not. 12:10:36
9 Q. And where in the specification does it say that you -- 12:10:40
10 that the CSF is limited to multiple interconnected 12:10:46
11 paths? 12:10:48
12 A. Once again, I mean, it's in the narrative. Right? 12:10:56
13 It's saying that as networks get complicated and 12:10:59
14 things could arrive in all kinds of different ways 12:11:03
15 and you don't know the history of a packet when it 12:11:06
16 arrives, you don't know if it's visited some 12:11:08
17 appliance are not, to me, that makes clear that 12:11:12
18 that's the kind of environment we're talking about. 12:11:14
19 We're not talking about a linear 12:11:15
20 processing line where you know the history of 12:11:17
21 everything that arrives because you know it has to 12:11:20
22 have come through point A, then point B, before 12:11:22

1	arriving at you, point C.	12:11:24
2	This is like the Wild West where packets	12:11:27
3	come in from all different directions and you don't	12:11:30
4	know where they've been or what their history is.	12:11:32
5	Q. So there's nothing in the claims that says the	12:11:35
6	property of security fabric is limited to inspecting	12:11:38
7	incoming and outgoing traffic. Right?	12:11:42
8	MR. LU: Objection. Vague.	12:11:44
9	A. I would have to review the claims. I don't recall	12:11:50
10	anything like that in the claims. I'm saying that	12:11:53
11	that's part of what CSF means.	12:11:56
12	BY MR. KLEIN:	12:11:59
13	Q. Based on things you're seeing in the claims or what's	12:11:59
14	in the specification or elsewhere?	12:12:02
15	A. Based on specification and other intrinsic evidence,	12:12:07
16	based on extrinsic evidence that I cite in my	12:12:12
17	declaration and referenced in my declaration, I	12:12:17
18	believe all supports that concept.	12:12:21
19	Q. And the '825 patent does not provide a definition of	12:12:22
20	cooperative security fabric. Right?	12:12:27
21	MR. LU: Objection. Vague.	12:12:32
22	A. It doesn't provide an explicit definition where it	12:12:33

1	says, here is the definition of CSF, and then gives a	12:12:36
2	word-by-word definition.	12:12:39
3	BY MR. KLEIN:	12:12:40
4	Q. Does it provide an implied definition of CSF?	12:12:40
5	A. I believe it does via the narrative description, via	12:12:46
6	the problem it's trying to solve, via its	12:12:50
7	embodiments. In that sense, I think it does.	12:12:54
8	Q. Is there a specific line in the specification you can	12:12:58
9	point me to that says the CSF only inspects incoming	12:13:02
10	and outgoing traffic?	12:13:07
11	MR. LU: Objection. Form.	12:13:15
12	A. I don't think I can point you to a single line. I	12:13:23
13	think you would have to read a few paragraphs and	12:13:50
14	read through the embodiments.	12:13:54
15	BY MR. KLEIN:	12:13:54
16	Q. And can you point me to a specific line that says the	12:13:55
17	CSF is limited to multiple interconnected paths?	12:13:57
18	A. Just to be clear, I'm looking at the patent right	12:14:16
19	now.	12:14:19
20	Q. Okay.	12:14:19
21	A. I mean, I'm looking now at column 1, line 33-34 of	12:14:45
22	the '825. "Network traffic transmitted to/from the	12:15:12

1	network may go through multiple network security	12:15:15
2	appliances along a path within the network."	12:15:17
3	That doesn't explicitly say what you asked	12:15:24
4	me for, but I think there's an implication in that	12:15:26
5	sentence, as well as many other sentences in the	12:15:29
6	specification.	12:15:32
7	Q. That's in the Background of the art. Right?	12:15:33
8	A. Right.	12:15:38
9	Q. Any other --	12:15:38
10	A. The '825 is not inventing fabrics. Right? So it's	12:15:39
11	just saying you can have multiple paths through a	12:15:43
12	network when you have a bunch of appliances.	12:15:45
13	Q. Any other statements you can point me to to support	12:15:47
14	the fact that the CSF is limited to multiple	12:15:52
15	interconnected paths?	12:15:55
16	A. So Figure 2 of the '825, which I also reproduced in	12:16:39
17	my declaration, shows a -- an arrangement, this is a	12:16:43
18	tree topology, of network security appliances, and	12:16:50
19	the description of this figure in the patent talks	12:16:56
20	about how traffic could arrive at the root and then	12:16:59
21	exit via different paths at the various leafs.	12:17:03
22	So it's giving an example there of multiple	12:17:09

1	paths through the topology.	12:17:12
2	Q. Is Figure 2 describing the invention or an exemplary	12:17:13
3	embodiment?	12:17:17
4	A. I would have to check. I think it's an embodiment,	12:17:19
5	though.	12:17:21
6	Q. Is there anyplace in the '825 patent that describes	12:17:23
7	the invention as being limited to multiple	12:17:26
8	interconnected paths?	12:17:28
9	A. So if we look at column 2 -- and again, this is	12:17:53
10	Background -- line 10, column 2, it talks about if	12:17:57
11	the incoming network traffic is from the second	12:18:09
12	network security appliance, then something happens.	12:18:13
13	And if it's not, then something else happens.	12:18:18
14	So it's contemplating the idea that traffic	12:18:20
15	may come via a second appliance and it may not. And,	12:18:24
16	in fact, in the claim, in Claim 1, there's a	12:18:29
17	determination as to whether that happened or didn't	12:18:31
18	happen, which I believe to a POSITA would imply that	12:18:34
19	there are different paths by which traffic could	12:18:37
20	arrive because you just don't know if it went through	12:18:39
21	the second network security appliance or not, which is	12:18:41
22	why we have flags.	12:18:45

1 Q. Now, does that have -- does that path have to be from 12:18:46
2 a network security appliance or could it be a path 12:18:50
3 from the Internet? 12:18:52
4 MR. LU: Objection. Vague. 12:18:56
5 A. If you are the root node, then traffic could be 12:18:57
6 arriving from the Internet. If you are an internal 12:19:02
7 node, then it couldn't be. I mean, not directly at 12:19:05
8 least. 12:19:08
9 BY MR. KLEIN: 12:19:08
10 Q. So in this line you're talking about in column 2 where 12:19:10
11 you have the two network security appliances, it's 12:19:14
12 only -- the excerpt is only describing two network 12:19:19
13 security appliances. Right? 12:19:22
14 A. It's talking about two among, presumably, many, but 12:19:23
15 it's focusing on two of them in that sentence. 12:19:26
16 Q. And it's talking about a -- potentially coordinating 12:19:29
17 actions between those two security appliances. Right? 12:19:32
18 A. Right. 12:19:37
19 Q. Now, in your requirement that there's multiple 12:19:37
20 interconnected paths, would it count if one of the 12:19:40
21 network appliances has a path where it can receive 12:19:46
22 communications from the other network appliance in the 12:19:49

1	Internet? Does that constitute multiple connected	12:19:55
2	paths?	12:19:57
3	MR. LU: Objection. Vague.	12:20:02
4	A. I'm not sure I understand your question. Maybe you	12:20:10
5	could try me one more time. Sorry.	12:20:15
6	BY MR. KLEIN:	12:20:17
7	Q. So you have the two network security appliances,	12:20:17
8	right, that say A and B, and A can get traffic from	12:20:20
9	the network appliance B, or A can get traffic from the	12:20:25
10	Internet. Does that have multiple interconnected	12:20:31
11	paths?	12:20:39
12	A. So it sounds like our topology now is just	12:20:40
13	point-to-point, A and B. Now maybe we're imagining	12:20:44
14	there are other appliances as well, but we're just	12:20:48
15	focusing on those paths. I would say that if the	12:20:53
16	only possible traffic is into A and to B and out, or	12:20:59
17	into B through A and out, and those are the only	12:21:05
18	paths we're talking about, that's not multiple paths,	12:21:07
19	that's a single path.	12:21:10
20	But if in this -- there's another appliance	12:21:12
21	C, and traffic could go from A to C as well and then	12:21:16
22	out, now you have multiple paths. But just A and B	12:21:21

1	alone, if that's the only path that's possible, then	12:21:24
2	that's a single path.	12:21:27
3	Q. So what about, you have A and B, and you have a path	12:21:28
4	where traffic can go from B to A out or traffic can go	12:21:32
5	from Internet to A to out.	12:21:39
6	MR. LU: Objection. Vague.	12:21:47
7	A. You still don't have multiple paths in your CSF.	12:21:51
8	Right? The CSF is A and B and that's it. So it's	12:21:55
9	not a CSF. I shouldn't call it that.	12:22:00
10	If you're only -- the appliances, ignoring	12:22:03
11	the Internet and the endpoints, but the actual	12:22:08
12	security fabric you're trying to build, but you only	12:22:11
13	have A and B and there's only a single path between	12:22:13
14	them, that's not a CSF, there aren't multiple paths.	12:22:16
15	BY MR. KLEIN:	12:22:27
16	Q. Okay. And then turning back to your construction, is	12:22:28
17	there a line -- again, kind of returning back to the	12:22:44
18	prior line of questioning -- someplace you can point	12:22:47
19	me to in this spec where the '825 describes the	12:22:49
20	invention as having multiple interconnected paths?	12:22:52
21	A. Only in the sense that it describes the vision as a	12:23:05
22	fabric. And I believe, based on the Background and	12:23:08

1	just what a POSITA would understand, the fabric needs	12:23:11
2	to have multiple interconnected paths.	12:23:15
3	Q. So there's no line in the '825 patent that says a	12:23:18
4	fabric has multiple interconnected paths, you're	12:23:24
5	getting to that based on your understanding of what a	12:23:26
6	fabric is.	12:23:30
7	MR. LU: Objection. Mischaracterizes	12:23:32
8	testimony.	12:23:35
9	A. My understanding, what I believe a POSITA would	12:23:36
10	understand and what is given in the Background	12:23:41
11	section, which I believe is intended to be general	12:23:44
12	information and not specific to any embodiment.	12:23:46
13	BY MR. KLEIN:	12:23:48
14	Q. And do you contend that the patentee defined the term	12:23:51
15	"CSF" during prosecution of the patent?	12:23:54
16	MR. LU: Objection. Form.	12:24:00
17	A. I did review the prosecution history, but I didn't	12:24:04
18	review it before today's deposition, so I don't	12:24:07
19	recall if there was any back and forth around that	12:24:10
20	term or any definition given in the prosecution	12:24:12
21	history.	12:24:16
22	BY MR. KLEIN:	12:24:17

1	Q.	Are you familiar with the concept of a disavowal for	12:24:17
2		claim construction purposes?	12:24:21
3	A.	Generally. Of course I don't have a legal background	12:24:26
4		and I know it's a legal term, but I understand the	12:24:28
5		general term.	12:24:30
6	Q.	Are you arguing that there's -- there was a disavowal	12:24:31
7		of claim scope related to the term CSF?	12:24:35
8		MR. LU: Objection. The document speaks	12:24:40
9		for itself.	12:24:43
10	A.	I don't have anything in my declaration that contends	12:24:44
11		there was some disavowal.	12:24:47
12	BY MR. KLEIN:		12:24:49
13	Q.	It's your testimony that your interpretation of "CSF"	12:24:49
14		is the plain and ordinary meaning of that term.	12:24:52
15		Right?	12:24:54
16	A.	That is my view of what a POSITA would understand the	12:24:58
17		plain and ordinary meaning in view of the intrinsic	12:25:01
18		and extrinsic evidence at the time.	12:25:03
19		MR. KLEIN: All right. I'm at a good	12:25:06
20		stopping point. Why don't we take a ten-minute break.	12:25:24
21		Does that work?	12:25:27
22		THE WITNESS: Works for me.	12:25:28

1	MR. KLEIN: Okay.	12:25:29
2	MR. LU: Sounds good.	12:25:29
3	(Off the record at 12:25 p.m.)	12:25:35
4	(Back on the record at 12:38 p.m.)	12:38:43
5	BY MR. KLEIN:	12:38:43
6	Q. Dr. Black, before the break we were talking about how	12:38:46
7	your construction has these two limitations; that's	12:38:51
8	one, inspecting incoming and outgoing traffic, and,	12:38:53
9	two, multiple interconnected paths. Right?	12:38:56
10	A. Correct.	12:38:59
11	Q. I want to try to see where in the term CSF you're	12:39:01
12	pulling those limitations. So let's start with	12:39:05
13	inspecting incoming and outgoing traffic. Okay?	12:39:09
14	A. Okay.	12:39:14
15	Q. Is that limitation found in "cooperative" in CSF?	12:39:16
16	A. You're saying --	12:39:24
17	MR. LU: Objection. Vague.	12:39:24
18	A. You're asking me to break CSF into its three	12:39:25
19	constituent words and then find every requirement	12:39:29
20	within each word?	12:39:35
21	BY MR. KLEIN:	12:39:38
22	Q. Yeah. Well, I want to know where you're getting these	12:39:39

1	limitations from. If it's from a specific word in	12:39:41
2	"cooperative security fabric," for example, where are	12:39:45
3	you getting the limitation inspecting incoming and	12:39:49
4	outgoing traffic from?	12:39:52
5	A. Yeah, so --	12:39:55
6	MR. LU: Objection. The document speaks	12:39:55
7	for itself.	12:39:57
8	A. So I'm not focusing on a single word to find that	12:39:58
9	requirement, or what I believe a POSITA would view is	12:40:06
10	a requirement for CSF. I'm looking at the evidence,	12:40:08
11	both intrinsic and extrinsic evidence. And looking	12:40:11
12	at that cooperative security fabric as a term, a	12:40:14
13	three-word term, but not necessarily focusing on	12:40:20
14	where everything could be found within a single word.	12:40:23
15	BY MR. KLEIN:	12:40:27
16	Q. So you're not opining that the limitation, inspecting	12:40:28
17	incoming and outgoing traffic, is found within	12:40:32
18	"cooperative" or "security" or "fabric" individually.	12:40:36
19	Right?	12:40:40
20	A. Correct.	12:40:43
21	Q. And why are you not understanding cooperative security	12:40:45
22	fabric via each individual word in the phrase?	12:40:51

1	MR. LU: Objection. The document speaks	12:40:57
2	for itself.	12:40:59
3	A. Because I don't think that the concept, the invention	12:41:01
4	of the cooperative security fabric by Fortinet, was	12:41:06
5	simply taking the concepts embodied by each of the	12:41:13
6	three words and gluing them together. I think	12:41:17
7	it's -- it's a name of a set of features that include	12:41:19
8	certain requirements, but that you can't pack	12:41:24
9	everything that the CSF is into a three-word phrase	12:41:28
10	that would capture exactly what it is, what it does.	12:41:32
11	I mean, it's a fair attempt to capture sort	12:41:37
12	of a high-level objective of what it is, but it's not	12:41:41
13	completely descriptive of everything that it	12:41:46
14	encompasses.	12:41:49
15	Q. So you submitted a prior declaration in these	12:41:50
16	proceedings. Right?	12:41:56
17	A. Yes.	12:41:58
18	Q. And in that prior declaration you proposed a	12:41:59
19	construction of the term "fabric." Right?	12:42:04
20	A. I honestly didn't review that declaration before	12:42:09
21	today, so I would have to go and look at it to	12:42:12
22	recall.	12:42:16

1	Q.	You can feel free to pull it up. It is Exhibit 2001.	12:42:16
2	A.	Okay, I have it pulled up.	12:42:47
3	Q.	And you can turn to page 15.	12:42:50
4	A.	Okay. I'm there.	12:43:03
5	Q.	And in this section -- and you can feel free to skim	12:43:05
6		it, if you want -- you're offering what you think is	12:43:09
7		the plain and ordinary meaning of just the term	12:43:12
8		"fabric." Right?	12:43:13
9	A.	I see the term quoted at the top of the page, but	12:43:15
10		it's -- the page is long. But, again, it's been a	12:43:20
11		while since I looked at this document. I don't	12:43:24
12		recall if I give a definition here.	12:43:27
13	Q.	But the point is that, in this declaration you focus	12:43:31
14		in on just the term "fabric" and offer what the	12:43:36
15		meaning of that term is; you don't offer the meaning	12:43:38
16		of the entire phrase "cooperative security fabric."	12:43:42
17		Right?	12:43:45
18		MR. LU: Objection. The document speaks	12:43:51
19		for itself.	12:43:53
20	A.	If it's okay, I'll take a minute just to look through	12:43:56
21		it.	12:44:06
22	BY MR. KLEIN:		12:44:07

1 Q. Sure. 12:44:07

2 A. So I agree that the section that we were talking 12:44:43

3 about, beginning on page 15, is focused solely on the 12:44:45

4 word "fabric." There is some discussion of 12:44:48

5 cooperative security fabric as well within that, but 12:44:50

6 there's no separate heading entitled cooperative 12:44:54

7 security fabric where I focus on the full phrase. 12:44:57

8 Q. Okay. Now, your limitation of multiple interconnected 12:45:01

9 paths, are you telling me that that does not come from 12:45:05

10 just the term "fabric," but it comes from your 12:45:08

11 understanding of the CSF phrase as a whole? 12:45:11

12 A. No. I think earlier today I said that -- when we 12:45:17

13 discussed "fabric" generally by itself, that it 12:45:22

14 should require multiple interconnected paths. 12:45:26

15 Q. Okay. So I'm confused because I'm trying to figure 12:45:32

16 out if your construction of "cooperative security 12:45:35

17 fabric" is derived from each individual term in that 12:45:40

18 phrase or the phrase as a whole. 12:45:42

19 And before it sounded like you said the 12:45:46

20 phrase as a whole, but now it sounds like you're 12:45:48

21 telling me you're getting limitations from certain 12:45:50

22 words in that phrase. Right? 12:45:54

1	MR. LU: Objection. Mischaracterizes his	12:45:57
2	testimony.	12:45:58
3	A. So I would say that how a POSITA would understand the	12:46:00
4	phrase as a whole isn't embodied in understanding	12:46:06
5	each word and then concatenating those understandings	12:46:10
6	into a single definition.	12:46:13
7	When I say that a cooperative security	12:46:19
8	fabric is a fabric, I'm not saying that that's true	12:46:20
9	because the word "fabric" appears, and I'm -- I'm	12:46:24
10	going down to that third word "fabric" and importing	12:46:28
11	the definition into the overall CSF definition. I'm	12:46:33
12	saying the cooperative security fabric is a fabric	12:46:37
13	because Fortinet says it is a fabric, not because the	12:46:40
14	word appears.	12:46:45
15	So I'm not doing this sort of like	12:46:45
16	distillation down to its component words and then	12:46:46
17	analyzing each word. I'm just saying, a CSF is a	12:46:49
18	fabric, as well as all these other things that it is.	12:46:52
19	BY MR. KLEIN:	12:46:58
20	Q. Where does the '825 patent discuss fabric outside of a	12:46:59
21	cooperative security fabric?	12:47:04
22	A. I believe, again, in the background they're talking	12:47:09

1 about a fabric when they talk about packets receiving 12:47:11
2 from -- in various directions and you don't know what 12:47:16
3 path they took. 12:47:18
4 Q. But where does the '825 patent talk about the 12:47:19
5 invention as it relates to a fabric as opposed to a 12:47:22
6 cooperative security fabric? 12:47:30
7 A. I'm not sure I understand the question. 12:47:36
8 Q. So you were talking about the patent uses the term 12:47:40
9 "fabric" in the background. Right? 12:47:43
10 A. I don't think I said that. In fact, I'm not sure it 12:47:46
11 does. I think it's talking about a fabric, but I 12:47:48
12 don't think it necessarily uses the term in the 12:47:51
13 Background section. We can check, but -- 12:47:53
14 Q. And we can check. Where does the '825 patent use the 12:47:56
15 term "fabric" separate from "cooperative security 12:47:59
16 fabric"? 12:48:04
17 A. I just went through the 25 instances that I could 12:48:43
18 find of the word "fabric" and I think in every 12:48:47
19 instance it's always part of that three-word 12:48:49
20 "cooperative security fabric" term. 12:48:52
21 Q. Now, your interpretation of the term "fabric," is that 12:48:54
22 based on how Fortinet has used that term or how it's 12:49:02

1	been used in the industry?	12:49:07
2	A. "Fabric" alone, I gave some evidence that --	12:49:11
3	intrinsic evidence about how it's used generally, not	12:49:15
4	simply within that compound phrasing or within	12:49:18
5	Fortinet's use of the term, but rather other people's	12:49:22
6	use as well.	12:49:25
7	Q. So Fortinet did not define the term "fabric."	12:49:26
8	A. Absolutely not, no.	12:49:30
9	Q. And they didn't come up with the term "fabric"?	12:49:31
10	A. I believe it was used before they existed.	12:49:34
11	Q. When do you think the term "fabric" started being	12:49:38
12	used? And you don't have to give me exact years	12:49:41
13	because I know it can be hard to pinpoint.	12:49:43
14	A. It may have risen even in the '70s or '80s in the	12:49:48
15	telephone space because telephone networks have a lot	12:49:52
16	of multiple paths and interconnected nodes. But to	12:49:54
17	my awareness, it wasn't until around the early 2000s	12:50:00
18	that it came into common use in the computer	12:50:04
19	networking area.	12:50:07
20	Q. Is -- did a fabric topology ever become the go-to	12:50:08
21	network topology for larger enterprises?	12:50:16
22	MR. LU: Objection. Vague. Beyond the	12:50:23

1	scope.	12:50:25
2	A. To the extent that the larger enterprises have lots	12:50:32
3	of computer usage, which most do these days, and a	12:50:36
4	data center, then every data center I've ever seen	12:50:42
5	has a fabric topology implemented within it, in the	12:50:46
6	same way that the patent is talking about.	12:50:49
7	BY MR. KLEIN:	12:50:52
8	Q. So when did the fabric topology start gaining	12:50:53
9	widespread use in computer networks?	12:50:57
10	MR. LU: Objection. Beyond the scope.	12:51:01
11	A. As demand increased, the number of computers in an	12:51:04
12	enterprise increased, bandwidth demands increased	12:51:13
13	because we're sending larger documents and maybe even	12:51:16
14	doing video streaming, conference calls, things like	12:51:19
15	that. Then the robustness, redundancy, because you	12:51:22
16	can have failover, you have multiple paths, increased	12:51:29
17	bandwidth because you can now send more stuff over	12:51:34
18	different paths through the same place.	12:51:39
19	So as those kinds of demands, redundancy,	12:51:40
20	increased bandwidth, increased performance,	12:51:43
21	reliability, as those increased, enterprises started	12:51:46
22	moving toward fabric topologies because of the	12:51:50

1	advantages that they offer.	12:51:56
2	BY MR. KLEIN:	12:51:56
3	Q. When was that, roughly? Was that around the 2000s?	12:51:57
4	A. I mean, of course it was a gradual thing. Right? So	12:52:02
5	the biggest companies with the highest demands	12:52:04
6	probably were the early adopters of this kind of	12:52:06
7	topology, and now, you know, in 2024, even modest	12:52:09
8	enterprises are going to use it. So there was a	12:52:14
9	gradual adoption of this idea for decades.	12:52:16
10	Q. And when did --	12:52:22
11	A. It started -- early 2000s is probably when it really	12:52:23
12	gained steam.	12:52:26
13	Q. Okay. So is it your opinion that Fortinet did not	12:52:27
14	invent the term "cooperative" or "security" or	12:52:54
15	"fabric," but it invented the phrase "cooperative	12:52:59
16	security fabric"?	12:53:04
17	MR. LU: Objection to form.	12:53:07
18	A. Certainly they didn't invent any of the individual	12:53:09
19	words. To my knowledge, and through the searching	12:53:12
20	that I describe in my declaration, I think they're	12:53:17
21	the inventor of that three-word phrase, and I think,	12:53:21
22	to date, are still the only people who use it. I've	12:53:24

1	never seen it used by anyone else.	12:53:27
2	BY MR. KLEIN:	12:53:30
3	Q. So in the -- strike that.	12:53:33
4	You've read the Board's institution	12:53:36
5	decision. Correct?	12:53:39
6	A. Yes.	12:53:40
7	Q. And the Board, in the institution decision, provided a	12:53:41
8	construction of "fabric." Right?	12:53:45
9	A. They did.	12:53:48
10	Q. And the Board's construction of a "fabric" is a	12:53:48
11	"Network topology such as the physical structure of a	12:53:53
12	switch or a network." Correct?	12:53:57
13	A. Yes.	12:53:59
14	Q. And you disagree with the Board's construction of	12:54:00
15	"fabric." Right?	12:54:10
16	A. I mean, it's unfortunately just scientifically	12:54:10
17	problematic. You can't have a network topology	12:54:13
18	inside of a switch, so they're talking about	12:54:16
19	switching fabric and network fabrics together.	12:54:18
20	It actually doesn't make sense the way	12:54:21
21	it's written so I have, you know, a problem there.	12:54:22
22	But I also, as I said in my declaration, think that	12:54:25

1	-- that it's also too broad.	12:54:31
2	Q. So the answer to my question is, yes, you disagree	12:54:37
3	with the words "construction of fabric"?	12:54:39
4	A. In a couple of ways, as I just described, yes.	12:54:41
5	Q. And you think a fabric cannot just be a network	12:54:43
6	topology. Correct?	12:54:46
7	A. Right. So a fabric is used in other ways other than	12:54:49
8	networking topologies. It's used inside of a switch,	12:54:52
9	which is a physical box. There's an interweaving of	12:54:56
10	wires, that's called the switching fabric. And they	12:55:00
11	sort of -- they said a "Network topology such as,"	12:55:04
12	and then they included a switch, which is not a	12:55:07
13	network topology, it's a separate kind of fabric that	12:55:10
14	has nothing to do with network topologies. So that's	12:55:13
15	just a technical problem with the construction.	12:55:15
16	Q. Okay. Sorry. I didn't -- I didn't follow that	12:55:35
17	completely.	12:55:38
18	So you're saying that the problem with the	12:55:38
19	network topology, as stated in the Board's	12:55:40
20	construction, is what?	12:55:44
21	MR. LU: Objection. Mischaracterizes	12:55:47
22	testimony.	12:55:51

1 A. So there's this thing called a switch, a network 12:55:51
2 switch, and it has a bunch of wires coming in and 12:55:54
3 wires going out and it has, internally, a bunch of 12:55:58
4 interconnections that's called the switching fabric. 12:56:01
5 That's not a network, that's just part of what makes 12:56:04
6 up this box. And we use this term all the time when 12:56:06
7 we talk about switches because, again, it kind of 12:56:09
8 harkens to this idea of interwoven connections. 12:56:13

9 So people in the network space, Cisco and 12:56:16
10 people in that area, will talk about the switching 12:56:19
11 fabric, so that's a common use of the word "fabric." 12:56:21
12 But it's not a network topology. 12:56:25

13 Now, what you and I have been talking 12:56:27
14 about all day when we say "fabric," we're talking 12:56:29
15 about network topologies, how networks are built and 12:56:32
16 interconnected. "Fabric" is used in both of those 12:56:35
17 contexts. 12:56:38

18 The Board starts out by saying it's "A 12:56:39
19 network topology such as that found in a switch." 12:56:42
20 That doesn't make sense. There's no network topology 12:56:46
21 in a switch. The network topology is only found in 12:56:50
22 networks. 12:56:52

1	Q. So a switching fabric, as you just mentioned, is not	12:56:55
2	the "fabric" as described in the '825 patent?	12:57:00
3	A. Right. And it's not a network topology either.	12:57:03
4	Q. All right. So you think -- so in your opinion there's	12:57:07
5	a difference between a fabric in the broad sense and a	12:57:24
6	fabric topology. Right?	12:57:28
7	MR. LU: Objection. Mischaracterizes	12:57:30
8	testimony.	12:57:34
9	A. I think "fabric" can be applied to a bunch of	12:57:34
10	different areas, including switches and network	12:57:37
11	topologies, and those are distinct things. And so	12:57:41
12	you can't say a network topology and then refer to a	12:57:44
13	switch. That makes no sense.	12:57:47
14	BY MR. KLEIN:	12:57:49
15	Q. All right. Okay. So you're agreeing that the --	12:57:52
16	there's a difference between "fabric" and "fabric	12:57:54
17	topology" and in the sense that "fabric" is just a	12:57:57
18	broader term and a part of that can be a "fabric	12:57:59
19	topology," but there are other aspects of "fabric" in	12:58:05
20	the general sense?	12:58:07
21	A. There are other contexts where that term is used that	12:58:08
22	have nothing to do with network topologies. So we've	12:58:11

1 got "fabric," which is this broad concept of a bunch 12:58:18
2 of connections, interconnections, and then we have, 12:58:22
3 as a subset of that use, is network topologies; you 12:58:26
4 can have a network fabric topology. 12:58:32

5 But you can also have a separate use of 12:58:35
6 "fabric" outside of network topologies altogether, 12:58:37
7 and it wouldn't make sense to use the second kind and 12:58:40
8 describe it as a network topology because it's not. 12:58:45
9 It's a separate use of the word in a different 12:58:47
10 context that is not a network. 12:58:49

11 Q. Okay. 12:58:52

12 A. Maybe I can -- I can make it clearer by saying -- you 12:59:08
13 know, if I define a "fabric" is a network topology 12:59:12
14 such as those found in pants. 12:59:15

15 Q. In pants? 12:59:20

16 A. Because fabrics -- you know, pants are made by 12:59:21
17 fabric. Right? So if I define "fabric" by saying 12:59:24
18 it's something pants are made out of, that that's 12:59:27
19 fine. It's a type of topology. That's fine. But if 12:59:30
20 I say it's a topology found in pants, that doesn't 12:59:34
21 make sense. 12:59:36

22 Q. And so in your opinion, "fabric," as used in CSF, is 12:59:45

1	referring to the fabric topology, not "fabric" in the	12:59:47
2	broad sense?	12:59:53
3	MR. LU: Objection. Mischaracterizes	12:59:53
4	testimony.	12:59:56
5	A. Right. So the word "fabric," as it's used in CSF, is	12:59:56
6	referring to a network topology that would be a	12:59:59
7	fabric.	13:00:03
8	BY MR. KLEIN:	13:00:16
9	Q. So I just want to make sure I get this. So we --	13:00:38
10	let's say we have two nodes, we have A and B, like	13:00:40
11	we've been using throughout the examination today, and	13:00:44
12	between those two nodes we have different paths a	13:00:54
13	packet could take to get from A to B. You know, it's	13:00:57
14	over the Internet, there's a bunch of different hops	13:01:00
15	and network switches. Would that be a fabric but not	13:01:03
16	a fabric topology?	13:01:08
17	MR. LU: Objection. Vague.	13:01:17
18	A. I mean, it sounds like we're establishing the context	13:01:18
19	of that question as networking because you're talking	13:01:28
20	about, in both cases, networks. So when you say "a	13:01:33
21	fabric," I'm going to hear that word used in the	13:01:36
22	context of a network and I'm going to think, he must	13:01:38

1	mean topology.	13:01:41
2	So I don't distinguish between a fabric	13:01:43
3	and a fabric topology in that question. They're the	13:01:47
4	same thing. They mean the same thing.	13:01:50
5	And I want to be careful to say also that	13:01:54
6	the way you described it, I'm not sure it constitutes	13:01:56
7	a fabric as we've been talking about all day because	13:01:59
8	you've only described two nodes.	13:02:01
9	BY MR. KLEIN:	13:02:06
10	Q. So a couple of things I want to unpack. The first is	13:02:06
11	that I know we talked about "fabric" being a more	13:02:11
12	general term as opposed to a fabric topology. Right?	13:02:13
13	A. Right. Because there's a switching fabric, for	13:02:17
14	example.	13:02:19
15	Q. Now, in networking, in that context, is there only one	13:02:19
16	use of the term "fabric," and that's a fabric	13:02:25
17	topology?	13:02:29
18	MR. LU: Objection. Vague.	13:02:32
19	A. I mean, somebody might say, well, a switching fabric	13:02:35
20	is still the networking domain. A switch is a	13:02:39
21	network -- you know, networking equipment, Cisco	13:02:42
22	makes them, they're a networking company. So you	13:02:45

1 would have to be clear when you use the term "fabric" 13:02:47

2 that we're talking about topologies and not something 13:02:49

3 else. 13:02:52

4 BY MR. KLEIN: 13:02:55

5 Q. Okay. So I just want to make sure we're clear. So 13:02:55

6 "fabric" as used in networking, that context, can have 13:02:58

7 different meanings? 13:03:02

8 A. Yeah, unless you make it clear we're talking about, 13:03:04

9 you know, interconnections of computers, which would 13:03:07

10 be a topology. You might be talking about, like I 13:03:09

11 said, a switching fabric which is, again, in the 13:03:13

12 domain of networking still but it's a separate topic. 13:03:15

13 Q. Can "fabric" refer to the physical connections of a 13:03:18

14 network; meaning, the wires going between all of the 13:03:23

15 computers in a network? 13:03:27

16 A. Certainly, yeah, you could talk about the fabric of 13:03:33

17 the network being the physical connections, as you 13:03:36

18 described. 13:03:41

19 Q. So then -- I want to return to the hypothetical where 13:03:42

20 you have the two different nodes, A and B, and we have 13:03:59

21 different pathways a packet can travel between the two 13:04:05

22 because there's different switchers and routers and 13:04:08

1	hops. Okay?	13:04:11
2	So I think you had said that that would not	13:04:13
3	be a fabric in the networking sense. Right?	13:04:15
4	A. I'm sorry, are you saying there's a network with only	13:04:22
5	two nodes, A and B, or there's a network with lots of	13:04:24
6	other components and nodes within the network as	13:04:27
7	well?	13:04:32
8	Q. Just the two nodes, A and B, but there's different	13:04:32
9	switches and gateways and routers, so a packet can	13:04:35
10	travel a different path between A and B.	13:04:38
11	A. So that means the network is actually comprised of	13:04:41
12	more than just A and B because you have all those	13:04:45
13	other components as well where packets can visit	13:04:48
14	other nodes in the network before arriving at A or B.	13:04:51
15	Q. Okay. So -- then, yes, it -- would that be a fabric?	13:04:56
16	A. If our network is A and B, as well as other nodes as	13:05:04
17	you've described, and if packets can take different	13:05:11
18	paths, so they can go from A to a router to B and	13:05:15
19	out, they could go from A directly to B and out, then	13:05:21
20	those would be multiple paths through the network.	13:05:25
21	The network would have at least three nodes because	13:05:27
22	it has the router, as well, and they're	13:05:30

1	interconnected. So that would meet what I described	13:05:34
2	as a "fabric" earlier.	13:05:36
3	Q. And I'm just thinking of, really, the Internet. So if	13:05:37
4	I'm the source, I'm node A, and I'm sending a packet	13:05:41
5	over the Internet to the destination node B, the	13:05:44
6	packet in a packet switch network is going to go	13:05:47
7	through a bunch of intermediate devices. Right?	13:05:51
8	A. Correct.	13:05:54
9	Q. Would that be a fabric topology?	13:05:54
10	MR. LU: Objection. Vague.	13:06:03
11	A. I mean, I think that most people would say that the	13:06:07
12	Internet as a whole is a fabric topology.	13:06:10
13	BY MR. KLEIN:	13:06:22
14	Q. So if we take that hypothetical we just talked about	13:07:23
15	and expand it a little bit where we have a third node,	13:07:26
16	C, and then there's, of course, intermediate routers	13:07:29
17	and switches between B and C, so we have a line, would	13:07:35
18	that be a fabric topology?	13:07:40
19	MR. LU: Objection. Vague. Incomplete	13:07:44
20	hypothetical.	13:07:48
21	A. If we have A, B, and C, and it sounds like they're	13:07:48
22	all interconnected, as long as packets can take	13:07:54

1	multiple paths, arrive at A, exit B, let's say, or	13:07:56
2	arrive at B and exit C, then we have a fabric.	13:08:00
3	BY MR. KLEIN:	13:08:03
4	Q. So if we've got A, B, and C in a line, and a packet	13:08:04
5	can enter A and exit B or enter A and exit C, that	13:08:09
6	would be a fabric?	13:08:14
7	A. Those would be multiple paths. You have three	13:08:17
8	computers and they're interconnected, so, yes.	13:08:19
9	Q. And then if we have that same setup and a packet can	13:08:23
10	enter A and exit C or enter B and exit C, would that	13:08:28
11	be a fabric too?	13:08:35
12	A. Yes.	13:08:37
13	Q. So if -- you testified earlier, and you can correct me	13:08:37
14	if I'm wrong, that the CSF does not process internal	13:09:05
15	traffic. Right?	13:09:11
16	A. Correct.	13:09:14
17	Q. Doesn't that seem a little bit silly that you wouldn't	13:09:15
18	be using the CSF infrastructure to process traffic,	13:09:19
19	let's say, between departments from marketing to	13:09:23
20	finance?	13:09:26
21	A. Often in security, you know, we have this sort of	13:09:30
22	mindset that internal traffic is of a different kind	13:09:32

1	than external traffic because once it's gotten into	13:09:37
2	the network it's gained some level of trust that's	13:09:41
3	generated by finance and sent to marketing. What	13:09:44
4	arrives at marketing isn't treated the same way as it	13:09:47
5	arrived from the Internet to marketing because we	13:09:51
6	view the Internet as this wild, dangerous place with	13:09:54
7	all kinds of bad stuff. And people in finance, we	13:09:58
8	trust them more.	13:10:00
9	And so you have -- go ahead.	13:10:01
10	Q. Go ahead. Go ahead.	13:10:03
11	A. You may have very different security profile for	13:10:05
12	internal traffic where you think, you know, you know	13:10:10
13	and trust these people, they work with you, they're	13:10:13
14	part of your company, versus something that's coming	13:10:15
15	from the outside world.	13:10:17
16	Q. So if I'm in marketing and I happen to get a file	13:10:18
17	that's a virus or I find a link to a spam website on	13:10:27
18	the Internet and I send that off to the people in the	13:10:31
19	finance department, you're telling me that would not	13:10:33
20	get processed through the CSF to look for viruses or	13:10:35
21	spam or any sort of malware?	13:10:40
22	MR. LU: Objection. Incomplete	13:10:43

1	hypothetical.	13:10:44
2	A. The way the CSF is designed is it's supposed to catch	13:10:44
3	that as it enters the network from the outside. So	13:10:49
4	as the marketing person downloaded the virus, that's	13:10:53
5	where all the scanning and testing and so forth is	13:10:56
6	done, but it's not done a second time when somebody	13:10:58
7	sends it from marketing to finance.	13:11:01
8	Ostensibly, if it got through the filter on	13:11:03
9	the way in, it's not going to be caught when you do	13:11:06
10	the same steps again internally.	13:11:09
11	BY MR. KLEIN:	13:11:11
12	Q. So in Figure 2 in the '825 patent, where does it show	13:11:11
13	that the virus or the files would be scanned on their	13:11:18
14	way into the marketing department?	13:11:21
15	MR. LU: Objection. Vague.	13:11:28
16	A. In Figure 2 of the '825, we're talking here?	13:11:33
17	BY MR. KLEIN:	13:11:38
18	Q. Correct.	13:11:39
19	A. So the patent describes the root node as the node	13:11:39
20	that's connected to the Internet, so external traffic	13:11:42
21	is going to arrive at the root node. And then the	13:11:45
22	patent talks about how some various checks -- you	13:11:47

1 know, IDS, which stands for intrusion detection 13:11:51

2 system, virus scanning, whatever other security 13:11:54

3 measures are taken, sandboxing, and so forth, could 13:11:58

4 be done there or could be done at other nodes. 13:12:02

5 And that's the whole idea with setting a 13:12:06

6 flag when you've done some checks, and that way 13:12:09

7 downstream nodes can know, oh, he already checked 13:12:11

8 that but he didn't check this and I want to check 13:12:14

9 something extra, but I don't want to redundantly 13:12:17

10 perform the same operation. So the patent describes 13:12:20

11 how those checks are performed between the initial 13:12:22

12 traffic entering at the root and then finally exiting 13:12:26

13 the CSF at a leaf. 13:12:29

14 Q. So if a bad actor is at subnet 141c and wants to send 13:12:33

15 a virus out to the internal network, let's say he -- 13:12:42

16 A. I'm sorry? I'm sorry, we're not -- what figure are 13:12:46

17 we on? 13:12:49

18 Q. Oh, sorry, I was looking at Figure 1. 13:12:50

19 A. Gotcha. 13:12:53

20 Q. So if some -- if a bad actor is at subnet 141c in 13:12:53

21 Figure 1 and wants to send out a virus to somebody in 13:12:58

22 marketing, let's say, in 141a, that would not get 13:13:03

1	processed through the CSF unless it came from the	13:13:08
2	Internet?	13:13:13
3	MR. LU: Objection. Vague. Incomplete	13:13:14
4	hypothetical.	13:13:19
5	A. Right. So the CSF is not directed toward finding	13:13:19
6	insider attacks. We typically call that an insider	13:13:23
7	attack, if somebody within the network is the	13:13:27
8	attacker. And those do occur in real life, you have	13:13:29
9	insider attacks.	13:13:34
10	So the CSF is directed toward testing	13:13:35
11	information coming from external sources on the	13:13:39
12	Internet into the root node and then into -- or the	13:13:42
13	reverse, leaving the internal network and going out.	13:13:46
14	BY MR. KLEIN:	13:13:49
15	Q. And you've heard of the concept of data loss	13:14:49
16	prevention. Right?	13:14:51
17	A. I have.	13:14:52
18	Q. And is an aspect of that, that certain departments	13:14:52
19	within an enterprise might be dealing with more	13:14:55
20	secretive information that you don't want getting	13:15:03
21	outside of that department?	13:15:06
22	MR. LU: Objection. Outside the scope.	13:15:07

1 A. I mean, in my experience and in the products that 13:15:10
2 I've seen, it's more broadly making sure that data 13:15:16
3 doesn't leave the network. Not -- it's not 13:15:21
4 usually -- I can't think of an instance, in fact, 13:15:26
5 where it's supervising moving data from machine to 13:15:29
6 machine within the network. 13:15:33

7 BY MR. KLEIN: 13:15:35

8 Q. So it's not monitoring internal traffic? 13:15:36

9 A. This is -- in the products I've seen that usually 13:15:43
10 it's at the border of the network, so wherever the 13:15:49
11 firewall is. It's really trying to lockdown what 13:15:52
12 information leaves the company. 13:15:55

13 I don't want to go on the record stating 13:15:58
14 that there aren't products out there that might be 13:16:00
15 able to monitor a single machine or a single subnet 13:16:06
16 within the network as well. I'm just -- the ones I'm 13:16:09
17 thinking of operate at the border of the network, not 13:16:11
18 on intranetwork traffic. 13:16:15

19 Q. Dr. Black, in what technical field is the '825 patent? 13:16:18

20 A. I mean, broadly, it's computer science. Within that, 13:17:10
21 it's, I guess, distributed computing and computer 13:17:14
22 security. That's how I'd describe it, I guess, to a 13:17:18

1	peer, just succinctly.	13:17:24
2	Q. Does the '825 patent ever use the term "distributed	13:17:26
3	computing"?	13:17:30
4	A. I can check real quick. I have it OCR'd. I don't	13:17:33
5	recall.	13:17:36
6	It talks about the distribution of security	13:17:46
7	operations amongst member nodes of a CSF, which is --	13:17:49
8	that's what distributed computing is.	13:17:54
9	Q. Can you turn to the Field of the invention on column	13:17:56
10	1?	13:17:59
11	A. Okay.	13:18:07
12	Q. Line 26 to 29.	13:18:07
13	A. I'm with you.	13:18:11
14	Q. Do you see anything in there about distributed	13:18:12
15	computing?	13:18:16
16	A. I don't see "distributed" or "computing," the words,	13:18:22
17	in that paragraph.	13:18:26
18	Q. And what is distributed computing?	13:18:27
19	A. It's when you want to perform a computer operation	13:18:31
20	and instead of performing it entirely on one box, on	13:18:35
21	one computer, the work is distributed, it's shared,	13:18:38
22	it's cut up and carved into pieces and some of its	13:18:43

1	maybe done on one machine and some other parts of it	13:18:46
2	are done on another machine.	13:18:50
3	Q. So is the '825 patent carving up operations and	13:18:51
4	distributing that across different appliances or is it	13:18:56
5	just coordinating separate actions taken across	13:19:01
6	devices?	13:19:03
7	MR. LU: Objection. Vague.	13:19:09
8	A. I don't know that I necessarily think of those as	13:19:12
9	different things. In order to break up work and	13:19:19
10	divide it up between multiple people, let's say, you	13:19:23
11	would have to have some coordination as part of that.	13:19:28
12	But you are distributing work among multiple people.	13:19:32
13	I mean, you could do it without any	13:19:36
14	coordination, but I don't think that makes much sense.	13:19:38
15	BY MR. KLEIN:	13:19:41
16	Q. So any coordination in computer science is in the	13:19:41
17	field of distributed computing?	13:19:45
18	A. No. But if you're coordinating the work that's being	13:19:50
19	done on multiple computers, I think that implies	13:19:53
20	you're doing distributed computing.	13:19:57
21	Q. But distributed computing doesn't require that you're	13:20:02
22	just taking an operation and distributing it --	13:20:06

1	distributing the load across multiple computers?	13:20:08
2	MR. LU: Objection. Vague.	13:20:12
3	A. I don't know what you mean by "load." I would say	13:20:19
4	you have a task to perform, and distributed computing	13:20:21
5	means typically you're breaking that task up into	13:20:25
6	distinct parts and assigning performance of those	13:20:29
7	subtasks to different computers.	13:20:32
8	I think you -- every instance I've ever	13:20:35
9	seen, you want to coordinate that overall process so	13:20:37
10	that you don't miss a step or you don't redundantly	13:20:42
11	perform steps.	13:20:45
12	BY MR. KLEIN:	13:20:47
13	Q. The '825 patent doesn't discuss having multiple	13:20:47
14	appliances share the load of doing a virus scan.	13:20:54
15	Right?	13:20:57
16	MR. LU: Objection. Vague.	13:21:02
17	A. I can't recall an embodiment that, say, breaks up the	13:21:06
18	virus scan subtask into further subtasks, if that was	13:21:12
19	your question.	13:21:16
20	BY MR. KLEIN:	13:21:17
21	Q. Right. So my point is the '825 patent doesn't ever	13:21:17
22	talk about taking a task, and that could be scanning	13:21:20

1	for a virus or scanning for DLP, or intrusion	13:21:23
2	detection, and distributing that amongst multiple	13:21:29
3	network appliances. Right?	13:21:34
4	MR. LU: Objection. Vague.	13:21:38
5	A. I can't recall an embodiment that breaks subtask into	13:21:41
6	further subtasks, like in your examples. It would	13:21:46
7	just be breaking the overall task of doing a security	13:21:51
8	scan into subtasks and that's it.	13:21:54
9	BY MR. KLEIN:	13:22:01
10	Q. In your definition of a POSITA, which is on	13:22:08
11	paragraph 18 of your declaration, if you want to look	13:22:10
12	at it, it says nothing about distributed computing.	13:22:12
13	Right?	13:22:16
14	A. You said paragraph 18?	13:22:30
15	Q. Yes.	13:22:32
16	A. Yeah, I found it.	13:22:32
17	I don't mention distributed computing in	13:22:42
18	that paragraph.	13:22:48
19	Q. And then in your Background, which starts on	13:22:50
20	paragraph 4 of your declaration and goes on to	13:23:02
21	paragraph 15, does not describe any experience in	13:23:07
22	distributed computing. Right?	13:23:10

1	A. I mean, other than in the sense that I've said I	13:23:18
2	taught classes that include that as a topic, but I	13:23:21
3	don't explicitly list "distributed computing" as one	13:23:25
4	of the topics in that list.	13:23:29
5	Q. Where do you say that you taught classes in	13:23:30
6	distributed computing in that section?	13:23:32
7	A. I'm just saying, some of the classes that I list	13:23:34
8	include distributed computing as a topic within the	13:23:36
9	class, such as operating systems, network, software	13:23:40
10	engineering, security.	13:23:43
11	Q. And, Dr. Black, I want to turn back to your definition	13:23:44
12	of a CSF.	13:24:18
13	I think you said that a CSF requires a	13:24:19
14	minimum of three or more devices. Right?	13:24:23
15	A. Yes.	13:24:27
16	MR. KLEIN: All right. I'm at a pretty	13:25:11
17	good stopping point. Why don't we take a break, and	13:25:12
18	we can do five or ten minutes, whatever you want,	13:25:14
19	Dr. Black, and then I think we'll have one more	13:25:17
20	section and then be done.	13:25:19
21	THE WITNESS: Ten sounds good, if that's	13:25:23
22	okay with everybody.	13:25:25

1	MR. KLEIN: Yeah.	13:25:26
2	MR. LU: Yep. Sounds good.	13:25:26
3	(Off the record at 1:25 p.m.)	13:25:27
4	(Back on the record at 1:42 p.m.)	13:42:09
5	BY MR. KLEIN:	13:42:15
6	Q. Dr. Black, can the term "fabric" refer to the physical	13:42:16
7	structure of a topology?	13:42:22
8	A. It can --	13:42:25
9	MR. LU: Objection. Asked and answered.	13:42:26
10	THE WITNESS: Sorry.	13:42:28
11	A. It can, yes.	13:42:29
12	BY MR. KLEIN:	13:42:30
13	Q. All right. I want to share something. This will be	13:42:35
14	Exhibit 1012.	13:43:01
15	So, Dr. Black, I just sent you a PDF	13:48:07
16	entitled Fig. 13.	13:43:22
17	A. I see it.	13:43:24
18	Q. And what you see here is basically a hypothetical with	13:43:33
19	six different nodes with connections in-between them.	13:43:36
20	Do you see that?	13:43:39
21	A. I do.	13:43:40
22	Q. Now, is this a fabric?	13:43:40

1	MR. LU: Objection. Vague. Incomplete	13:43:46
2	hypothetical.	13:43:58
3	A. Give me a second to try to unpack this because it's	13:43:58
4	not the case that every node has got an arrow to	13:44:01
5	every other.	13:44:03
6	So I should interpret these arrows to mean	13:44:20
7	the traffic can only travel in that direction along	13:44:22
8	the arrow or is it a bi-directional connection that	13:44:25
9	they're indicating?	13:44:30
10	BY MR. KLEIN:	13:44:30
11	Q. It's the flow of data, so the data flow path.	13:44:31
12	MR. LU: Objection. Vague. Incomplete	13:44:33
13	hypothetical.	13:44:39
14	A. So it's the flow of data in a particular snapshot of	13:44:39
15	time or it's the only direction in which data can	13:44:41
16	flow?	13:44:44
17	BY MR. KLEIN:	13:44:44
18	Q. Only direction.	13:44:45
19	A. It's difficult to parse in the heat of the moment	13:44:53
20	because, for example, it looks like Node 3 and Node 6	13:44:56
21	can only talk to one another. Right? So the only	13:44:59
22	outgoing from Node 3 is to Node 6, and the only	13:45:04

1	outgoing from Node 6 is to Node 3. So in that	13:45:08
2	instance, it seems like those two are, in a way,	13:45:13
3	isolated. So it's a very unusual setup that's hard	13:45:16
4	to analyze.	13:45:21
5	Q. So 4 and 5 can talk to 3. Right?	13:45:28
6	A. 4 and 5 can both send to Node 3, yes.	13:45:35
7	Q. So is this an example of a fabric? And if not, why	13:45:53
8	not? Or what more information would you need to know?	13:45:58
9	A. This is a strange setup because I'm not used to	13:46:04
10	seeing unidirectional paths in, sort of, weird	13:46:08
11	isolation, but under the definition I've given, if	13:46:12
12	these are all network security appliances, and there	13:46:15
13	are certainly more than three of them, and there	13:46:18
14	are -- I don't know if there are multiple paths. Let	13:46:25
15	me see...	13:46:28
16	Yeah, so Node 1 -- something arrives at	13:46:29
17	Node 1, it could go to Node 5 to Node 3 to Node 6, or	13:46:33
18	it could just go directly from Node 1 to Node 6. So	13:46:39
19	those are different paths through the diagram, and so	13:46:42
20	I would say there are multiple paths and there are at	13:46:47
21	least three nodes.	13:46:53
22	So, yes, if these were all network security	13:46:58

1	appliances, I would say this forms a fabric, a very	13:47:01
2	strange fabric, but it meets my definition.	13:47:04
3	Q. So if it meets your definition that these are	13:47:09
4	unidirectional data flows, then I assume it would meet	13:47:12
5	your definition that these were bidirectional data	13:47:15
6	flows and the arrows represented just a snapshot in	13:47:18
7	time of the way a particular packet was traveling?	13:47:20
8	MR. LU: Objection. Vague. Incomplete	13:47:26
9	hypothetical.	13:47:28
10	A. If all the arrows were actually bidirectional links	13:47:28
11	and you're just showing me that traffic at this	13:47:34
12	moment in time is flowing in the direction of the	13:47:37
13	arrow, that's not relevant to the topology at all,	13:47:39
14	it's just the wires themselves that are relevant.	13:47:42
15	And you're telling me they're bidirectional, so then	13:47:45
16	I'm comfortable saying it's a fabric.	13:47:48
17	BY MR. KLEIN:	13:47:50
18	Q. All right. And then I wanted to show one other one.	13:47:57
19	This will be Exhibit 1013. Let me know when you get	13:48:01
20	that.	13:48:12
21	A. And this is labeled Figure 14, it looks like.	13:48:18
22	Q. Correct.	13:48:20

1	A.	Okay, I have it up.	13:48:24
2	Q.	And so in this hypothetical, we have a simple	13:48:25
3		connection between Computer A and Computer B.	13:48:30
4		Do you see that?	13:48:33
5	A.	Yeah. I wouldn't say it's a "simple connection," but	13:48:34
6		I do see that Computer A has got three ports and it's	13:48:37
7		connected to Computer B.	13:48:42
8	Q.	And if the connections between Computer A and Computer	13:48:43
9		B is a single cable connecting the two computers and	13:48:49
10		the arrows represent the logical connections, would	13:48:52
11		this be a fabric?	13:48:54
12		MR. LU: Objection. Vague. Incomplete	13:48:56
13		hypothetical.	13:49:01
14	A.	So then it -- each computer has three ports, so how	13:49:01
15		are you going to connect a single cable to three	13:49:04
16		different ports?	13:49:06
17	BY MR. KLEIN:		13:49:09
18	Q.	Can you not have multiple logical connections over a	13:49:09
19		single cable?	13:49:14
20	A.	You can have multiple, yeah, logical connections like	13:49:17
21		TCP/IP connections over one cable, but it seems that	13:49:20
22		the computers each have three ports on them.	13:49:27

1	Q. And so -- let me rephrase.	13:49:32
2	The ports are virtual ports between	13:49:35
3	Computer A and B.	13:49:39
4	A. I see. Okay. So these are -- these are TCP/IP port	13:49:40
5	numbers or something like that --	13:49:46
6	Q. Right.	13:49:47
7	A. -- they're not actually physical ports.	13:49:47
8	Q. Right.	13:49:49
9	A. Well, then you have a point-to-point topology, and	13:49:52
10	you have multiple connections going over that single	13:49:56
11	connection in the topology, that single line in the	13:50:01
12	topology.	13:50:04
13	Q. So it would not be a fabric?	13:50:08
14	A. In the example you describe, no, because the network	13:50:14
15	is just two computers and a cable. That's the	13:50:16
16	network. The fact that you have multiple connections	13:50:18
17	doesn't change the topology.	13:50:21
18	Q. So does a fabric require interwoven physical cabling?	13:50:23
19	MR. LU: Objection. Vague.	13:50:32
20	A. I would say that's sort of the default depiction I	13:50:34
21	have. I mean, the problem is, these days, every	13:50:46
22	physical system you could conceive of can be	13:50:48

1	simulated. You can always run a simulation with	13:50:52
2	virtual machines and virtual networks all on one	13:50:56
3	computer. And so I don't want to miss a corner case	13:51:00
4	here where somebody is doing that instead, they're	13:51:04
5	simulating the entire network on a single box. But	13:51:07
6	the normal setup is that you have appliances as	13:51:10
7	physical devices that are connected via cables.	13:51:14
8	BY MR. KLEIN:	13:51:19
9	Q. So does there have to be more than one cable between	13:51:20
10	the devices for there to be a fabric?	13:51:23
11	A. Well, I'm saying there would have to be at least	13:51:29
12	three appliances, so there would have to be at least	13:51:32
13	two cables so that they're interconnected. So I	13:51:34
14	guess the number of cables is two at minimum.	13:51:36
15	Q. And --	13:51:39
16	A. And again, the caveat is that it could be wireless.	13:51:46
17	I don't think anybody would ever do that, but it's	13:51:50
18	possible as well. You don't have to have a cable	13:51:52
19	per se.	13:51:54
20	Q. So when you're looking at the number of connections,	13:51:54
21	do you consider the logical data paths or just the	13:51:58
22	physical data paths?	13:52:04

1	MR. LU: Objection. Vague.	13:52:08
2	A. So a connection could be just a logical connection	13:52:12
3	like a TCP/IP connection. Making more and more of	13:52:16
4	those connections does not change the network,	13:52:20
5	doesn't change the topology.	13:52:22
6	The topology is sort of the underlying	13:52:24
7	substrate of how the network is organized, and then	13:52:26
8	you could have zero to thousands of connections	13:52:29
9	occurring across the network, including, as you've	13:52:33
10	shown me in this figure, many connections that are	13:52:36
11	over a single wire or line.	13:52:40
12	So your question, when you say	13:52:44
13	"connection," I don't know if you mean, like,	13:52:46
14	connecting a wire into a computer or if you just mean	13:52:48
15	like TCP/IP connections, which there could be many of.	13:52:51
16	BY MR. KLEIN:	13:52:54
17	Q. In the last question, I was talking about the latter,	13:52:56
18	the logical TCP/IP type connections.	13:52:59
19	A. Okay. So the creation and teardown of those types of	13:53:01
20	connections doesn't change the topology at all.	13:53:06
21	Q. Okay. I think -- I think I've got just a couple more	13:53:10
22	follow-up questions.	13:53:48

1	So when you're looking at the fabric -- or	13:53:48
2	what constitutes a fabric, you're looking at the	13:53:52
3	physical cabling and the physical ports, not any	13:53:55
4	virtual connections or virtual ports because the --	13:54:01
5	MR. LU: Objection.	13:54:01
6	[Simultaneous speaking.]	13:54:01
7	Q. -- is virtual. Right?	13:54:06
8	MR. LU: Objection. Mischaracterizes	13:54:06
9	testimony.	13:54:06
10	STENOGRAPHER: Just repeat that. I didn't	13:54:06
11	hear that whole question because it was interrupted.	13:54:06
12	BY MR. KLEIN:	13:54:16
13	Q. So when you're looking at whether something	13:54:16
14	constitutes a fabric, you're just looking at the	13:54:18
15	physical devices and the physical ports, not any	13:54:21
16	logical connections or logical ports. Right?	13:54:25
17	MR. LU: Objection. Mischaracterizes	13:54:31
18	testimony.	13:54:35
19	A. Well, let me start at the second half. If there are	13:54:35
20	TCP/IP connections, let's say, which are	13:54:40
21	software-based connections, that is not going to tell	13:54:43
22	me whether I've got a fabric or not because the	13:54:45

1 fabric is the network itself, not what is currently 13:54:50
2 happening on the network. 13:54:53

3 So if you said, Dr. Black, here is a 13:54:56
4 network, is this a fabric, my default would be to look 13:54:59
5 at the physical implementation. And let's say you're 13:55:02
6 showing me just two computers connected with a single 13:55:05
7 wire, and I say no, and you go, aha, but I've 13:55:09
8 simulated a network on the first computer, I've got 13:55:13
9 you. Right? 13:55:15

10 So I want to carve out that exception of 13:55:15
11 virtualization and simulation of networks because you 13:55:18
12 could do that and you could get a fabric in a virtual 13:55:21
13 world. But normally, and the way that the '825 is 13:55:24
14 talking about things, is these are network appliances 13:55:28
15 which are actually tangible machines and there are 13:55:31
16 cables between them, and for you to get a fabric out 13:55:35
17 of those machines, those appliances, you would want to 13:55:38
18 have -- to be able to look at the physical 13:55:42
19 implementation in that case. 13:55:45

20 MR. KLEIN: Pass the witness. 13:55:59

21 MR. LU: All right. I've got a couple of 13:56:13
22 questions. 13:56:18

1	EXAMINATION	13:56:18
2	BY MR. LU:	13:56:18
3	Q. Dr. Black, do you recall saying a CSF requires a	13:56:19
4	minimum of three or more devices?	13:56:27
5	A. I do. I think I clarified "appliances" right after	13:56:29
6	that, but I did say "devices" at one point, I recall.	13:56:33
7	Q. Okay. And so in your last answer, you said, "My	13:56:37
8	default would be to look at the physical	13:56:50
9	implementation."	13:56:52
10	Are there situations where you would look	13:56:54
11	beyond the physical implementation to determine the	13:56:57
12	topology of your network?	13:57:00
13	A. Yeah. For example, I think we briefly touched upon	13:57:04
14	VPNs. You know, the physical implementation of a VPN	13:57:09
15	may be complex and involve lots of other computers	13:57:15
16	and so forth. But, there, that's a logical network,	13:57:18
17	that's a network that's being simulated in software,	13:57:22
18	it's not tangible, and that still is a network.	13:57:25
19	So that's why I was trying to be careful	13:57:30
20	to not say the only kind of network that exists is	13:57:32
21	one you can touch because you can build a network on	13:57:35
22	top of a physical network, that's called a virtual	13:57:38

1	network, that's every bit as real, that the computers	13:57:42
2	react the same exact way as if it were physical but	13:57:46
3	it's all implemented in software.	13:57:49
4	MR. LU: All right. No further questions.	13:57:52
5	MR. KLEIN: So I've got a follow-up	13:57:56
6	question, then, on that last response you just gave,	13:57:57
7	Dr. Black.	13:58:00
8	RE-EXAMINATION	13:58:00
9	BY MR. KLEIN:	13:58:00
10	Q. So where do you draw the line between when you're	13:58:01
11	looking at a virtual part of a network for purposes of	13:58:03
12	what's a fabric?	13:58:07
13	MR. LU: Objection. Vague.	13:58:13
14	A. You would have to make it clear in the discussion	13:58:16
15	you're having, to say -- if you say "the network,"	13:58:20
16	and we're talking about a VPN that's running on an	13:58:26
17	underlying physical network, and you ask me what's	13:58:29
18	the topology -- let me give an example.	13:58:31
19	Let's say we're using the Internet as our	13:58:34
20	physical network and we build a point-to-point network	13:58:38
21	as a VPN; so I can talk to you, you can talk to me,	13:58:43
22	that's our network. We can't see any other computers,	13:58:46

1	our world is you and me and this one connection	13:58:48
2	virtually. And you say, well, what's the topology of	13:58:51
3	the network? I'd say, Do you mean the Internet	13:58:54
4	underlying this or do you mean the virtual network	13:58:57
5	we've created? Because my answer is different.	13:59:00
6	It's point-to-point if you're talking about	13:59:02
7	the virtual network. It's, you know, much more	13:59:04
8	complicated if we're talking about the Internet.	13:59:06
9	Q. When we were talking before on the prior examination,	13:59:15
10	you were saying that you don't necessarily count the	13:59:21
11	virtual connections or virtual ports when analyzing	13:59:24
12	whether something is a fabric.	13:59:30
13	MR. LU: Objection. Vague.	13:59:36
14	Mischaracterizes testimony.	13:59:37
15	MR. KLEIN: I wasn't -- I wasn't done, but	13:59:41
16	that's all right. I was kind of pausing for a long	13:59:43
17	time. I was trying to think of the rest of the	13:59:45
18	question.	13:59:47
19	MR. LU: All right.	13:59:47
20	MR. KLEIN: Let me rephrase it.	13:59:48
21	BY MR. KLEIN:	13:59:49
22	Q. So when we were talking before about what	13:59:49

1	considerations go into whether something is a fabric,	13:59:52
2	you were saying that typically you don't look at the	13:59:56
3	virtual connections or virtual ports. Right?	13:59:58
4	MR. LU: Objection. Mischaracterizes	14:00:02
5	testimony.	14:00:03
6	A. I was saying that in -- I think we talked about	14:00:05
7	TCP/IP connections, and there are ports in that	14:00:08
8	world, TCP/IP ports -- those are not real ports,	14:00:14
9	those are software ports -- that the coming and going	14:00:17
10	of those ports and those connections doesn't affect	14:00:20
11	the topology.	14:00:23
12	Now, setting aside TCP/IP, let's talk about	14:00:26
13	IPSec or OpenVPN or some VPN technology. Okay? We're	14:00:29
14	not using a network yet, we are building a new	14:00:35
15	network, a virtual network on top of -- there has to	14:00:39
16	be some underlying physical network to build the	14:00:43
17	virtual network upon.	14:00:45
18	So now I'm going to build a new network,	14:00:47
19	I'm going to give new addresses to these virtual	14:00:49
20	interface cards that don't really exist, but I'm going	14:00:52
21	to assign them IP addresses, I'm going to build ports,	14:00:55
22	again, those are software only, and I'm going to	14:00:58

1	connect, you know, things to other things. I'm	14:01:01
2	building a topology now, a virtual network topology.	14:01:05
3	I'm not doing any TCP -- there's no connections yet,	14:01:08
4	this is just me setting things up and building	14:01:11
5	connections.	14:01:14
6	Those ports and those connections are part	14:01:14
7	of the topology. So I would count that as important	14:01:18
8	in deciding, is this a fiber -- sorry, is this a	14:01:22
9	fabric or not, because that's actually building the	14:01:26
10	topology. Once you go and open a browser and start	14:01:28
11	using it and you're creating connections, that's	14:01:31
12	irrelevant.	14:01:33
13	MR. KLEIN: I have no further questions.	14:01:55
14	MR. LU: Let me just ask one clarifying	14:01:59
15	question.	14:02:01
16	RE-EXAMINATION	14:02:01
17	BY MR. LU:	14:02:01
18	Q. So in your previous answer, Dr. Black, were you	14:02:03
19	making -- were you making a distinction between	14:02:09
20	connections as you set up the network and PCP	14:02:11
21	connections when you're using the network?	14:02:16
22	A. That's right. So just like in the real world, you	14:02:20

1 make a connection by plugging the cable in, and 14:02:23
2 that's what we call a connection, and then I go open 14:02:27
3 my browser and I connect across that cable and I make 14:02:31
4 a connection to Google.com. That's also a connection 14:02:37
5 but it's very different. Right? It's use of the 14:02:40
6 network versus building of the network. 14:02:43

7 MR. LU: Okay. No further questions. 14:02:46

8 MR. KLEIN: Nothing further. 14:02:51

9 (Proceedings concluded at 2:02 p.m.)
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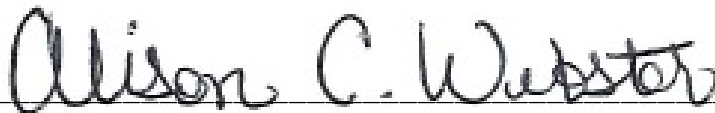
CERTIFICATE OF NOTARY

STATE OF MICHIGAN)

) SS

COUNTY OF OAKLAND)

I, ALISON WEBSTER, certify that the deposition of JOHN BLACK, JR. was taken before me via videoconference on the date hereinbefore set forth; that the foregoing questions and answers were recorded by me stenographically and reduced to computer transcription; that this is a true, full, and correct transcript of my stenographic notes so taken; and that I am not related to, nor of counsel to, either party nor interested in the event of this cause.



ALISON C. WEBSTER, CSR-6266, RPR, RMR, CRR, RDR

Notary Public, Oakland County, Michigan

My commission expires: May 1, 2029

ACKNOWLEDGMENT OF DEPONENT

I, JOHN BLACK, JR., do hereby acknowledge
that I have read and examined the foregoing testimony
and the same is a true, correct, and complete
transcription of the testimony given by me and any
corrections appear on the attached errata sheet signed
by me.

(SIGNATURE)

(DATE)

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