

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

CROWDSTRIKE, INC.,

Petitioner,

vs.

Case IPR2025-00070

U.S. Patent No. 9,954,872

GOSECURE, INC.,

Patent Owner.

DEPOSITION OF ANGELOS STAVROU, Ph.D.
Taken on behalf of the Petitioner

March 11, 2026

Saundra Tippins, CCR

(The deposition began at 8:56 a.m.)

1	QUESTIONS BY:	PAGE NO.
2	MR. HART	5
3	MR. PETERS	148

INDEX OF EXHIBITS MARKED

6	EXHIBIT	DESCRIPTION OR	PAGE
7	NO.	BEGINNING BATES NUMBER	
8	Exhibit 1	Declaration WIZ v. Orca	15
9	(Exhibit was attached.)		

10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD

3 CROWDSTRIKE, INC.,

4 Petitioner,

5 vs.

Case IPR2025-00070

U.S. Patent No. 9,954,872

6 GOSECURE, INC.,

7 Patent Owner.

8 DEPOSITION OF DR. ANGELOS STAVROU,

9 produced, sworn, and examined on the 11th day of

10 March, 2026, between the hours of nine o'clock in

11 the forenoon and five o'clock in the afternoon of

12 that day, via Zoom, before SAUNDRA TIPPINS, a

13 Notary Public, and Certified Court Reporter within

14 and for the States of Missouri and Kansas, in a

15 certain cause now pending before the U.S. Patent

16 and Trademark Office, Before the Patent Trial and

17 Appeal Board, wherein CROWDSTRIKE, INC. is

18 Petitioner, and GOSECURE, INC. is Patent Owner.

A P P E A R A N C E S (by Zoom)

For the Petitioner:

MR. PAUL R. HART
ERISE IP
717 17th Street, Suite 1400
Denver, Colorado 80202
paul.hart@eriseip.com

For the Patent Owner:

MR. STEVEN W. PETERS
CLEARY, GOTTlieb, STEEN & HAMILTON
1841 Page Mill Road
Palo Alto, California 94303
speters@cgsh.com

The Court Reporter:

Ms. Sandra Tippins
Lexitas Legal
1608 Locust Street
Kansas City, Missouri 64108

1 IT IS HEREBY STIPULATED AND AGREED,
2 by and between counsel for parties that the
3 deposition of DR. ANGELOS STAVROU may be taken in
4 shorthand by Sandra Tippins, a notary public and
5 shorthand reporter, and afterwards transcribed into
6 typewriting; and the signature of the witness is
7 expressly reserved.

8 * * * * *

9 THE REPORTER: Would you like
10 realtime, rough draft and final on Saturday?

11 MR. HART: Friday would be good.

12 THE REPORTER: Would you also like
13 the realtime, rough draft and final on Friday?

14 MR. PETERS: Yes.

15 * * * * *

16 DR. ANGELOS STAVROU,
17 of lawful age, produced, sworn and examined on
18 behalf of Petitioner, deposes and says:

19 EXAMINATION

20 QUESTIONS BY MR. HART:

21 Q Good morning, Dr. Stavrou. Can you
22 please state your full name for the record to get
23 us started.

24 A **Yes. My full name is Angelos Stavrou.**

25 Q Have you been deposed before,

1 Dr. Stavrou?

2 A Yes, sir.

3 Q Approximately how many times have you
4 been deposed?

5 A I would say six or seven times.

6 Q Okay. How many of those were patent
7 cases?

8 A I would say the majority of them were
9 patent cases.

10 Q Okay. Well, let me just as a quick
11 refresher go over the most important ground rules.

12 It's my job to ask clear questions today.
13 If you don't understand anything I ask you or any
14 aspect of a question I ask you, please let me
15 know so I can rephrase or clarify.

16 Second important rule, the court reporter
17 can only capture one of us speaking at a time. I
18 will do my best not to speak over you, and I'd
19 just ask that you try not to speak over me.

20 To this end, if I cut you off while you're
21 answering one of my questions, please do let me
22 know so I can stop speaking and let us finish
23 your answer.

24 Is there any reason, medical or otherwise,
25 you would be unable to answer my questions fully

1 and truthfully today?

2 **A No.**

3 Q Because we are conducting this
4 deposition remotely, I want to ask a few questions
5 regarding your setup.

6 Is there anyone in the room with you
7 today?

8 **A No.**

9 Q Do you have any open lines of
10 communication with anyone?

11 **A No.**

12 Q Okay. Do you have any materials with
13 you potentially relevant to your testimony today?

14 **A I have a binder with clean copies of**
15 **the exhibits for my deposition and my deposition,**
16 **and I have online versions, also clean and**
17 **untouched, that were provided by the counsel.**

18 Q Okay. Let me just take a quick
19 inventory of what you have before you.

20 Before I create that list, did you say
21 that everything you have access to is a clean
22 copy, without annotations or notes?

23 **A Correct.**

24 Q Okay. Do you have your declaration
25 submitted in this proceeding?

1 **A Yes.**

2 Q Do you have the prior art references
3 submitted in this proceeding?

4 **A I believe I have some. I don't know**
5 **if I have everything, but I have the ones that I**
6 **referenced in my deposition, I believe.**

7 Q In your declaration?

8 **A Sorry, in my declaration. My**
9 **apologies.**

10 Q That's okay. Okay. It sounds like
11 you're going to have everything that I need.

12 What is your preference when I ask you a
13 question about a document that you have analyzed
14 in this case or created in this case? Would you
15 like to use those local clean copies?

16 **A I would prefer that, yes.**

17 Q Okay. I will presume -- I will
18 double-check to make sure you have access to any
19 document I'm asking a question about. And I will
20 presume that you are using your local clean copy.

21 Please do let me know if you would prefer
22 that I screen-share anything that I'm asking a
23 question about, so we can all look at the same
24 document. But otherwise, I will just let you use
25 your local copies.

1 Is that the easiest way to handle things
2 today for you?

3 **A Yes, sir.**

4 Q All right, very good. What did you
5 do, if anything, to prepare for today's
6 deposition?

7 **A I went over the documents in my**
8 **declaration, the declaration itself, and then, you**
9 **know, the references and exhibits in my**
10 **declaration.**

11 Q Did you meet with anyone in
12 preparation for today's deposition?

13 **A We had meetings with the counsel over**
14 **Zoom.**

15 Q Okay. Approximately how much time did
16 you spend meeting with counsel in preparation for
17 today's deposition?

18 **A I would say a few hours.**

19 Q Over how many days?

20 **A Couple of days.**

21 Q And how much time did you spend on
22 your own preparing for today's deposition?

23 **A Again, a few hours, I would say,**
24 **between these meetings.**

25 Q Fewer than ten hours total meeting

1 with counsel. Is that accurate?

2 **A That's accurate. I think around, I**
3 **mean, that number, yes. I cannot recall exact**
4 **number, but that's accurate.**

5 Q As part of preparing for today's
6 deposition, did you communicate with anyone other
7 than counsel for GoSecure?

8 **A No, sir.**

9 Q Can I have you open your declaration
10 submitted in this proceeding, which is
11 Exhibit 2031.

12 **A Yes.**

13 Q And I would like you to -- I don't
14 know if you're scrolling or flipping, but to take
15 yourself toward the end to paragraph 98, please,
16 and let me know when you're there.

17 **A I'm here.**

18 Q All right, very good. In paragraph 98
19 in a section titled CrowdStrike's materials from
20 around 2013, show that its product at that time
21 practiced at least Claims 1 and 2 of the '872
22 patent.

23 You introduce an analysis that you
24 performed comparing what you believe is
25 CrowdStrike's system in approximately 2013 to two

1 claims in the '872 patent. Is that right?

2 **A That appears to be correct, yes.**

3 Q What is the relevance of that opinion
4 to this proceeding, if you know?

5 MR. PETERS: Object to form, calls
6 for a legal conclusion.

7 **A I mean, I'm not a lawyer. I was asked**
8 **to review this material and provide the mapping to**
9 **the claims of 1 and 2 of the '872 patent.**

10 Q (By Mr. Hart) Do you know why it
11 matters to the current invalidity challenge
12 whether CrowdStrike's system in 2013 practiced
13 these claims of a patent it issued in 2018?

14 **A I was not privy to that, you know,**
15 **presenting before that. I would be remiss to**
16 **basically provide a legal opinion about that.**

17 **So I would say that I was asked about a**
18 **technical validity of what I show, and I provided**
19 **an opinion about that.**

20 Q Are you familiar with the legal
21 concept of secondary considerations of
22 nonobviousness?

23 **A I'm vaguely familiar, but I don't**
24 **remember it on top of my mind, and I don't know --**
25 **I don't see it in my declaration.**

1 Q Okay. Do you believe you opined on
2 any secondary considerations of nonobviousness in
3 this declaration?

4 MR. PETERS: Object to form.

5 A As I said before, I was asked to
6 provide a mapping of the materials produced and
7 given to me from CrowdStrike from approximately
8 2013, which are marked Exhibits 2015 all the way
9 to 2017 and 2051.

10 And I was asked to opine if these
11 materials show that the CrowdStrike Falcon
12 Platform in 2013 practiced at least Claims 1 and
13 2 of the '872 patent.

14 Q (By Mr. Hart) I understand that you
15 provided that analysis. I understand what you
16 analyzed, what you compared to the claims of the
17 patent.

18 I'm trying to make sure I understand the
19 scope of your analysis.

20 A As I said --

21 MR. PETERS: Object to form. Was
22 there a question?

23 MR. HART: There was not a
24 question. I will ask a question right now.

25 Q (By Mr. Hart) Have you analyzed

1 secondary considerations of nonobviousness in any
2 prior case?

3 **A Prior to what case, sir? I'm sorry.**

4 Q Have you ever analyzed secondary
5 considerations of nonobviousness in a prior patent
6 case other than this proceeding?

7 MR. PETERS: Objection, scope.

8 **A It was a while ago.**

9 Q (By Mr. Hart) Do you recall which
10 case that was?

11 MR. PETERS: Objection, scope.

12 **A That was done in a prior proceedings**
13 **that I don't know if I'm privy to disclose, number**
14 **one; and number two, it was irrelevant to the**
15 **specifics of this specific case. And I was not --**
16 **I did not opine to -- I mean, there's no secondary**
17 **consideration arguments. Let me rephrase that.**

18 **My opinion isn't -- I was asked -- what I**
19 **was asked to do is compare the materials that I**
20 **was given to CrowdStrike's platform in 2013, and**
21 **to opine if they practiced at least Claims 1 and**
22 **2 of the '872 patent, to which I opined yes.**

23 Q (By Mr. Hart) Let me drop into the
24 chat -- let me make sure this is a clean copy
25 here.

1 I'm going to drop into the chat your
2 declaration submitted in IPR2024-01190, which was
3 WIZ, Inc. versus Orca Security Limited.

4 Do you recall your work in that case?

5 MR. PETERS: First I'm going to
6 object to the document in terms of both hearsay
7 and scope, but you can answer.

8 A So this was a lot of time, many, many,
9 obviously a few years ago. And, you know, while
10 this is my document and declaration, I would say
11 that this was -- I haven't taken good time to
12 reacquaint myself with the document, and I
13 wouldn't be able to opine in these proceedings
14 about this specific document, because it's out of
15 scope for this specific proceedings.

16 Q (By Mr. Hart) To ease your mind -- to
17 ease your mind a bit, I'm not going to be asking
18 about the technology in that case. I don't know
19 what it was about, and it would certainly be a
20 waste of our time today.

21 But I do want to take you to the leading
22 principles that you set forth in your declaration
23 in that case.

24 Can I have you turn to paragraph 18.

25 (Counsel presented to the

1 witness electronically Exhibit No. 1.)
2 (Off the record.)

3 Q (By Mr. Hart) Dr. Stavrou, in
4 paragraph 18 -- I'm sorry. Going back, I think
5 there was an objection, and I'm not sure if we
6 got an answer.

7 Is this your declaration from the
8 proceeding WIZ v. Orca that you submitted an
9 opinion in?

10 A As I said, it's been a while ago. I
11 do not -- I don't see any markings on this
12 document. It might well be, but I cannot attest
13 because I haven't read that document. It's a very
14 long document. And I don't know if it is or not,
15 based on the fact that I have not personally
16 validated that.

17 Q But you did submit a declaration in
18 that proceeding. Correct?

19 A That is correct.

20 Q Very good.

21 MR. PETERS: Blanket objection to
22 scope about any questions to this exhibit, so that
23 I don't have to do it every question. So go
24 ahead.

25 Q (By Mr. Hart) In paragraph 18 that we

1 can all see on the screen share, I'm going to
2 read in your discussion of a legal standard.

3 I have been advised that there are several
4 factors that may be considered as a secondary
5 consideration. These factors include the
6 commercial success of the invention, industry
7 praise for the invention, skepticism of the
8 invention, licensing of the invention, copying of
9 the invention, any long-term need that the
10 invention solved, failure of others, and
11 unexpected results of the invention.

12 Do you see that, Dr. Stavrou?

13 **A I do.**

14 **Q In the GoSecure case that we are**
15 **discussing today, have you analyzed any of these**
16 **secondary considerations with respect to any**
17 **invention claimed in the '872 patent?**

18 **MR. PETERS: Object to form.**

19 **A As I explained in paragraph 98 of my**
20 **declaration, I was asked to provide an opinion**
21 **about -- my technical opinion about how these**
22 **materials sold at CrowdStrike's platform in 2013**
23 **practiced at least Claims 1 and 2 of the '872**
24 **patent. That is the extent of which I opined.**

25 **I think that I was not -- to the extent**

1 that this applies in this case for the secondary
2 consideration, I am not a legal expert, so I
3 cannot opine about that.

4 But I will -- what I opined -- and again,
5 I'm pointing you to my declaration. I looked at
6 the materials from 2013, so that the product at
7 that time practiced at least Claims 1 and 2 of
8 the '872 patent.

9 Q (By Mr. Hart) The next paragraph in
10 your declaration from the WIZ v. Orca IPR
11 proceeding states, I have been further advised
12 that in order for evidence of secondary
13 considerations to be significant, there must be a
14 sufficient nexus between the claimed invention
15 and the evidence of secondary considerations. I
16 understand that this nexus serves to provide a
17 link between the merits of the claimed invention
18 and the evidence of secondary considerations
19 provided.

20 Do you see that, Dr. Stavrou?

21 A I do.

22 Q For the GoSecure case that we're here
23 today to talk about, have you analyzed the nexus
24 between any invention claimed in the '872 patent
25 and any secondary consideration?

1 MR. PETERS: Object to form.

2 A Again, I will repeat what I said
3 before. I was asked to opine specifically about
4 the relevance, not the relevance, the materials
5 from 2013 that showed that CrowdStrike's platform
6 material product, product itself, the Falcon
7 Platform, exhibit and practice at least the Claims
8 1 and 2 of the '872 patent.

9 That is the scope of my opinion that's
10 expressed in my declaration.

11 Q (By Mr. Hart) I think we are done
12 with Exhibit 1. And you can -- I have
13 effectively stopped the screen share. Correct?
14 You are no longer seeing my screen; is that
15 right, Dr. Stavrou?

16 A Yes, sir.

17 Q Turning back to your declaration, in
18 that section that begins at paragraph 98.

19 (Off the record.)

20 Q (By Mr. Hart) Okay. In paragraph 98
21 you state, I've been asked to consider certain
22 materials, which I have been informed were
23 created and published by CrowdStrike in
24 approximately 2013. These materials are Exhibits
25 2015 through 2017 and 2051. I will refer to

1 these materials as the Falcon Platform materials.

2 Now, these materials show that
3 CrowdStrike's Falcon Platform in 2013 practiced
4 at least Claims 1 and 2 of the '872 patent.

5 What are the primary components of the
6 CrowdStrike Falcon Platform that you analyzed?

7 MR. PETERS: Object to form.

8 A I think that I go into details on the
9 next paragraphs, explaining the mapping between
10 these materials and the CrowdStrike Falcon
11 Platform starting with -- I don't want to -- I can
12 go ahead and read -- this is my declaration -- if
13 you'd like.

14 Q (By Mr. Hart) I don't need you to
15 read it into the record, but I do want to just
16 ask, at a high level, what are the components
17 that you analyzed that make up this Falcon
18 Platform?

19 A Again --

20 MR. PETERS: Object to form.

21 A Again, I would like to reiterate that
22 my opinion is formed based on comparison of the
23 Claims 1 and 2 of the '872 patent and the material
24 that was presented by the CrowdStrike Falcon
25 Platform. And I can go into details.

1 **My goal was not to perform an exhaustive**
2 **technical analysis of the Falcon materials and**
3 **platform, but to map at least for Claims 1 and 2**
4 **of the '872 patent how these materials basically**
5 **allow me if this material show that the**
6 **CrowdStrike Falcon Platform in 2013 practiced**
7 **those claims.**

8 Q **(By Mr. Hart) In paragraph 99 that we**
9 **see here on page 61 of your declaration, you**
10 **quote Exhibit 2016, which makes a reference to a**
11 **lightweight host-based sensor as part of the**
12 **Falcon host platform.**

13 **Do you see that reference?**

14 A **I see the reference that says that,**
15 **Exhibit 2016 similarly describes that the Falcon**
16 **host leverages a lightweight host-based sensor**
17 **that shadows, captures and correlates low-level**
18 **operating system events to instantly identify the**
19 **adversary tradecraft and activity through our**
20 **patent-pending execution profiling technology.**

21 Q **Where does the lightweight host-based**
22 **sensor reside in the CrowdStrike's Falcon**
23 **Platform?**

24 A **So again, it says host-based sensor.**
25 **I take it at its value. This is not my -- you**

1 know, this is not my text. It's coming from an
2 Exhibit 2016.

3 Also, I want to point out that
4 Exhibit 2015, which I cite immediately prior to
5 that, describes that the Falcon Platform
6 identifies malware and provides attribution of
7 the attackers.

8 So similarly, the Falcon host similar in
9 2016 describes the Falcon host, which is part of
10 the Falcon Platform materials. And so that's the
11 lightweight -- lightweight host-based sensor.

12 Q Are you done with your answer,
13 Dr. Stavrou?

14 A I am, sir.

15 Q Do you know where physically the
16 lightweight host-based sensor resides in
17 CrowdStrike's Falcon host platform at the time?

18 A Only to the extent Exhibit 2016 says,
19 it says, Falcon host is described as an on-premise
20 host-based sensor, as I explain.

21 Q And what does that mean to you,
22 on-premise host-based sensor? What does that say?
23 What does that tell you about the location of the
24 sensor, if anything?

25 A It says that this host-based sensor,

1 which means it is located in a host. And on
2 premise means that it's on premise, what someone
3 would read.

4 Q What someone would read?

5 A A person of ordinary skill in the art
6 would understand that it's on premise.

7 Q Whose premise?

8 A The document itself. And let me just
9 give me one second. I want to open the document,
10 if you don't mind.

11 Q And which document are you opening,
12 Dr. Stavrou?

13 A 2016, sir. All right. So reading
14 this document, it talks about in the middle of the
15 first page about endpoint activity monitoring,
16 detection and response. And it says that,
17 CrowdStrike Falcon host solves the main business
18 problems that enterprises face today, to include
19 visibility into targeted threats, detects zero-day
20 attacks, lack of time to hunt through enterprise
21 activity, and insufficient resource to provide
22 flexible responses. And it says clearly up here
23 endpoint activity.

24 And then it goes along and says,
25 CrowdStrike Falcon host's endpoint activity

1 monitoring EAM saves time and money by reducing
2 risk. By avoiding silent failure, EAM offers
3 real-time forensics by tracking all execution on
4 all hosts at all times, shortening the window
5 between infection and detection, while providing
6 users with live forensics.

7 So as far as I'm concerned, when I read
8 this, it says it does it on all hosts at all
9 times.

10 Q Is it your testimony that the sensor
11 referred to in these CrowdStrike Falcon host
12 materials is installed and running on endpoint
13 devices?

14 A I'm merely reading what it says in the
15 document in front of me from CrowdStrike that says
16 clearly that CrowdStrike Falcon host's endpoint
17 activity monitor saves time, money, while reducing
18 risk by avoiding silent failure.

19 EAM, which is basically CrowdStrike's
20 Falcon host endpoint activity monitoring, offers
21 real-time forensics by tracking all execution on
22 all hosts at all times.

23 Q So you have compared a system that
24 existed over a decade ago to patent claims of the
25 '872 patent, and I'm trying to make sure I

1 understand what the system is that you are
2 comparing to the claims.

3 So I'm asking you specifically about the
4 sensor in the CrowdStrike Falcon Platform that
5 you analyzed.

6 Where does that sensor reside?

7 **A Again, and I want to be very clear,**
8 **I'm reading from the document that I have in front**
9 **of me. I'm not making up my own mind. I'm making**
10 **up my own opinion based on extended material.**

11 **I'm reading what is in front of me. It**
12 **says very clearly that the CrowdStrike Falcon**
13 **host's endpoint activity monitoring, EAM, that**
14 **refers to host right there. And then it talks**
15 **about real-time forensics by tracking all**
16 **execution on all hosts at all times.**

17 **To me, that shows that it can be and is**
18 **installed on all hosts at all times and tracks**
19 **all execution. I'm reading directly from the**
20 **text.**

21 **Q I understand you're reading the text,**
22 **but I did not see the word "sensor" in that**
23 **paragraph, which is why I'm coming back and asking**
24 **for clarification.**

25 **Can you please scroll up to the top of**

1 that document. Maybe we can lay a little better
2 foundation here.

3 **A Yes.**

4 Q In this document, Exhibit 2016 that
5 you've been reading from, it starts out with the
6 following: CrowdStrike Falcon host is the
7 cloud-managed threat protection application
8 running on the CrowdStrike Falcon Platform.
9 Falcon host is comprised of two core components,
10 the cloud-based application and the on-premise
11 host-based sensor.

12 Do you see that, Dr. Stavrou?

13 **A I do.**

14 Q Do you have an understanding of where
15 physically the cloud-based application resides and
16 where physically the on-premise host-based sensor
17 resides?

18 **A As far as I can tell, this document**
19 **does not explain that.**

20 Q Okay. And do you have an
21 understanding of those concepts from any other
22 documents that you have analyzed as part of this
23 opinion?

24 **A So what I can tell you is that it goes**
25 **ahead and says that, Falcon Host leverages a**

1 **lightweight host-based sensor. To me that**
2 **statement means that this is a host-based sensor.**

3 **Later when it talks about the endpoint**
4 **activity monitoring, usually anybody would tell**
5 **you that endpoints are usually hosts or include**
6 **hosts, and in fact that the same sentence**
7 **continues and talks about all hosts at all times**
8 **and all execution.**

9 **Execution happens at endpoints, too. So**
10 **to me it captures everything. It can be done in**
11 **the cloud. It can be done on the host. It's a**
12 **host-based sensor.**

13 Q Let's go back to your declaration. I
14 think you can stop sharing your screen and I can
15 share mine. All right.

16 So in this portion of your declaration, if
17 I scroll down to paragraph 100 regarding
18 limitation 1A from Claim 1 on the '872 patent,
19 you state, The Falcon Platform materials describe
20 monitoring activity on the first computer system.

21 Do you see that, Dr. Stavrou?

22 **A I do.**

23 Q What is the first computer system that
24 you have mapped from the Falcon Platform
25 materials?

1 **A As I showed you, for example, on the**
2 **previous Exhibit 2016, it describes that the**
3 **Falcon Host shadows, captures and correlates**
4 **low-level operating system events, and also**
5 **provides a highly efficient real-time monitoring**
6 **of all system activities, right there.**

7 **Also Exhibit 2017 describes that, Falcon**
8 **sensors capture over 100 security-related events**
9 **including things like process creation, drivers**
10 **being loaded, registry modifications. It's right**
11 **there on paragraph 100.**

12 **Q What is a computer system as recited**
13 **in limitation 1A? What are the requirements of a**
14 **computer system?**

15 **A I don't think I mention computer**
16 **systems here other than -- so I covered that in my**
17 **declaration, I believe, but we have to go to a**
18 **different section, if you'll do it.**

19 **Q Have you opined in this section in**
20 **paragraph 100 as to whether the Falcon Platform**
21 **included a first computer system?**

22 **A I have opined in my declaration, but**
23 **not specifically here.**

24 **Q Okay. Let me make sure I understand.**
25 **So limitation 1A in Claim 1 of the '872**

1 patent states, Monitoring activity on the first
2 computer system. The first sentence in paragraph
3 100 of your declaration states, The Falcon
4 Platform materials describe monitoring activity
5 on the first computer system.

6 What is the first computer system in your
7 analysis in the Falcon Platform?

8 **A What is the first computer analysis of**
9 **the Falcon Platform? Falcon Platform mentions**
10 **clearly that the sensors run on hosts, at all**
11 **times monitoring all activity.**

12 **So I think that this is important to say,**
13 **that basically there are -- I mean, there is no**
14 **need for a specific computer to be mapped,**
15 **because it is being performed on all hosts,**
16 **according to 2016.**

17 **Q Give me one example of what a first**
18 **computer system is and your understanding of the**
19 **Falcon Platform at the time.**

20 **MR. PETERS: Objection, form,**
21 **asked and answered.**

22 **A I mean, we can go back to 2016**
23 **Exhibit. It's pretty obvious that it states**
24 **clearly that it's being done on all hosts,**
25 **monitors all activity at all times. And in 2016**

1 that talks about next level. I will share my
2 screen if you don't mind.

3 First of all, it says that these had
4 host-based detection sensors we discussed. Let
5 me find it. It says that, EAM offers real-time
6 forensics by tracking all execution on all hosts
7 at all times.

8 So as a product, it means that it can act
9 anywhere. I don't see a limitation here that
10 says that this product should run on this
11 computer or that computer.

12 Q What hardware and/or software are you
13 mapping to the phrase first computer system in
14 limitation 1A of Claim 1 of the '872 patent?

15 MR. PETERS: Objection, form,
16 asked and answered.

17 A Again, I think it's really clear from
18 paragraph 100 that Exhibit 2017 and 2016 describe
19 Falcon sensors are the host. And I think I
20 explained from 2016 that it can run -- it doesn't
21 seem to have any limitation based on the material
22 in front of me where it can be run.

23 Q (By Mr. Hart) Is a Falcon sensor
24 running on a host the first computer system
25 according to your analysis?

1 **A It can be. Yes, that's correct. It**
2 **can be.**

3 **Q You analyzed a system from over a**
4 **decade ago and concluded that it satisfied these**
5 **claim limitations, and I'm trying to understand**
6 **how you concluded that and what specifically you**
7 **looked at that mapped onto these claim**
8 **limitations.**

9 **So I'm going to ask it again. Is the**
10 **Falcon host running on an endpoint device -- I'm**
11 **sorry. Let me start over.**

12 **Is the sensor running on an endpoint host**
13 **device the first computer system in your**
14 **infringement analysis set forth in your**
15 **declaration?**

16 **MR. PETERS: Objection, form,**
17 **asked and answered.**

18 **A Again, 1A is talking about monitoring**
19 **activity on the first computer system. I believe**
20 **that I have answered the entirety the 1A by**
21 **explaining that Falcon sensors, they capture**
22 **security-related events, including things like**
23 **process creation, drivers being loaded, registry**
24 **modifications.**

25 **And it can be done on all hosts at all**

1 times and can capture basically all activity,
2 based exactly on what it says here on 2016, all
3 execution on all hosts at all times.

4 I mean, to me that statement covers the
5 fact that basically it can handle anything.

6 Q Is the first computer system in your
7 infringement analysis all hosts, or is it an
8 individual single host?

9 A My opinion was about being able to
10 perform monitoring activity on the first computer
11 system. I believe that my declaration covers that
12 very clearly. There's no need to pick a system
13 when it can run like -- I mean, I can give you
14 examples, but it's obvious that the sensor based
15 on the description of 2016 can run on all hosts at
16 all times and monitor all execution based on what
17 it says in 2016.

18 Q Claim 1 is a method claim. Right?

19 A Correct.

20 Q And your opinion is that the method
21 recited in Claim 1 was performed on the Falcon
22 Platform at approximately 2013 as it existed in
23 approximately 2013. Correct?

24 A That's what I state in my declaration.
25 That is correct.

1 Q And if we think about that method
2 being performed on CrowdStrike's 2013 Falcon
3 Platform, one example of that method being
4 performed, is the recited first computer system a
5 single individual endpoint device, or is it all
6 endpoint devices?

7 MR. PETERS: Objection, form,
8 asked and answered.

9 A Again, 2016, Exhibit 2016, does not
10 provide a limitation to that extent. So my
11 opinion is that it says all hosts. I mean, you
12 can -- I can give you examples, but that's what it
13 states.

14 Q (By Mr. Hart) In your infringement
15 analysis, have you aligned first computer system
16 with one machine or multiple machines?

17 MR. PETERS: Objection.

18 A Again, I did not consider this
19 question because the document itself states all
20 hosts, which makes it is visible to be on one or
21 more.

22 In fact, if we go a little bit down --
23 give me one second -- where you would see that in
24 paragraph 103, Exhibit 2015 as I have it here
25 describes that the Falcon Platform shares

1 information across an entire community of
2 like-minded trusted defenders.

3 Similarly, Exhibit 2051 describes the
4 product is a game changer, primarily because it
5 focuses on the concept of community helping each
6 other. People need to basically share indicators
7 of what the bad guys are doing, so the bad guys
8 and the adversaries use these techniques.

9 This implies that sharing means that there
10 is one or more computers that individually or
11 collaboratively basically share indicators, but
12 there is a point that it doesn't clarify that.
13 But it's clear here that sharing requires, you
14 know, potentially more than one computer.

15 Q (By Mr. Hart) If we stay on paragraph
16 103 that you have shown on your screen right now,
17 this is in reference to limitation 1D in Claim 1,
18 which states, Transmitting to one or more
19 computer systems other than the first computer
20 system information identifying one or more of the
21 activity sources, the activity targets and the
22 associations for preventing future attacks to the
23 one or more computer systems, and then it goes
24 on.

25 So there is a transmission from the first

1 computer system to other computer systems require
2 of this limitation. Correct?

3 **A That is correct.**

4 **Q Where in the Falcon Platform is that**
5 **transmission occurring, between what computer**
6 **systems, according to your infringement analysis?**

7 **A Here it talks about sharing of**
8 **information across an entire community of**
9 **like-minded trusted defenders.**

10 **That sharing of information as being**
11 **basically performed indicates that there is a**
12 **transmission of information, because it says**
13 **sharing of indicators, which I have highlighted**
14 **here on basically Exhibit 2051, which it's part**
15 **of that.**

16 **So the indicators, sharing of indicators**
17 **requires -- indicates the basic transmission to**
18 **other computer system indicators here is the**
19 **claim information identifying one or more of the**
20 **activity sources, the activity targets and**
21 **associations to protect ourselves, meaning to**
22 **prevent future attacks to the other computer**
23 **systems associated with the identified sources,**
24 **targets and associations.**

25 **Accordingly, these materials show that the**

1 **Falcon Platform practiced 1D.**

2 Q So what is the one or more other
3 computer systems to which that information is
4 transmitted, according to your infringement
5 analysis?

6 A Again, the Falcon Platform, and I have
7 it here, shares information across an entire
8 community of like-minded trusted defenders.

9 And again, let me break 2015 up just to
10 make more clear. You can see 2015?

11 Q Yes.

12 A Again, what we have here that, as you
13 notice, is part of the Falcon host that we have
14 discussed before, is a host-based adversary
15 detection application. And it talks about
16 identify and protect against damage from
17 determined attackers who are undetected by
18 existing passive defense solutions.

19 And then the third bullet here under
20 benefits is, Share and receive real-time
21 intelligence on attacks relevant to your
22 industries and sectors, and then continues,
23 Shares information across an entire community of
24 like-minded trusted defenders.

25 To me, sharing intelligence, and here the

1 point, it's also real-time, according to the
2 document I have in front of me, says clearly that
3 it's basically used to share among endpoints.

4 It says that correlates intelligence and
5 security events in real-time from our global of
6 network sensors and provides unprecedented level
7 of insight into adversary activities and business
8 impact from these attacks.

9 Again, I believe, and as you see here with
10 the Falcon Host it says, Cloud-managed,
11 host-based adversary detection application.

12 So maybe management of the system cloud,
13 based on what I read, is host based. That's what
14 leads me to believe that there is a transmission
15 because it clearly states that the data is shared
16 among like-minded individuals, as I point out.

17 Q Can you give me, based on your
18 understanding of these materials, one example of
19 what type of device would receive this recited
20 transmission?

21 MR. PETERS: Object to form.

22 A Again, I was not asked to opine about
23 the type of device. Here I'm opining about if the
24 specific product basically infringes or performs
25 the 1D, that the Falcon Platform practiced 1D.

1 Q (By Mr. Hart) So 1D recites
2 transmitting to one or more computer systems
3 other than the first computer system.

4 What are those one or more computer
5 systems other than the first computer system in
6 your infringement analysis?

7 MR. PETERS: Object to form, asked
8 and answered.

9 A I think I answered that question. I
10 believe that it's pretty obvious that this
11 information is shared, and the Falcon Platform
12 transmits to other computer systems' indicators
13 the claimed information identified on one or more
14 of the activity source targets, associations to
15 protect ourselves, meaning to prevent future
16 attacks to other computer systems associated with
17 the identified sources, targets and associations.

18 That's part of what I cite, and that's
19 part of what is part of the Exhibit 2015 and
20 2051.

21 Q In this paragraph referring to
22 indicators, the center of paragraph 103 in your
23 declaration you state, These materials indicate
24 that the Falcon Platform transmits to other
25 computer systems indicators.

1 Are the other computer systems not part of
2 the Falcon Platform, based on your understanding?

3 **A Again, I'm reading paragraph from**
4 **2016, sorry, 2015, and I'm bringing it up. I see**
5 **the platform is consisted, or at least it says**
6 **here, The applications are consisted from Falcon**
7 **Host, Falcon intelligence, Falcon DNS, Falcon**
8 **email.**

9 **I see that it says clearly that,**
10 **identifies malware and provides attribution of**
11 **the attackers, detects zero-day threats, and**
12 **prevents damage from targeted attacks. And then**
13 **it says also as the fourth bullet, Shares**
14 **information across an entire community of**
15 **like-minded trusted defenders.**

16 **Q Are those like-minded trusted**
17 **defenders not part of the Falcon Platform,**
18 **according to your analysis?**

19 **A It doesn't specify, sir. It can be or**
20 **it cannot be. I don't know. There's no**
21 **limitation here.**

22 **Q Well, you've analyzed a limitation**
23 **that recites transmitting to one or more computer**
24 **systems other than the first computer system. And**
25 **I'm trying -- I'm trying to figure out based on**

1 your understanding of the Falcon Platform where
2 that transmission occurs between what entities.

3 It looks like in this paragraph you have
4 stated, Materials are transmitted from a Falcon
5 Platform to other computer systems. I want to
6 know what those other computer systems are and
7 whether they are external to the Falcon Platform.

8 MR. PETERS: Object to form, asked
9 and answered.

10 A These materials indicate that the
11 Falcon Platform shares information to other
12 computer system indicators. I did not claim that
13 these computer systems are within the Falcon
14 Platform or not, because that's not specified in
15 2016 and 2051.

16 Q (By Mr. Hart) So you have formed no
17 opinion as to whether the other computer systems
18 mapped in your infringement analysis are part of
19 the Falcon claim.

20 Do I understand your testimony correctly?

21 A I believe my testimony and the
22 declaration is pretty clear. I have identified
23 the infringement of 1D by identifying
24 transmissions to one or more computer systems
25 associated with one or more of the activities

1 **sources, activities targets and associations. I**
2 **do not quantify where these computers are located.**

3 Q I'm not asking for physical locations.
4 I'm just trying to understand the nature of your
5 analysis and your understanding of the Falcon
6 Platform, so I'm going to ask that same question
7 again.

8 When you state, These materials indicate
9 that the Falcon Platform transmits to other
10 computer systems indicators, have you assessed
11 whether those other computer systems are part of
12 the Falcon Platform or not?

13 MR. PETERS: Object to form, asked
14 and answered.

15 A I did not get enough information to
16 make a determination. My focus was if the Falcon
17 Platform was -- is basically was performing or
18 practiced 1D, and that's what I performed here as
19 a task.

20 Q (By Mr. Hart) Limitation 1C recites,
21 Storing in the memory a data structure that
22 identifies the active sources, the activity
23 targets and the associations for the plurality of
24 activities.

25 Do you see that, Dr. Stavrou?

1 **A I do, sir.**

2 **Q Where have you identified the recited**
3 **data structure in the Falcon Platform?**

4 **A I explain in paragraph 102 of my**
5 **declaration.**

6 **The Falcon Platform materials describe**
7 **storing in the memory of data structure recited**
8 **in 1C. I give an example. For example,**
9 **Exhibit 2017 describes that Falcon sensors**
10 **capture over 100 security-related events**
11 **including things like process creation, drivers**
12 **being loaded, registry modifications, et cetera.**

13 **That paragraph explains that we need more**
14 **than just this. We need the context as well.**
15 **The Falcon Platform is a situational model that**
16 **keeps track of all the relationships and contexts**
17 **between all of these different processes in a**
18 **graph database.**

19 **Q You first reference that the Falcon**
20 **sensor captures over 100 security-related events.**

21 **Do you know what specific information is**
22 **captured by the sensor about these events?**

23 **A Only to the extent that is recited and**
24 **mentioned in Exhibit 2017, which I put in my**
25 **declaration.**

1 Q What specific information is captured
2 by the sensor about these events?

3 A I believe I just answered that
4 question. It says including things like process
5 creation, drivers being loaded, registry
6 modification, et cetera.

7 Q Those are events. Correct?

8 A I apologize. You cut me off. Please
9 tell me.

10 Q I defer to you. So please go ahead
11 and finish the answer that I interrupted.

12 A I want to say that I can bring up --
13 Exhibit 2017 is a video, which will make it
14 difficult for us to scroll through. But it
15 further explains that we need more than just the
16 data. We need the context as well.

17 It talks about all the relationships and
18 contexts between all these different processes in
19 a graph database. To me, in order for you to be
20 able to keep track of relationships and contexts,
21 we need to have the full picture of processes,
22 which means that basically it keeps a lot of
23 information about the processes, which maps
24 directly to activity sources, activity targets
25 and associations, because these relationships are

1 **indicative of associations and relationships and**
2 **contexts between nodes, assuming that basically**
3 **the draft data identifies sources and targets,**
4 **because it's being -- it's being basically --**
5 **that's what it says.**

6 Q I want to make sure I understand your
7 testimony.

8 You're testifying that because the data
9 capture allows the system to create this graph
10 database, the data captured must at least include
11 activity sources, activity targets and the
12 associations for the activities. Is that right?

13 MR. PETERS: Object to form.

14 A **Again, I think that I'm not relying on**
15 **that. The document itself basically mentions --**
16 **the exhibit itself mentions process creation,**
17 **drivers being loaded, registry notifications, et**
18 **cetera.**

19 My declaration further and my opinions
20 further are enforced by the fact that it says
21 further down that the Falcon Platform has a
22 situational model that keeps track of all the
23 relationships and contexts between all these
24 different processes in a graph database.

25 To me, that's an indication that in order

1 **for you to be able to keep all these different**
2 **processes and the relationships and contexts, you**
3 **need information that will allow you to use that**
4 **graph database. And that source of materials**
5 **from the Falcon Platform is from 1C.**

6 MR. HART: We've been going about
7 an hour. Why don't we take a quick ten-minute
8 break.

9 (Recess.)

10 Q (By Mr. Hart) Welcome back,
11 Dr. Stavrou. I'm going to share my screen so
12 Saundra has an easier time following the
13 conversation here.

14 We were, before we broke, we were
15 discussing your analysis of the Falcon Platform
16 materials relevant to limitation 1C in Claim 1 of
17 the '872 patent.

18 Do you recall that?

19 **A Yes, sir.**

20 Q Okay. You referenced a graph database
21 that is described in the Falcon Platform
22 materials. In this paragraph 102 that we see on
23 the screen in your declaration you state, The
24 relationships and contexts correspond to the
25 recited associations between sources and targets.

1 Further, storing the data in a graph database
2 identifies the sources and targets, e.g. the nodes
3 in the graph, and the associations, e.g. the
4 relationships and contexts between nodes.

5 Do you see that, Dr. Stavrou?

6 **A I do, sir.**

7 Q Have you seen the underlying data used
8 to generate these graph databases in the Falcon
9 Platform?

10 **A Not beyond extent that is described in**
11 **Exhibit 2017.**

12 Q And have you provided the level of
13 detail Exhibit 2017 describes here in your
14 declaration?

15 MR. PETERS: Object to form.

16 **A I believe so.**

17 Q (By Mr. Hart) So beyond the detail
18 described in your declaration, you have not seen
19 any other lower-level detail as to how that data
20 is connected by the Falcon Platform, allowing it
21 to create a graph database that you're discussing
22 here?

23 **A The extent of my opinion is limited by**
24 **the exhibits that are listed here.**

25 Q Okay. It's your opinion that because

1 the Falcon Platform system can generate this graph
2 database, that it must be storing data identifying
3 activities sources, activities targets and the
4 associations for the activities. Correct?

5 MR. PETERS: Object to form,
6 mischaracterizes.

7 A That's not exactly what I'm claiming
8 here. Also I want to point you out that in a
9 previous section of my declaration paragraph, the
10 Falcon Platform says that it tracks all hosts, all
11 execution at all times.

12 So this is not just from -- I mean, when
13 I'm talking here, I'm talking about all the
14 exhibits that I have provided in my declaration
15 in support of this argument.

16 Here I'm highlighting 2017, but my opinion
17 is informed based on more than one exhibit.

18 Q (By Mr. Hart) In limitation 1C,
19 storing in the memory a data structure that
20 identifies specific things, what does the word
21 "structure" mandate in that limitation?

22 A I don't believe that I opine about
23 that in this specific section. I mean ...

24 Q How did you interpret the phrase "data
25 structure" in limitation 1C for purposes of

1 assessing infringement?

2 MR. PETERS: Object to form.

3 A I looked at the graph database and I
4 compared -- and I asked the question, is the graph
5 database a data structure? And the answer was
6 yes.

7 Q (By Mr. Hart) So the graph database
8 is the data structure that you have mapped in
9 your analysis. Is that right?

10 A Yes, because it says storing -- I
11 clarify that further, storing the data in a graph
12 database. Identifies the sources, targets,
13 associations, relationships. And the graph
14 database can be considered a data structure.

15 Q Do you know how data is stored
16 representing the graph database in the Falcon
17 Platform?

18 A Again, my opinion is formed based on
19 all the exhibits that I have listed in my
20 declaration. Those exhibits point to tracking,
21 keeping track of all the relationships and
22 contexts between all these different processes in
23 a graph database.

24 To the extent that this stores the
25 information that we need for 1C, meaning activity

1 sources, activity targets and associations for
2 the plurality of activities, a graph database is
3 data structure.

4 Q What is a graph database?

5 A I believe that I explain that. I say,
6 Further, storing the data in a graph database
7 identifies the sources and targets, e.g. the nodes
8 of the graph, and the associations, e.g. the
9 relationships and contexts between nodes. And
10 again, I point to Exhibit 2017 at 1:42 all the way
11 to 2:11.

12 Q In the art, what is your understanding
13 of the phrase "graph database"?

14 A I have explained that. The graph
15 database identifies, it has nodes and letters, and
16 I mark those clearly to sources and targets, which
17 are considered the nodes in the graph, and their
18 associations, the relationships and contexts
19 between nodes.

20 Q That is a description of your
21 understanding of the Falcon Platform graph
22 database. I'm asking more generally, what is a
23 graph database as that phrase is used in the art?

24 MR. PETERS: Object to form,
25 scope.

1 **A** **I mean, I believe that I respond to**
2 **that directly by mapping here what I perceive to**
3 **be the graph database for the specific product,**
4 **Falcon Platform.**

5 **It has nodes and letters, and I mark those**
6 **clearly to sources and targets, which are**
7 **considered the nodes in the graph, and their**
8 **associations, the relationships and contexts**
9 **between nodes.**

10 **Q** **(By Mr. Hart) Were you familiar with**
11 **the phrase "graph database" before you looked at**
12 **these Falcon Platform materials?**

13 **A** **Of course.**

14 **Q** **And what is a graph database, separate**
15 **and apart from the Falcon Platform?**

16 **MR. PETERS: Same objections.**

17 **A** **A graph database can take different**
18 **forms. It's a data structure, and it can take**
19 **different forms. Mapping here what I understand**
20 **to be the graph database in the Falcon Platform,**
21 **specifically nodes that identify the source and**
22 **targets and their associations, relationship and**
23 **contexts between the nodes.**

24 **Q** **(By Mr. Hart) What are the**
25 **characteristics of a graph database that**

1 distinguish it from other databases, separate and
2 apart from the Falcon Platform?

3 MR. PETERS: Object to scope.

4 A Again, it can take different forms.
5 And there would be different database products
6 that claim to be graph database.

7 Here I specifically explained how that
8 graph database could look based on what I've seen
9 on the exhibits.

10 Q (By Mr. Hart) Are you able to
11 describe characteristics that are common between
12 graph databases separate and apart from the
13 Falcon Platform?

14 MR. PETERS: Same objection.

15 A Again, the Falcon database has evolved
16 over time. And I would be remiss if I don't bring
17 this up. It's very basic. And there is a set of
18 nodes and associations between them.

19 Q (By Mr. Hart) And is the phrase
20 "graph database" referring just to the storage of
21 data, or is there a display component that comes
22 along with a graph database?

23 A I won't be able to tell you based on
24 what I see in front of me.

25 Q Scrolling down to paragraph 103 in

1 your declaration, we covered this a bit earlier
2 but I want to revisit the discussion with
3 indicators.

4 About halfway down paragraph 103 you
5 state, These materials indicate that the Falcon
6 Platform transmits to other computer systems
7 indicators, the claimed information identifying
8 one or more of the activity sources, the activity
9 targets and the associations, to protect
10 ourselves, meaning to prevent future attacks to
11 the other computer systems associated with the
12 identified sources, targets and associations.

13 Do you see that?

14 **A I do.**

15 Q What is the relationship between these
16 indicators and the graph database?

17 **A I don't think that I opine about that**
18 **here, and that was not something that I**
19 **considered.**

20 Q Okay. Have you seen any examples of
21 these indicators you discuss?

22 **A I have seen what is being described in**
23 **Exhibit 2015 and 2051 in the sense that it**
24 **discusses certain indicators and talks about --**
25 **and again, I want to bring up 2015 if you don't**

1 mind so I can point you.

2 Let me see if I have it here. Do you mind
3 if I share my screen?

4 Q Go ahead.

5 A Thank you. All right, can you guys
6 see my screen?

7 Q Yes.

8 A So based on the description of the
9 platform it says, Designed to continuously monitor
10 share and mitigate the adversary's tactics,
11 techniques and procedures. That sentence alone
12 requires basically a lot of information.

13 CrowdStrike Falcon provides unmatched
14 real-time detection, attribution, flexible range
15 of response actions and intelligence
16 dissemination capabilities.

17 And based on the list of bullets which I
18 will cite here, detects zero-day threats and
19 prevents damage from targeted attacks, identifies
20 malware, and provides attribution of the
21 attackers, provides a flexible range of responses
22 to raise the cost and risk to the adversary,
23 shares information across an entire community of
24 like-minded trusted defenders, and then says
25 leverages a cloud-based platform and a global

1 network of event-driven security sensors.

2 To me, to be able to perform these
3 functions and basically later on the benefits,
4 identify and protect against damage from
5 determined attackers who are undetected by
6 existing passive defense solutions.

7 It says, Understand who is attacking you,
8 why, and what they want to steal or damage.
9 That's a lot of information you need to extract.

10 And share and receive real-time
11 intelligence on attacks relevant to your
12 industries and sectors. I believe it says
13 sectors.

14 To me, this requires the sharing of a lot
15 of information regarding the attack and basically
16 event data as it's -- the product states itself.
17 So while I have not seen an example because that
18 doesn't provide an example, it says that it can
19 actually pinpoint targeted attacks in real-time.

20 And it says, This massive intelligence
21 repository is constantly mined, and advanced
22 analytics are used to reveal insights that have
23 escaped existing solutions.

24 I think it clearly indicates that -- it
25 clearly indicates that there's a lot of

1 information being shared and received in
2 real-time by relevant -- basically not only just
3 attacks, on attacks, but relevant to industries
4 and sectors.

5 And it says, No on-premises equipment
6 needed, reducing the overall total cost of
7 ownership.

8 But the section that is important is that
9 it basically identifies a lot of information.
10 And that is from endpoints.

11 And again, let me switch to 2016, which is
12 relevant because again it talks about the Falcon
13 Platform. It talks about all execution on all --
14 tracks all execution on all hosts at all times.
15 To me, being able to, in order to detect
16 sophisticated attacks, you would need to transfer
17 a lot of information between hosts, as it says
18 here.

19 And in fact, it talks about all hosts at
20 all times, all execution. So this here is very
21 broad.

22 Q Right. I'd like to shift gears a
23 little bit and turn next to the '872 patent
24 itself. I'm going to refer to your discussion of
25 the '872 patent in your declaration, Exhibit 2031.

1 Let me share my screen for Sandra.

2 So for paragraph 17 through 34 in your
3 declaration, you summarize important aspects of
4 the '872 patent. I'm going to start at paragraph
5 20 with my questioning. You see it in paragraph
6 20, The '872 patent shifted the focus of malware
7 detection from the network perimeter to activity
8 occurring within a given computer system.

9 This shift, which is reflected throughout
10 the specification and in the claims, see e.g.
11 Claim 1, which recites monitoring activity on the
12 first computer system, represented a paradigm
13 shift and serves as a key distinction between the
14 '872 patent and the prior art referenced in the
15 petition, including Capalik, as explained further
16 below.

17 I'd like to better understand your opinion
18 as to how the malware monitoring differs between
19 the '872 patent and what Capalik describes. So
20 to start, I want to lay a little foundation.

21 You agree that both Capalik and the '872
22 patent utilize decoy systems. Correct?

23 **A While I would agree the detail is**
24 **here, so the way that they have been used,**
25 **exercised, monitored is important.**

1 Q And I'm getting there. I want to lay
2 a little foundation to make sure we agree on the
3 basics, so we can get into the more specifics as
4 to the disagreement.

5 So they both utilize decoy systems. You
6 would agree that both deploy virtual machines in
7 those decoy systems that are susceptible to
8 attack. Right?

9 MR. PETERS: Object to form.

10 A While there are some mentions, there
11 are in many cases examples as to how claims are
12 being listed in the specification as examples
13 to -- that's about it.

14 I didn't see the requirement in any of the
15 claims, but please point me if that's the case.

16 Q (By Mr. Hart) I'm not asking you
17 about the claims yet. I'm just laying some
18 ground -- laying a little foundation to make sure
19 we're on the same page as to the similarities,
20 which should help the conversation focus in on
21 the differences that you have discussed in your
22 declaration.

23 You would agree that both Capalik and the
24 '872 patent monitor attacks to decoy systems that
25 occur in virtual machines, wouldn't you?

1 MR. PETERS: Object to form.

2 A I don't think that it is a realistic
3 view of what is happening. I would say it's not
4 accurate, in my opinion.

5 I mean, while there is monitoring of
6 activity, the way it's performed and the type of
7 how it's performed is important.

8 Q (By Mr. Hart) Let's get to the
9 difference.

10 You describe a key distinction between the
11 '872 patent and the prior art reference in the
12 petition, including Capalik. What is that key
13 distinction?

14 A I believe I have the restrictions that
15 I mention later in my declaration. If you have --
16 I mean, I could point you to my declaration, but
17 there are plenty of places where I show the
18 differences basically.

19 Q Let me jump in here to clarify. I'm
20 not asking -- I'm not suggesting that you have
21 identified one and only one distinction between
22 the prior art in the '872 patent. I read into the
23 record your discussion in paragraph 20 that
24 identifies an alleged paradigm shift which you
25 contend serves as a key distinction between the

1 '872 patent and Capalik.

2 What is the key distinction you're
3 alluding to in this paragraph?

4 A So there are more than one, as I said,
5 key descriptions. And basically I describe them
6 further down. I'm happy to point you to my
7 declaration and discuss them.

8 But basically they have to do mostly with
9 the way that the two patents here are completely
10 different claims. So they're related to claims.
11 So I would be remiss if I just focus on one of
12 them.

13 Q Well, this paragraph refers to one.
14 You identify a paradigm shift and an alleged key
15 distinction.

16 What is the key distinction you're
17 referring to in this paragraph of your
18 declaration?

19 A So I can point you to, for example,
20 this is an example, so I don't want to -- I don't
21 want to make it -- I mean, again, this was a
22 phrase that I use here, but there are more than
23 one distinctions.

24 So I'm going to point you, if you go to
25 page 43 where, it talks about Claim 2. If you go

1 to paragraph 67, Claim 2 recites monitoring of
2 all activity on the first computer system where
3 the first computer system is the system on which
4 unauthorized activities are being identified.

5 As described above, Capalik monitors only
6 activity associated with a network connection
7 through a socket and only after an attacker
8 connects to the decoy. And I have a reference to
9 Capalik 0027, 0049, 0059 of Capalik.

10 It does not monitor all activity across
11 the decoy computer, including the processing
12 module 508, which has its own operating system
13 and performs substantial work, such as storing
14 attack information, creating signatures and
15 transmitting signatures to the IDS/IPS.

16 Again, this is from Capalik 0051 to 0052.
17 CrowdStrike does not identify any disclosure in
18 Capalik of any monitoring of that processing
19 module. To the contrary, the processing 508 is
20 merely a trust part of the decoy and not
21 monitored by the introspection of the module.

22 Capalik 0051, processing module is part of
23 a secure and separate administrative network from
24 the introspection module.

25 And I go to -- I have a lot more. And I

1 go 69 if you don't mind, where I contrast it,
2 since you want the contrast. By contrast, the
3 '872 patent explicitly discloses monitoring
4 various types of internal activities, such as
5 file modifications, user actions, instructions or
6 processes, threads, data streams and socket
7 connections.

8 And I have a reference to '872 patent,
9 15:41 all the way to 47. And it's illustrated in
10 Figures 4A through 4D. And the system can detect
11 unauthorized activity in files X and Y.

12 There is a lot of detail here. I can go
13 on, recite my declaration if you like. But one
14 of the key differences is what I just describe.

15 Q Going back to paragraph 67 that you
16 read into the record you state, As discussed
17 above, Capalik monitors only activity associated
18 with a network connection through a socket and
19 only after an attacker connects to the decoy.

20 Are you suggesting that Capalik's
21 monitoring is limited to data passing through the
22 socket?

23 A I explicitly -- that's incorrect,
24 first of all. Let's start with that.

25 Capalik monitors activity associated with

1 **network connection through a socket and only**
2 **after an attacker connects to the decoy. That is**
3 **my statement, and I stand by it.**

4 Q So Capalik does monitor the attack as
5 it runs on the virtual machine. Correct?

6 A **Yes, to the extent that the sensors**
7 **provide information about this attack, like**
8 **whatever is collected by Capalik.**

9 Q Does Capalik monitor activities as
10 they run on the virtual machine?

11 A **What are you referring to? Can you**
12 **rephrase that statement?**

13 Q You state, Capalik monitors only
14 activity associated with a network connection
15 through a socket and only after an attacker
16 connects to the decoy.

17 So once an attacker connects through
18 the -- to the decoy through a socket, does
19 Capalik monitor the attack-related activities
20 running on the virtual machine?

21 A **That is correct. The attack**
22 **activities, that's correct.**

23 Q And help me understand, how is that
24 different from what the '872 patent monitors?

25 A **I believe I state that very clearly on**

1 paragraph 69. I say -- and you can go there. By
2 contrast, the '872 patent explicitly discloses
3 monitoring various types of internal activity,
4 such as file modifications, user actions,
5 instructions or processes, threads, data streams
6 and socket connections, as described in patent
7 '872, 15:41 to 47, also illustrated in Figures 4A
8 through 4D.

9 The system can detect unauthorized
10 activities in files X and Y, propagate that
11 activity to process A and B, and only later
12 identify a socket and incoming packet stream as
13 affected by unauthorized activity. Again, it's
14 patent '872, column 12, lines two through 26.

15 These internal events can be detected and
16 modeled even before any suspicious network
17 activity is recognized. A person of ordinary
18 skill would have understood such a solution to be
19 fundamentally different from the monitoring
20 described in Capalik, which is based on
21 monitoring data that flows through a socket.

22 Q You agree that Capalik monitors
23 internal activities of an attack. Correct?

24 A You have to explain to me what you
25 mean by internal activities of an attack.

1 Q Paragraph 69 you state, The '872
2 patent explicitly discloses monitoring various
3 types of internal activity, such as file
4 modifications, user actions, instructions or
5 processes, threads, data streams and socket
6 connections.

7 Does Capalik monitor those types of
8 internal activities?

9 A Capalik is monitoring only activities
10 as in relation to a network connection from an
11 attacker.

12 Here I think you are mistaking the type of
13 internal activities that I'm referring to, which
14 are very clear in my declaration, talking about
15 file modifications that are not necessarily --
16 they are not necessarily because of socket
17 creation or incoming network, network
18 connections.

19 I state that, These internal events can be
20 detected and modeled even before any suspicious
21 network activity is recognized.

22 Q I understand that you are drawing a
23 distinction between triggering events that cause
24 the monitoring to occur, and I want to look
25 specifically at the types of monitoring that is

1 occurring.

2 You agree with me that in both the '872
3 patent and in Capalik, the systems are monitoring
4 the internal activities running on a virtual
5 machine as part of an attack. Correct?

6 **A I disagree.**

7 Q And why don't you agree with that?

8 **A I will explain why. I disagree**
9 **because the scope is very limited. In one case**
10 **you are relying -- and actually if you can bring**
11 **up Capalik.**

12 I want to be very clear. Capalik 0049, if
13 you have it. If you don't have it, I can bring
14 it up.

15 Q I can share Capalik.

16 **A I apologize. I just want to be**
17 **precise.**

18 Q I appreciate the precision. Capalik
19 is on the screen.

20 Is there a particular place in Capalik you
21 would like me to scroll?

22 **A Yes, sir. If you can go to 0049.**

23 Q 0049 is currently on the screen.

24 **A So it starts by saying, When an**
25 **attacker connects to a network port and begins**

1 interacting with a virtualized decoy operating
2 system 512, the introspection module 538 monitors
3 and captures information from the connection,
4 including port numbers, data streams, file
5 uploads, keystrokes, ASCII or binary files,
6 malicious payloads, memory manipulation attempts,
7 and any other data transfers or malicious
8 attempts.

9 This is clearly predicated by a network
10 connection by the attacker. That is not the same
11 as to say that the virtual machine is monitored
12 all the time for activity that does not --
13 necessarily an attacker activity is not
14 necessarily attributed or started or instigated
15 or triggered by a network connection.

16 Q So once the triggering event occurs in
17 Capalik with an attack entering the port and
18 attacking the virtual machine, Capalik is
19 monitoring activity subsequent to that as they
20 occur in the virtual machine. Correct?

21 MR. PETERS: Object to form.

22 A Again, I would say that I read 0049.
23 That is what it says here. There is an
24 introspection module 558 that captures
25 introspection, that information.

1 **To the extent that this information is**
2 **captured by the introspection module, then yes,**
3 **that information is gonna be available.**

4 Q (By Mr. Hart) Is the introspection
5 module in Capalik monitoring activities as they
6 occur on the virtual machine?

7 **A I believe so.**

8 Q Let's go back to your description of
9 the '872 patent. Let me switch my screen share
10 here.

11 In paragraph 21 you state that, The '872
12 patent discloses and claims techniques for
13 identifying unauthorized activities by monitoring
14 and identifying associations between activity
15 sources and activity targets without using
16 predetermined fingerprints, and in turn, using
17 the collected data to generate fingerprints of
18 zero-day attacks.

19 On the next page in the same paragraph
20 that I have up on the screen, you note that, The
21 system continuously observes activity occurring
22 inside the endpoint, enabling the identification
23 of malicious behaviors undetected by prior
24 systems.

25 In support of that, you cite the '872

1 patent, column ten, lines eight through ten,
2 which states, In some embodiments, the
3 introspection module monitors all activity, e.g.
4 system calls, library calls, kernel calls, et
5 cetera, on virtualized decoy operating system
6 112.

7 Is it your opinion that the introspection
8 module in the '872 patent monitors and identifies
9 associations between activity sources and
10 activity targets consistent with the claims of
11 the '872 patent?

12 MR. PETERS: Object to form.

13 **A Again, I believe that it's clear there**
14 **it says in some embodiments. It's just an example**
15 **as an exemplar that states that introspection**
16 **monitors all activity.**

17 Q (By Mr. Hart) There are a number of
18 places in your analysis where you identify
19 certain embodiments that you contend fall outside
20 the scope of the claim and certain embodiments
21 that you contend are consistent with the claims.

22 For example, you discuss sending
23 fingerprints to an IDS/IPS versus sending
24 fingerprints to an endpoint device.

25 Do you recall that discussion?

1 MR. PETERS: Object to form.

2 A I would like to see what exactly is it
3 that you are pointing to.

4 Q (By Mr. Hart) Let me -- I am not
5 asking you about the IPS/IDS right now. So what
6 I want to make sure I do right now is make sure I
7 understand what teachings in the '872 patent you
8 believe are consistent with the '872 claims.

9 And so when we're talking about the
10 claimed process of monitoring and identifying
11 associations between activity sources and
12 activity targets, without using predetermined
13 fingerprints, is it your understanding that the
14 introspection module operation is one example
15 that is consistent with the claim process of
16 identifying an unauthorized activities by
17 monitoring and identifying associations between
18 activity associations and activity targets?

19 MR. PETERS: Object to form.

20 A I would say it is consistent, yes.

21 Q (By Mr. Hart) Okay, very good. Let's
22 go to the '872 patent itself, which is
23 Exhibit 1001 in this proceeding. I'm going to
24 scroll down to paragraph -- I'm sorry, column six
25 toward the end and the top of column seven.

1 Column six, line -- starting at line 58
2 states, The introspection module is configured to
3 examine the memory assigned to virtualized decoy
4 operating systems 112 in order to acquire
5 low-level data about the interaction between the
6 decoy operating systems 112 and attack activity.

7 Do you see that?

8 **A I am sure. It's too small for me.**
9 **Can you --**

10 Q Yes, I can. And obviously feel free
11 to use your own. I'm putting this on the screen
12 for Sandra's benefit mostly.

13 I'll read that again. The introspection
14 module is configured to examine the memory
15 assigned to virtualized decoy operating systems
16 112 in order to acquire low-level data about the
17 interaction between the decoy operating systems
18 112 and attack activity.

19 Do you see that?

20 **A I do.**

21 Q Okay. Then 23, we go to the bottom of
22 that paragraph, which flows over to column seven,
23 the second to last sentence here. In this manner,
24 the introspection module examines the contents of
25 the memory segments of the virtualized decoy

1 operating systems 112 in an instrumented context
2 that generates and retrieves forensic data or
3 fingerprint.

4 Do you see that?

5 **A Yes.**

6 Q Is this forensic data produced by the
7 introspection module consistent with the activity
8 sources, activity targets and the associations
9 between the sources and targets that are
10 referenced in the '872 patent claims?

11 MR. PETERS: Object to form.

12 **A I don't see any mention. I cannot**
13 **based on this text. It doesn't seem there is a**
14 **contradiction.**

15 Q (By Mr. Hart) It does not seem like
16 there is a contradiction? Did I hear you
17 correctly?

18 **A Yes.**

19 Q This forensic data that is generated
20 by the introspection module, if I scroll down and
21 take a look at Claim 1 of the '872 patent, which
22 refers to a data structure that identifies the
23 activity sources, the activity targets and the
24 associations for the plurality of activities, is
25 the forensic data produced by the introspection

1 module sufficient to teach this data structure?

2 MR. PETERS: Object to form.

3 A Again, I think the question is very
4 generic, but I would say that the information that
5 you need to create the data structure might be
6 present, but the formation, storage and
7 identification of the specific elements of data
8 activity sources and activity target and
9 associations have to be present and clearly
10 delineated and stored in memory for a data
11 structure to happen.

12 Q (By Mr. Hart) So your opinion is that
13 the data structure required Claim 1 uses the
14 forensic data created by the or generated by the
15 introspection module, but then organizes it in a
16 different way. Is that right?

17 A I believe it requires -- it might
18 require additional steps, like processing,
19 inference, a forensic information. All forensic
20 information by nature can be very big and also
21 might require additional processing.

22 I wouldn't know, because again this is
23 something that's not described. But I would say
24 that while the information might be present in a
25 forensic log, how you organize it, present it

1 and, you know, structure data structuring where
2 you store it, here identifying activity sources,
3 activity targets and associations, is what
4 separates it from the forensics data.

5 Q Okay. So the claim data structure
6 differs from the forensic data in how the data is
7 organized and presented. Is that right?

8 MR. PETERS: Object to form.

9 A Not exactly true. Again, it's
10 important that we understand that there is no
11 clear description here how you pass from the
12 forensic data to the -- there is no clear
13 explanation on how the data structure -- there is
14 clear requirement that there is a data structure
15 that identifies the activity sources, activity
16 targets and associations, which can be derived on
17 this case by the forensic information.

18 But how the data is analyzed, processed to
19 reach the point of creating that data structure
20 that has that information inside is not something
21 that is -- I would have understood that this is
22 feasible, but it's not clearly delineated as far
23 as I can tell.

24 Q So the '872 patent does not describe
25 how you transition from forensic data to the claim

1 data structure. Is that right?

2 MR. PETERS: Object to form.

3 A I didn't say that.

4 Q (By Mr. Hart) Okay.

5 A I think that -- I think that is
6 described -- it's not described in the -- in
7 detail, but it shows that basically that
8 information is used to form the data structure.

9 MR. HART: My apologies. We've
10 not been going quite an hour, but I could use a
11 quick break. Is everybody okay with another ten
12 minutes?

13 (Recess.)

14 Q (By Mr. Hart) Welcome back,
15 Dr. Stavrou. When we broke, we were discussing
16 the forensic data generated by the introspection
17 module in the '872 patent. I want to take you to
18 a discussion of that forensic data in the
19 introspection module in the '872 patent at column
20 ten. You should see my screen share. I've
21 highlighted the portion I'm going to read in.

22 Column ten, starting at line 30, The '872
23 patent states, In use, the introspection module
24 captures through the introspection raw attack
25 information. The raw attack information is then

1 communicated to and stored on the database server
2 128 as forensic data 236 for later analysis.

3 The fingerprint generation engine 130 or
4 the trace analyzer 226 then uses this raw
5 forensic information 236 to generate a signature
6 of the attack.

7 Do you see that, Dr. Stavrou?

8 **A I do, sir.**

9 Q So the introspection module produces
10 raw forensic data reflecting attack activities.
11 Correct?

12 **A In this specific portion of the**
13 **patent, that's what it says, yes.**

14 Q And then that raw forensic data is
15 used to create a signature of the attack. Right?

16 **A I believe it also says that it's**
17 **communicated to and stored on the database server**
18 **128.**

19 Q Was there a "yes and" in your answer?

20 **A Yes and, yes.**

21 Q Let's go down to the claim, so I can
22 better understand how these disclosures tie into
23 the claimed invention.

24 In Claim 1 that I have here on the screen,
25 there is a method step, storing in the memory a

1 data structure that identifies the activity
2 sources, the activity targets and the
3 associations for the plurality of activities.

4 And then in Claim 3 it recites, Further
5 comprising creating from the stored information a
6 fingerprint indicative of the activity on the
7 first computer system.

8 Do you see that, Dr. Stavrou?

9 **A I do, sir.**

10 Q Is the data structure recited in
11 Claim 1 consistent with that raw forensic data
12 generated by the introspection module?

13 MR. PETERS: Object to form.

14 **A For that I would like to point you to**
15 **paragraph 60 of my declaration. If you can bring**
16 **it up, that would be helpful.**

17 Q (By Mr. Hart) All right, paragraph 60
18 from your declaration is on the shared screen.

19 **A So I'm saying here that, The '872**
20 **patent stands in sharp contrast, as it expressly**
21 **describes and illustrates data structures,**
22 **including Figures 5A to 5C, that identify for each**
23 **of the plurality of activities, their sources,**
24 **their targets, and the associations between them.**

25 **The '872 patent in 12, column 12, line 45**

1 to 48, there is a lot of references there,
2 including Figures 3A to 3C and 4A to 4E and 5A to
3 5C. In other words, for each activity or event,
4 the data structure must identify a source,
5 target, associations between the source and
6 target.

7 Capalik provides no comparable disclosure.
8 CrowdStrike does not provide any rationale for
9 adding such structure to Capalik's network-based
10 signature-generation approach.

11 While there are some excerpts in the
12 patent that focus on different elements of the
13 patent, the patent clearly illustrates data
14 structure.

15 And if we go back to the patent, if you go
16 to Figure 5A -- and I apologize about swapping,
17 but unfortunately this is our references from the
18 patent -- 5A, yes, here you go, you can see here
19 that there is a clear data structure that says,
20 Status, frequency, global timestamp.

21 It's an example, of course, but this is
22 basically what it looks like. And of course, if
23 you continue, I mean, it delineates what these
24 are further down, Figures 5B and 5C.

25 Q Is it your understanding that the

1 claimed data structure must store sources, targets
2 and associations, as depicted in these figures?

3 MR. PETERS: Object to form.

4 A They can. These are exemplars, which
5 should not be taken as the only mechanism. They
6 are just examples. And in these examples, I
7 believe all these elements are displayed.

8 But they are not the only ways that this
9 information can be displayed. It's just an
10 example.

11 Q (By Mr. Hart) How else might
12 individual data items be stored to satisfy the
13 claim data structure if not in the way depicted
14 in these figures?

15 MR. PETERS: Object to form, calls
16 for speculation.

17 A Again, I mean, I was not asked to
18 opine about all the possibilities that data can be
19 put in a data structure. And that's basically
20 something I have not contemplated.

21 But I have an example in front of me that
22 shows that, which makes it completely different
23 than forensic data look, which might or might not
24 have information displayed here immediately. It
25 might require post-processing.

1 **In fact, in Capalik, the forensic load**
2 **data are not -- are never clearly described.**

3 Q (By Mr. Hart) So your testimony is
4 that the claim data structure does not
5 necessarily require storing data as depicted in
6 these figures, but it does require organizing
7 data beyond just the raw forensic data produced
8 by the introspection module. Is that right?

9 MR. PETERS: Object to form.

10 A **Again, I'm not entirely sure. Your**
11 **question is a little bit misleading, because I**
12 **explain that these just an example.**

13 **I believe the claim is pretty clear about**
14 **what it requires. It requires basically to store**
15 **in memory a data structure that identifies the**
16 **activity sources, the activity targets and their**
17 **associations for the variety of activities.**

18 Q (By Mr. Hart) Let's just focus on the
19 second half of my question.

20 Is it your testimony that the claimed data
21 structure requires something beyond the raw
22 forensic data produced by the introspection
23 module?

24 A **Once it's beyond in terms of data**
25 **processing -- I mean, beyond is not clearly**

1 **defined, in what sense you mean beyond.**

2 Q Is the raw forensic data produced by
3 the introspection module sufficient to satisfy the
4 claimed data structure?

5 A Clearly the information -- the
6 information for the raw forensic data is not
7 usually -- logs are not usually organized in the
8 form of a data structure that clearly delineates
9 activity sources, activity targets and
10 associations for a variety of activities.

11 And I didn't see any mention of that in
12 Capalik.

13 Q And this is the understanding I'm
14 trying to get to.

15 It's your understanding that if you take
16 raw forensic data produced by the introspection
17 module as described in the '872 patent, that
18 would not necessarily be organized in a way that
19 would satisfy the claimed data structure.

20 Do I have that right?

21 A I think again you misunderstand. I
22 think that maybe the elements to create the data
23 structure information is probably -- could
24 potentially be present. And we can look at an
25 example of how this information should be stored

1 in memory as part of the claim.

2 I don't see -- I mean, the information
3 produced is part of the description of the
4 packet, which makes it consistent. I don't see
5 any inconsistencies here.

6 Q There's a difference between
7 consistent and sufficient when it comes to
8 aligning the specification with the claims. I'm
9 trying to get to sufficient.

10 If we -- if we look at the introspection
11 module and the forensic data that it produces, I
12 believe you have already testified unambiguously
13 that that forensic data is consistent with the
14 claimed invention. I'm trying to get to whether
15 it is sufficient to satisfy the claimed data
16 structure.

17 A So again, I believe that I answered
18 that question.

19 First of all, and just to be clear, it
20 doesn't mention any organization of any forensic
21 data. So the presentation identifies sources,
22 targets and associations is necessary, and I
23 believe the '872 patent is making it clear by
24 providing figures and expressly describes and
25 illustrates data structures, including Figures 5A

1 to 5C that identify for each of the variety of
2 activities their sources, their targets and their
3 associations between them.

4 And the patent '872, patent column 45 to
5 48, Figures 3A to 3C, Figures 4A to 4E and 5A to
6 5C all indicate that. So while there's
7 description of what is in data, this data
8 organized as a data structure is clear invention
9 by the patent.

10 Q The organized data is the invention of
11 the patent.

12 Is that what your testimony was just then?

13 MR. PETERS: Object to form.

14 A Again, I think you are
15 mischaracterizing what I'm just suggesting. No.
16 I mean, to satisfy -- you are asking me about
17 specific limitation 1C.

18 And my position there is Capalik does not
19 teach or suggest storing memory data structure
20 that identifies the activity sources, the
21 activity targets and the associations for the
22 plurality of activities.

23 Q (By Mr. Hart) Again, I'm not
24 mentioning Capalik at all in this line of
25 questions. I'm trying to get to the bottom of

1 what the '872 patent is teaching and what the
2 '872 patent is claiming, based on your
3 understanding of the record here.

4 And as I understand your testimony, there
5 is a difference between raw forensic data
6 produced by the introspection module and
7 organized data reflecting the data structure as
8 recited in limitation 1C.

9 Do I have that right?

10 MR. PETERS: Object to form.

11 A Again, it's not enough. Claim 1C
12 requires data structure stored in memory that
13 basically identifies the activity sources,
14 activity targets and associations.

15 An example of that is in the specification
16 of the patent.

17 Q (By Mr. Hart) Let's go back to the
18 column ten discussion in the '872 patent that we
19 covered earlier

20 So column 10, description of the
21 introspection module functionality that we read
22 earlier, starting at line 30 in column ten, In
23 use, the introspection module captures through
24 the introspection raw attack information. The
25 raw attack information is then communicated to

1 and stored on the database server 128 as forensic
2 data 236 for later analysis.

3 The fingerprint generation engine 130 or
4 the trace analyzer 226 then uses this raw
5 forensic information 236 to generate a signature
6 of the attack.

7 Let me go back to the claims here. In
8 Claim 3 that we looked at earlier, creating a
9 fingerprint indicative of the activity on the
10 first computer system, is the signature of attack
11 that was described in column 10 consistent with
12 the claimed fingerprint indicative of the
13 activity on the first computer system in Claim 3?

14 MR. PETERS: Object to form.

15 A Again, I want to point you back to the
16 patent.

17 Q (By Mr. Hart) This is the patent.
18 Did you answer?

19 A No. I point you to the discussion
20 about the data structures, because I think you're
21 directing the attention from data structure.

22 If you go to column one, page one, column
23 one of the patent, please. So the patent is
24 entitled System and Method for Identifying
25 Unauthorized Activities on a Computer System

1 **Using a Data Structure Model. I mean, that's in**
2 **the title.**

3 **Now, it's mentioned multiple times in the**
4 **specification. You're pushing and you're reading**
5 **excerpts of a specification without actually**
6 **putting it in context.**

7 **I repeat that Figure 5A illustrates an**
8 **exemplary data structure of an authorized**
9 **activity data, in accordance with some**
10 **embodiments. And 5B is again an exemplary data**
11 **structure of fingerprint in accordance with some**
12 **embodiments. 5C illustrates another example of**
13 **data structure of fingerprint in accordance with**
14 **embodiments.**

15 **So you have it there, both for**
16 **unauthorized activity data and for fingerprint.**
17 **I don't have to guess because the patent already**
18 **explains it.**

19 **Q I don't have to guess because the**
20 **patent already explains it, I'm not entirely sure**
21 **what you mean by that.**

22 **A I mean the patent describes it. If**
23 **you go again to column three.**

24 **Q Yes.**

25 **A Please go to column three. It says**

1 explicitly what figure 5A, 5B and 5C are. I'm
2 reading from the patent.

3 Here 5A illustrates an exemplary data
4 structure of unauthorized activity data in
5 accordance with some embodiments. 5B, Figure 5B,
6 illustrates an exemplary data structure of
7 fingerprint in accordance what some embodiments.

8 Figure 5C illustrates another exemplary
9 data structure of fingerprint in accordance with
10 some embodiments. It provides examples.

11 We can go to 5A, and I can walk you
12 through what it shows, in 5B and 5C. It's up to
13 you.

14 Q I would like you to answer my
15 question, which relates to the discussion of a
16 signature of the attack generated from the
17 forensic data produced by the introspection
18 module.

19 Is the signature of the attack described
20 in the '872 patent consistent with the
21 fingerprint claimed in Claim 3?

22 MR. PETERS: Object to form.

23 Q (By Mr. Hart) Or is that an
24 embodiment that falls outside the scope of these
25 claims?

1 MR. PETERS: Objection.

2 A Again, I would point you further down
3 in the same column. It says, In some embodiments,
4 the fingerprint generation engine 130 or the trace
5 analyzer 226 uses the raw attack information to
6 generate a signature of the attack, without
7 storing the raw attack information in data
8 storage, data server.

9 It should be appreciated that although the
10 signature of the attack may be used to generate
11 an attack signature suitable for use in security
12 applications, the signature of the attack is
13 distinct from the attack signature.

14 The signature, also called a fingerprint,
15 may be used for providing detailed forensic
16 analysis of the character and nature of the
17 attack or the nature of the attack and its impact
18 on the operating system, which can be used as the
19 basis for generating triggers.

20 Such triggers may be used to deny
21 malicious system or library calls on the decoy
22 operating system 112. And it goes on.

23 So I think that this is clear there what
24 it does.

25 Q I wish it were. Is the signature of

1 the attack or the attack signature, which this
2 paragraph distinguishes, which one of those is
3 consistent with the claimed invention that recites
4 a fingerprint?

5 MR. PETERS: Object to form.

6 Q (By Mr. Hart) The signature of the
7 attack or the attack signature?

8 MR. PETERS: Object to form.

9 A Again, I think that I'm not sure if we
10 are reading the same thing.

11 I believe that here we have the
12 information is stored in a form in the data, in
13 this data format, that allows you basically to
14 extract signatures. I mean, the data structure
15 aids in that, in that, in that.

16 But the data structure contains
17 information or some of the information --
18 actually it contains the information to create
19 the signature. But also basically again -- I'm
20 not understanding your question, sir.

21 Q Sure. So the paragraph you read into
22 the record says, It should be appreciated that
23 although the signature of the attack may be used
24 to generate an attack signature suitable for use
25 in security applications e.g. IPS, AV, et cetera,

1 the signature of the attack is distinct from the
2 attack signature.

3 Which of those, if either, between the
4 signature of the attack and the attack signature
5 is consistent with the claimed invention?

6 MR. PETERS: Object to form.

7 **A I believe both of them, because of the**
8 **information -- the information you can derive both**
9 **of them based on that information.**

10 Q (By Mr. Hart) And are they both
11 potentially consistent with the fingerprint
12 recited in Claim 3?

13 MR. PETERS: Object to form.

14 **A I don't see any fingerprint in**
15 **Claim 3.**

16 Q (By Mr. Hart) Is it because I don't
17 have it on the screen?

18 **A Yes, sir.**

19 Q Okay. Now it's on the screen.
20 Claim 3, creating from the stored information a
21 fingerprint indicative of the activity on the
22 first computer system.

23 **A Yes. The fingerprint, it is**
24 **fingerprint of the activity is consistent,**
25 **correct.**

1 Q Okay. So both the signature of the
2 attack and the attack signature referred to in
3 column 10 are consistent with this fingerprint
4 indicative of the active on the first computer
5 system. Correct?

6 MR. PETERS: Object to form.

7 A **Again, there is no limitation that**
8 **prevents from you using that information to**
9 **construct either of those or both.**

10 Q (By Mr. Hart) What -- what
11 information are you referring to in that answer?

12 A **Again, the signature, I mean, what we**
13 **read in from the patent.**

14 Q You said there is no limitation that
15 prevents you from using that information to
16 construct either of those or both. I need more
17 specificity, I think. I'm just not able to follow
18 that answer.

19 A **So it talks about the stored**
20 **information, from the stored information. The**
21 **stored information is sufficient to create a**
22 **fingerprint indicative of the activity of the**
23 **first computer system. That's what I'm ...**

24 Q Okay. So the forensic data includes
25 information sufficient to generate a fingerprint

1 indicative of the activity on the first computer
2 system?

3 MR. PETERS: Object to form.

4 A Again, you're talking about forensic
5 information in abstract. Are you talking about
6 the forensic information collected by the '872
7 patent as described in the introspection module?

8 Q (By Mr. Hart) Yes.

9 A Yes.

10 Q Going back to your earlier testimony
11 about putting that forensic data into the claimed
12 data structure, is there any description of how
13 the system converts raw forensic data from the
14 introspection module into a data structure that
15 satisfies the limitation 1C?

16 MR. PETERS: Object to form,
17 scope.

18 A A person of ordinary skill in the art
19 would have understood that given the information
20 presented in the specific forensic, it's not --
21 you have the information that is of the
22 introspection module, and that information can be
23 organized and presented in the form required by
24 claim 1C.

25 So that, of course, something that

1 could -- a person of the ordinary skill in the
2 art would have understood at least something that
3 can be done, because it's not -- it was not
4 difficult to convert or to transform information
5 from one form with processing or additional
6 algorithms to another form and store it in memory
7 as a data structure.

8 But that requires additional steps. It's
9 not done automatically.

10 Q (By Mr. Hart) What is involved in
11 that process? Is it deleting information,
12 reorganizing information, adding information, a
13 combination of those? Can you help me understand
14 what's involved in going from that raw forensic
15 data, from the introspection module to something
16 that you would contend satisfies limitation 1C?

17 MR. PETERS: Object to form, calls
18 for speculation.

19 A Again, I don't know. It would have
20 been a lot of things on implementation, on the
21 introspection module, how the information is
22 stored, what type of information is stored and
23 when, if it's correlated with timestamps or not.
24 There's a lot of information that I don't have
25 available.

1 But a person of the ordinary skill in the
2 art would have understood that this is, given the
3 description in the patent and the examples and
4 exemplars, that this is something that can be
5 achieved, because it's not a gap in -- there's no
6 gap.

7 This is a step that can be done, but it
8 requires additional steps that given the
9 implementation of the systems could have been
10 performed.

11 Q (By Mr. Hart) So again, this is the
12 '872 patent standing alone. And I'm not asking
13 you to speculate outside of the '872 patent.

14 Just based on what the '872 patent
15 describes, your testimony, as I understand it, is
16 that there would be a conversion or processing
17 between the raw forensic data and a data
18 structure that satisfies the limitation 1C. And
19 I want to understand exactly what's happening in
20 that process.

21 Does the patent give us any guidance as to
22 how we get from raw forensic data to a data
23 structure that you contend is aligned with
24 limitation 1C?

25 A I explained that that's correct,

1 because there is an exemplary of how the data
2 would be stored, because 5A to 5C describe that.
3 And they describe that for clearly a person of the
4 ordinary skill in the art would have had clear
5 example of how this would occur.

6 Q Does the patent provide an exemplar of
7 forensic data produced by the introspection
8 module?

9 A I believe it does. It does. It
10 illustrates activities. I believe absolutely if
11 you go -- one second. If you go to Figure 3A,
12 please, in the patent.

13 And this is an exemplar, right? It shows
14 the attacker. It shows the source here. It
15 shows the association and the target. So someone
16 who has observed that from introspection module
17 would be able to convert that to the desired data
18 structure we discussed in 1C.

19 And if you continue further, there are
20 more examples. You can go to Figure 3B and then
21 Figure 3C.

22 Q So we have Figure 3C on the screen
23 here, which depicts a virtual machine 113-1 and a
24 sequence of events starting with attacker 302 that
25 creates a packet stream 304, that enters socket at

1 step 306, creates a process A 308 and process A
2 generates two files, file X at 310 and file Y at
3 312.

4 Do you see all that?

5 **A I do.**

6 Q Are you -- is it your testimony that
7 this is information that is captured as raw
8 forensic data by the introspection module?

9 **A It's an exemplar of what could be**
10 **captured, yes.**

11 Q Okay. And so it tells us the sources,
12 the targets and the associations of all these
13 activities. Correct?

14 **A It gives us an example. It doesn't**
15 **tell us all of them. It gives an example. It's**
16 **an exemplar for a POSITA to understand.**

17 **You asked how to translate between data**
18 **introspection module to an organized data**
19 **structure that contains that information**
20 **specifically.**

21 Q I see. And so the data structure that
22 we see in, you know, Figures 5A, 5B or I guess 5A
23 specifically, your testimony is that that could
24 easily be created from raw forensic data, such as
25 the data we see in Figure 3C?

1 MR. PETERS: Object to form.

2 A Again, it's not automatic. It
3 requires an additional step. It has to be done by
4 design, and it requires, you know, someone to
5 delineate those elements, identify them and store
6 them properly in the database, as an example of
7 which we show in 5A. There are other examples in
8 5B and 5C, I believe.

9 Q (By Mr. Hart) Let's switch gears a
10 bit back to your declaration. I'm already there.
11 Okay.

12 From paragraph 61 to paragraph 66 in your
13 declaration, you're discussing Petitioner's
14 theory that Capalik transmits activity
15 information to other protected computer systems,
16 which is required of the limitation 1D.

17 I want to ask a few questions about
18 paragraph 64 to 66. Here in paragraph 64, you
19 start out by stating, To the extent CrowdStrike
20 intended to argue that a POSITA would have
21 understood the IDS to forward the signatures to
22 the protected network devices, I disagree?

23 As an initial matter, I note that
24 CrowdStrike has not cited to any passage in
25 Capalik suggesting such transmission nor any

1 evidence that it happens. To the contrary, the
2 signature is sent to and stored in the IDS/IPS
3 signature library, separate from the protected
4 network devices.

5 And this is the kind of substantive
6 distinction I want to dig into here. You then
7 state, Capalik's attack signature is initiated by
8 network activity. In addition, it is derived
9 from the network data that traversed the socket,
10 such as keystrokes and uploaded files, and is
11 intended to allow the IDS/IPS to match low-level
12 IP packets in the future. It is for use by the
13 IDS, not by the protected devices.

14 Is it your opinion that Capalik does not
15 generate attack information that endpoint devices
16 could use to prevent similar attacks on
17 themselves?

18 MR. PETERS: Object to form.

19 A I don't believe I say that.

20 Q (By Mr. Hart) Okay. Could you help
21 me understand --

22 A I say that --

23 Q Go ahead.

24 A No, please go ahead.

25 Q No, no, no. I interrupted you, and I

1 told you at the beginning I wouldn't do it, and I
2 just did, so please go ahead.

3 **A It's actually there. Capalik is**
4 **collecting information about the attack signature**
5 **that is initiated by a network activity as a**
6 **matter of principle. That's a huge distinction to**
7 **begin with.**

8 **Again, the information that is basically**
9 **then collected is triggered by this network**
10 **activity and then collected as part of the decoy.**
11 **But that information does not necessarily capture**
12 **data that the host creates prior or any attacks**
13 **that do not necessarily correlate to an attack**
14 **signature initiated by network activity.**

15 **Q Capalik is monitoring attack**
16 **activities as they occur on the virtual machine.**
17 **Correct?**

18 **MR. PETERS: Object to form.**

19 **A As a response to a network activity,**
20 **as an initial monitor of network activity, that is**
21 **correct, yes.**

22 **Q (By Mr. Hart) And Capalik is**
23 **generating attack information that describes the**
24 **attack activity occurring on virtual machine.**
25 **Correct?**

1 MR. PETERS: Object to form.

2 A Again, in the limited fashion where
3 Capalik has collected that attack signature,
4 because of initiating network activity through a
5 socket, but that is correct.

6 Also, information collected in Capalik is
7 for use for intrusion detection, not by the
8 protected device. And what I mean by that is it
9 does not have -- an inclusion detection system
10 does not necessarily have -- inclusion detection
11 system does not have and cannot test an attack
12 only because it -- I don't want to go down that
13 path, because I will have to go to my
14 declaration. It's okay. Scratch that. I'm
15 sorry about that.

16 Q (By Mr. Hart) I would like to
17 understand -- I'm still struggling to understand
18 the distinction between the attack information
19 generated by Capalik and its use to protect other
20 devices, and the attack information generated in
21 the '872 and the way it's used to protect other
22 devices.

23 A Absolutely. I can help you with that.

24 MR. PETERS: Object to form.
25 There's no question pending.

1 Q (By Mr. Hart) So going back to your
2 answer, you said, The information collected in
3 Capalik is for use for intrusion detection, not
4 by the protected device. What I mean by that is
5 it does not have an inclusion detection system,
6 does not necessarily have -- inclusion detection
7 system does not have and cannot test an attack
8 only because it doesn't, and then you stopped. I
9 don't want to go down that path because I'll have
10 to go to my declaration.

11 A **Yeah. So I would scratch that because**
12 **it is an incomplete sentence. I apologize about**
13 **that. If you have any question, I will answer it.**

14 Q I would like to understand why the
15 attack information that describes attack
16 activities running on a virtual machine in Capalik
17 could not be used by an endpoint device to avoid
18 damage from similar activities.

19 MR. PETERS: Object to form.

20 A **As a matter of principle, I did not**
21 **state that. I mean, I didn't say that it cannot**
22 **be used, just to be clear.**

23 Q (By Mr. Hart) Okay. So it could be
24 used --

25 MR. PETERS: Can you let him

1 finish his answer?

2 MR. HART: If he's not done, go
3 ahead.

4 Q (By Mr. Hart) Go ahead, Dr. Stavrou.

5 A No, I'm not done. What I meant to say
6 is that there is activity information that occurs
7 prior or without a network attack being initiated
8 that is necessary -- that can be necessary for an
9 attack to be characterized.

10 And I can show you in the patent basically
11 how that looks like at the same time the attack
12 signatures generated by Capalik are basically
13 intended to allow the intrusion prevention system
14 to mask IP packets in the future. It's stated
15 clearly by Capalik in 004, 013, 022 and 055. It
16 is for use by the IDS, not by the protected
17 devices.

18 So again, and I will repeat, Capalik's
19 attack signature is initiated by another
20 activity. In addition, it is derived from the
21 network data that traversed the socket, such as
22 keystrokes and uploaded files, and is intended to
23 allow the IDS/IPS to match low-level IP packets
24 in the future.

25 That is what I meant, and I apologize if I

1 **did not explain properly before.**

2 Q You've referred a number of times
3 today to the triggering event being a key
4 distinction between Capalik and the '872 patent,
5 and specifically to the monitoring that occurs in
6 Capalik, only monitoring activity that immediately
7 follows an attack that enters into a port.

8 Do I -- do I understand your
9 interpretation of Capalik correctly, that
10 Capalik's monitoring is limited to attack
11 activities that occur immediately after an attack
12 enters a port into the virtual machine?

13 A I am not stating that Capalik is
14 stating that.

15 Q But that is your interpretation of
16 Capalik's teachings?

17 A No. If you can bring up Capalik, I
18 will show it to you.

19 Q I want to make sure I am accurately
20 characterizing your description of Capalik.

21 Do I have it right?

22 A It's not a description of Capalik that
23 I make. If you go to paragraph 49 of Capalik --
24 and I would like for the record to bring Capalik
25 up.

1 Q I'm going to stop you because I think
2 we're missing each other. I'm not disputing your
3 interpretation and asking you to support it with
4 express teachings in Capalik. I'm asking if I
5 have it correct that that is your understanding of
6 Capalik's teachings.

7 MR. PETERS: Object to form.

8 A **This is what I read from Capalik. He**
9 **mentions it in paragraph 49.**

10 Q (By Mr. Hart) Is it your
11 interpretation of Capalik's teachings that its
12 attack activity monitoring only occurs after an
13 attack has entered a port?

14 MR. PETERS: Object to form. Note
15 that Mr. Hart is refusing to open up Capalik
16 although asking questions about Capalik and the
17 witness has Capalik --

18 MR. HART: Steven, the witness has
19 Capalik in front of him. He can reference
20 anything he would like to.

21 A **I'm referring to Capalik 0049. And I**
22 **can bring it up to share. It clears states, when**
23 **an attacker connects to a network port and begins**
24 **interacting with a virtualized decoy operating**
25 **system 512, the introspection module 538 monitors**

1 and captures information from the connection,
2 including port numbers, data streams, file
3 uploads, keystrokes, ASCII or binary files,
4 malicious payloads, memory manipulation attempts,
5 and other data transfers or malicious attempts.

6 And also if we go to the figure
7 describing, it says in Figure 2, start, wait for
8 incoming intercept.

9 Q What is an intercept in the context of
10 Capalik's teachings?

11 A I mean, we can look it up. It says, A
12 network attack on the virtualized operating system
13 is then intercepted by a virtual machine-based
14 rootkit module running on the hypervisor operating
15 system. That is in paragraph 0015.

16 And also 23 it says, Attack 10 is
17 monitored by decoy 100 that includes at least one
18 monitor/intercept module 30 monitor/intercept
19 module 30 comprises fully functioning decoy
20 operating system 32 that monitors each of the
21 access ports for network 20.

22 There are plenty of references. I don't
23 think I have to be exhaustive.

24 Q Am I correct that you interpret
25 Capalik's teachings to monitor attack activity

1 only immediately following an intercept in the
2 form of an attack entering a port to the virtual
3 machine?

4 MR. PETERS: Object to form.

5 A I'm going to read again from Capalik
6 0049. It clearly states that, When an attacker
7 connects to a network port and begins interacting
8 with a virtualized decoy operating system 512, the
9 introspection module 538 monitors and captures
10 information from the connection. And it goes on
11 about what type of information it captures. I
12 don't have to speculate.

13 Q (By Mr. Hart) I'm not asking if
14 you're speculating or not. I'm asking for a yes
15 or no answer.

16 Am I clearly understanding your take on
17 Capalik's teachings, yes or no?

18 MR. PETERS: Object to form, asked
19 and answered.

20 MR. HART: It has not been
21 answered. Every time I ask a question to make
22 sure I understand his testimony, he just reads
23 long portions of the record. It's unhelpful, and
24 it's obstructing my ability to probe his opinions
25 in this case.

1 MR. PETERS: You asked him about
2 Capalik, and he's telling you what's in Capalik.
3 You're not entitled to a yes or no question just
4 because you said yes or no.

5 MR. HART: I'm asking if I
6 understand -- if I correctly understand his
7 opinions. It's unbelievable that I can't get a
8 yes or no answer to that.

9 Q (By Mr. Hart) Dr. Stavrou, can you
10 take me to Claim 1 and explain to me why this
11 portion that you keep reading from paragraph 49
12 in Capalik distinguishes Capalik's process from
13 the claimed invention in the '872 patent?

14 MR. PETERS: Objection,
15 argumentative and form.

16 A I will take you to my declaration,
17 which is there. And you will see that basically I
18 say here paragraph 67, Claim 2 recites monitoring
19 all activity on the first computer system where
20 the first computer system is the system on which
21 unauthorized activities are being identified. As
22 discussed above, Capalik monitors only activity
23 associated with a network connection through a
24 socket and only after an attacker connects to the
25 decoy. And I point to Capalik 0027, 0049, 0059.

1 It does not monitor all activities --
2 activity across the decoy computer, including in
3 processing module 508, which has its own
4 operating system and performs substantial work,
5 such as storing attack information, creating
6 signatures and transmitting signatures to the
7 IDS/IPS.

8 I'm going to Capalik 0051 to 52.
9 CrowdStrike does not identify any disclosure 234
10 Capalik of any monitoring of that processing
11 module. To the contrary, the processing module
12 508 is merely a trust part of the decoy and not
13 monitored by the introspection module.

14 Capalik 0051, and then Capalik assumes
15 that the monitored system is uncompromised until
16 an attacker connects to a port and starts
17 interacting with the decoy. Any monitoring in
18 Capalik is only triggered by such network
19 intrusion.

20 I believe I answered that in my
21 declaration, your question.

22 Q (By Mr. Hart) My question was about
23 Claim 1 and you took me to a discussion of Claim
24 2.

25 A The discussion is pertinent to exactly

1 **what you asked.**

2 Q I expressly asked you to explain how
3 this feature of Capalik is relevant to Claim 1 of
4 the '872 patent.

5 Is it relevant to Claim 1 of the '872
6 patent, or is it only relevant to Claim 2, which
7 requires monitoring all activity?

8 A Again, the discussion that we had was
9 about Capalik abilities. You didn't ask me about
10 Claim 1 before. And we can go to Claim 1 and
11 discuss Claim 1.

12 Which of the limitations of Claim 1 would
13 you like me to talk about? I'm happy to talk
14 about them. There are many limitations that I
15 talk about. Some of them are relevant. Some of
16 them are not.

17 Q My question was, Dr. Stavrou, can you
18 take me to Claim 1 and explain to me why this
19 portion that you keep reading from paragraph 49 in
20 Capalik distinguishes Capalik's process from the
21 claimed invention in the '872 patent?

22 The paragraph in -- the discussion in
23 paragraph 49 of Capalik, that the monitoring
24 occurs only after the triggering event of an
25 attack coming in the port, is something you've

1 referred to repeatedly today.

2 I would like to understand, is that a
3 relevant distinction with regard to Claim 1 in
4 the '872 patent?

5 MR. PETERS: Object to form.

6 A Again, I'm happy to answer that
7 question if you point me in my declaration where I
8 mentioned that, because I don't -- I don't see it
9 in my declaration, and I want you to point me
10 where is it.

11 Q (By Mr. Hart) I'm asking. Is it --
12 is that characteristic of Capalik's process or
13 Capalik's teachings relevant to Claim 1?

14 A Let me get to Claim 1, if you don't
15 mind.

16 Q Sure.

17 A Yes. If we go to Claim 1, what's
18 claimed is activities monitoring activity on the
19 first computer system. So we can actually share.
20 I can share my screen.

21 Now, to the extent that these activities
22 are monitored after an attack while the decoy is
23 operating and what is the breadth of the
24 activities monitored, it affects Claim 1, but it
25 doesn't affect it basically -- it's just

1 **basically, that is not mentioned in Claim 1.**

2 Q I'm sorry. Could you restate the end
3 of your answer if I'm not sure --

4 A We are monitoring of all activity is
5 mentioned in Claim 2. It's not mentioned in
6 Claim 1. You are correct. But the activities
7 are -- identifying a plurality of activity being
8 performed on the first computer system, the
9 breadth of these activities, like what type of
10 activities they are and may not be performed is
11 affected by if you don't have all of -- all
12 activity monitored.

13 Like the trigger will affect it, but it
14 does not affect the claim as it states, Claim 1.

15 Q So Claim 1 does not require monitoring
16 all activities. Correct?

17 A It doesn't seem so, yes.

18 Q And Claim 1 does not exclude Capalik's
19 process that monitors activities only after an
20 attack is received in the virtual machine. Is
21 that also correct?

22 MR. PETERS: Object to form.

23 A It wouldn't be as comprehensive, but
24 it does not.

25 Q (By Mr. Hart) Okay. This is a good

1 breaking point. I don't think I'll have more
2 than one more session, but I know it's one
3 o'clock where you guys are. So why don't we --
4 you want to break for a quick lunch, half an
5 hour?

6 **A We can power through if you think it's**
7 **not going to take you like two hours.**

8 (Recess.)

9 Q (By Mr. Hart) All right, welcome
10 back, Dr. Stavrou. I want to get into the
11 claimed computer system.

12 I'm going to take you back to the claims
13 in the '872 patent. Let me show my screen so
14 we'll be on the same page. All right.

15 So the Claim 1 in the '872 patent recites
16 in the first limitation 1A, Monitoring activity
17 on the first computer system. And then Claim 2,
18 as we've covered today a bit, recites, Wherein
19 the monitoring further comprises monitoring all
20 activity on the first computer system.

21 Do you see those two limitations?

22 **A I do.**

23 Q Okay. Starting with Claim 1, what
24 specific examples of a monitored computer system
25 are described in the '872 patent that are

1 consistent with this claimed invention?

2 MR. PETERS: Object to form.

3 A I mean, I was not asked to come up
4 with, you know, examples. I mean, it mentions
5 computer system. I was not -- I mean, I didn't
6 try to come up with examples. I mean, did I -- I
7 mean, someone can come up with an example.

8 What I can tell you is that on paragraph
9 43 of my declaration, I discuss about computer
10 system.

11 Q (By Mr. Hart) Sorry if my question
12 was unclear. I wasn't asking for all examples,
13 just any example of a monitored computer system
14 described by the '872 patent that is consistent
15 with the computer system in Claim 1.

16 MR. PETERS: Same objection.

17 A I mean, again, the computer system
18 here is a term that's been used. A person of the
19 ordinary skill in the art would have understood
20 what the computer system is. And as I claim
21 personally, a computer system can encompass
22 multiple components that work together as one
23 unit. That does not mean it covers connection of
24 network computers.

25 For example, there are -- there are

1 references I'm citing as Aziz, which is
2 Exhibit 1002, page 76, and Armstrong in '872
3 patent cover are the references.

4 Again, in those references, computing
5 systems or computer systems are described as
6 individual devices that are connected to a
7 network, not as the network itself. For example,
8 Aziz refers to computing systems as computing
9 devices typically found in a computer network.
10 And there is a figure here for Aziz.

11 Similarly, Armstrong describes, Each
12 computer system in the network or array as a
13 physically separate entity with its own network
14 attachment, operating system and so forth.

15 Then I go on. There are -- basically this
16 is my basis for comparison.

17 Q (By Mr. Hart) So I asked you to
18 identify any example of a computer system that is
19 monitored in the '872 patent, and you took me to
20 two extrinsic patents, Aziz and Armstrong, and
21 how they treat computer system. I'm not sure I'm
22 following how that is responsive to my question.

23 MR. PETERS: Object to form.

24 Q (By Mr. Hart) Can I take you to -- I
25 might reclaim the screen share here.

1 **A No problem.**

2 Q Can I take you to Figure 1 in the '872
3 patent. Figure 1, I believe, is described as a
4 distributed computer system. It has a decoy
5 computer network 102 that includes decoy network
6 device 106. It has protected computer network
7 104, firewall router, other communication networks
8 and other devices.

9 Is there a monitored computer system
10 consistent with Claim 1 that is depicted in
11 Figure 1? And if so, which aspects of Figure 1
12 are the monitored computer system?

13 MR. PETERS: Object to form.

14 **A Again, the device decoy network device**
15 **106 is present there. Let me go to the patent.**
16 **Yes.**

17 Q (By Mr. Hart) Are you done with your
18 answer, Dr. Stavrou?

19 **A Yes, sir.**

20 Q Okay. Just to recenter this, is it
21 correct that you've identified decoy network
22 device 106 in Figure 1 as a computer system that
23 is consistent with the monitored computer system
24 in Claim 1?

25 MR. PETERS: Object to form.

1 **A Just give me one second. Correct.**

2 **It's the computer network 102. I'm referring to**
3 **basically as the decoy device 106, decoy network**
4 **device 106, yes.**

5 **Q (By Mr. Hart) Is it the decoy network**
6 **device 106 or the decoy computer network 102 that**
7 **aligns with the monitored computer system in**
8 **Claim 1?**

9 **A It is --**

10 **MR. PETERS: Object to form.**

11 **A Again, it says only one element, which**
12 **is 106 right there. So I would say 106 is the**
13 **correct, but 102 is described as a network, but it**
14 **doesn't give me elements.**

15 **So the two of them are basically the same**
16 **because it doesn't help. They're depicted as**
17 **different elements and they are discussed**
18 **different elements, but it says the decoy**
19 **computer network 102 with decoy network 106 in**
20 **the Figure 1 device.**

21 **Q (By Mr. Hart) I've scrolled down one**
22 **figure to Figure 2 in the '872 patent, which is a**
23 **depiction of the decoy network device 106.**

24 **Can you see that, Dr. Stavrou?**

25 **A Yes, sir.**

1 Q Where does the monitoring occur within
2 decoy network device 106 as depicted in Figure 2?

3 A I mean, the patent describes this. I
4 mean, I have to look in the patent, but it's been
5 described in the patent.

6 Q Were you going to look it up in the
7 patent, or was that your full answer?

8 A I mean, if you want me to, I can.

9 Q I would like to understand how the
10 monitoring works within decoy network device 106
11 pursuant to the '872 patent teachings.

12 A Again, I'm going to go to patent. Let
13 me share my screen so I can explain for you, too,
14 so we can see exactly what it says. Give me one
15 second.

16 You mentioned Figure 2, and I want to be
17 precise. Figure 2 is a block diagram
18 illustrating the decoy network device in
19 accordance with some embodiments, which is an
20 illustration here.

21 So it's not the only way that we can
22 actually translate things. And that's why I
23 wanted to come here. The decoy network device
24 106 typically includes one or more processing
25 units 202, one or more network or other

1 communications interfaces memory, and one or more
2 communication buses, 208, for interconnecting
3 these components.

4 In some embodiments, which is again an
5 exemplar, includes circuitry, sometimes called a
6 chipset, that interconnects and controls
7 communications between system components.

8 In some other embodiments, the decoy
9 network device 106 includes a user interface. It
10 goes on and on. It talks about the memory and
11 continues. Then it talks about -- I will go a
12 little bit further down. It talks about -- it
13 talks about the interfaces.

14 And then it talks about, column six, the
15 host operating system 110, also called hypervisor
16 OS, that includes procedures for handling various
17 basic system services and for performing hardware
18 dependent tasks, and database server 128, which
19 stores data and fingerprint, and fingerprint
20 generation interface 130, which generates the
21 fingerprint data.

22 And then it goes on to say, In some
23 embodiments -- again, these are all exemplary, so
24 I want to be careful. This is a lot of different
25 examples, and I don't want to put this into one

1 example. This is one example.

2 The host operating system, the host 110,
3 includes one or more of the following: A virtual
4 machine monitor, also called hypervisor 214,
5 virtual machines 216, including virtual machine
6 one, which is 113.1, and optional virtual machine
7 two, 113-2, and normal hypervisor OS user
8 processes 114-1 and 114-2, such as administrative
9 utilities, and goes on.

10 The virtual machine monitor 214 includes a
11 hypervisor kernel 116 that resides in the
12 physical memory and provides the basic services
13 to the virtual machine monitor 214. In some
14 embodiments, again another example, you have
15 hypervisor kernel is part of hypervisor operating
16 system. In such environments, the hypervisor
17 kernel is a part of the operating system
18 activity.

19 In such embodiments, the hypervisor kernel
20 116 is a part of the operating system that
21 activates the hardware directly or interfaces
22 with another software layer that in turn drives
23 the hardware.

24 The hypervisor kernel 116 includes a
25 hypervisor virtual machine kernel module 118 that

1 supports virtualization of a guest decoy
2 operating system 112. The hypervisor kernel 116
3 also includes an introspection module 120
4 interposed between the virtual machine monitor
5 214 and the decoy operating systems 112.

6 The introspection module 120 performs
7 introspection physical monitoring into the
8 physical memory segments assigned to each of the
9 virtualized decoy operating system 112.

10 And I'm going to stop here. That's an
11 example.

12 Q What is that an example of?

13 A It is placed in architecture as
14 described in Figure 2, which I recited from the
15 patent. I'm going to Figure 2.

16 That shows different elements as that can
17 be implemented here. You can see here virtual
18 machine one, which is 113-1, with a decoy
19 operating system, which is labeled 112-1.

20 And the reason that I want to go through
21 this is because it states in multiple different
22 sections of that description on the specification
23 that this is an example. It's not the only way
24 of doing this.

25 Q In this example, where is the activity

1 monitoring occurring?

2 **A I believe in this specific example,**
3 **this module called introspection. It's basically**
4 **120.**

5 Q Is that doing the monitoring?

6 **A I believe that's what the**
7 **specification states. Give me just one second to**
8 **identify it.**

9 It says that the introspection mode 120
10 performs introspection, for example monitoring
11 into the physical memory segments assigned to
12 each of the virtualized decoy operating system
13 **112.**

14 Q And so if we go back to Figure 2,
15 where are the activities occurring that are being
16 monitored?

17 **A Inside the decoy operating systems,**
18 **which are part of virtual machine, in this case**
19 **one and two.**

20 Q So activities occur inside the virtual
21 machine, and the introspection module monitors
22 those activities inside the virtual machine. Is
23 that right?

24 **A That's what it says in the specific**
25 **example, yes.**

1 Q Okay.

2 A That's not the only example, but
3 that's an example.

4 Q Does the patent describe monitoring
5 activities that occur in anything other than the
6 virtual machine within the decoy device?

7 A You have to point me to what exactly
8 you mean. I give you an example of what -- how
9 this is implemented.

10 What do you mean? The question is very --
11 I'm happy to answer your question, but you have
12 to point me to what you mean as an example.

13 Q I think I'm going to have to take back
14 control of the screen share. It's just
15 impossible, talking while we're trying to connect
16 to deposition.

17 Let me keep Figure 2 on the screen, and
18 you can use your local copy of the patent if you
19 would like to refer to any other teachings.
20 Okay?

21 A Yes.

22 Q So what we have gotten to the bottom
23 of so far with respect to Figure 2 is that in at
24 least one example, activities occur in the virtual
25 machine within decoy network device 106. And

1 those activities are monitored by the
2 introspection module 120.

3 Do I have that right?

4 **A Correct.**

5 Q Okay. And what I'm trying to
6 determine is if the patent describes monitoring
7 activities as they occur anywhere else in the
8 decoy network device; for example, outside the
9 virtual machine.

10 Is there any description in the '872
11 patent of monitoring activities within the decoy
12 network device other than activities occurring
13 within the virtual machine?

14 **A So let me take you then to Figure 6A**
15 **if you don't mind.**

16 Q I can scroll down to Figure 6A, sure.

17 **A I apologize. Okay. So you will see**
18 **that on the top right of Figure 6A, it says**
19 **monitoring activity on the virtual machine. And**
20 **then it goes on to identify plurality of**
21 **activities being performed at a virtual machine,**
22 **but then continues to A, if you go to the next**
23 **page, on Figure 6B.**

24 **Identify activity sources that are**
25 **affected by unauthorized devices. This is**

1 basically all -- it doesn't specify -- it's
2 monitoring all the activities inside the virtual
3 machine, as it is described, but it doesn't
4 prevent it to monitor activities.

5 As you will notice, there were two virtual
6 machines. To the extent that the two virtual
7 machines are communicating, if you go back to --
8 I apologize. Go back to Figure -- the one that
9 we started, Figure 2.

10 You'll notice that there are virtual
11 machines plural, and then they have a second
12 virtual machine. Right? To the extent that
13 there are interactions between these virtual
14 machines, the virtual machines monitor that this
15 basically, the introspection would potentially
16 detect those within that block because it's part
17 of the virtual machine block 216 that is present
18 here.

19 And again, this is an example. I'm just
20 using it for illustration purposes.

21 Q Does the '872 patent ever describe
22 monitoring activity occurring in the introspection
23 module?

24 A The introspection module itself, give
25 me just one second. It doesn't specify either

1 way.

2 Q So the introspection module does
3 monitor. It performs monitoring. Is it itself
4 monitored by something else?

5 A Again, the patent does not preclude
6 that, does not specify that.

7 Q Does it describe that?

8 A Again, this provides some embodiments.
9 It does not necessarily specify every potential
10 embodiment here. We're talking about an example.

11 At Figure 2 is an example. So, I mean,
12 maybe in another example that would have
13 happened. In this specific example, doesn't show
14 it.

15 Q Does the '872 patent describe
16 monitoring activities within the fingerprint
17 generation engine 130?

18 A Again, I would answer the same way.
19 It doesn't specify either way, because it does not
20 describe that either way. And it's not precluding
21 it from being able to do it or not. There is no
22 embodiment that provides it or shows it.

23 Q Is there any express description of
24 monitoring activities within the decoy network
25 device that occur outside the virtual machine box

1 216?

2 A Again, that is a set of virtual
3 machines. So while again this is an exemplar, the
4 specific exemplar 216 describes more than one
5 virtual computers, which does allow for more than
6 one systems to be involved, as you probably
7 realize there.

8 You're asking me if that can happen
9 outside. And my answer remains the same, that
10 the patent does not show a negative of that or as
11 an exemplar.

12 Q I asked that question intentionally to
13 capture any number of virtual machines that may be
14 running at any given time.

15 As I understand the disclosure in the '872
16 patent, activities occur in one or more virtual
17 machines. Those activity are monitored. In some
18 embodiments, all activities in the one or more
19 virtual machines are monitored.

20 And what I'm trying to get at from you is
21 whether there are any activities occurring
22 anywhere else in the decoy network device that
23 are described as monitored.

24 MR. PETERS: Object to form.

25 A Again, examples that we have in front

1 of us don't show that, but they don't preclude it
2 either.

3 Q (By Mr. Hart) Okay. Is there any
4 description of any computer system in the '872
5 patent where activities are monitored outside a
6 virtual machine?

7 A The computer needs -- because you have
8 more than one virtual machines, for example 113-1e
9 and 113-2.

10 So are you talking about outside of the
11 virtual machines containing 216, or are you
12 talking outside of the virtual machines one or
13 two or three?

14 What is monitored is the virtual machine
15 106, and in that sense you might be capturing
16 things during that.

17 Q I meant to capture all potential
18 virtual machines, so let me ask my question again.

19 Is there any description of any computer
20 system in the '872 patent where activities are
21 monitored outside of virtual machines?

22 A There are no examples that show that.
23 That's correct.

24 Q Okay.

25 A That doesn't mean that they're

1 **exhaustive.**

2 Q I'm going to switch over to your
3 declaration, page 29 in your declaration.

4 A **Just give me one second to orient.**
5 **Yes, sir.**

6 Q Okay. So in footnote two, this is in
7 a section in your declaration discussing claim
8 construction of computer system.

9 And in footnote two on page 29 you state,
10 I note that in this passage and others that use
11 the language a computer system e.g. the virtual
12 machine 113-1, the '872 patent is noting that the
13 virtual machine is the component of the computer
14 system where the described activity occurs and is
15 not equating computer system and virtual machine.

16 Do you see that?

17 A **Yes, sir.**

18 Q Okay. Now, if we go back to -- so
19 your opinion is that the virtual machine is not a
20 computer system. Is that right? It is a
21 component of a computer system?

22 A **No, sir. I merely, in my declaration,**
23 **I'm merely stating what is defined in the '872**
24 **patent.**

25 **The '872 patent defines AVM as emulating**

1 computer systems, and it's actually in '872. You
2 have it in front of you. It's '872 patent,
3 column seven, 59, all the way to 61. That is
4 further reinforced by Dr. Jakobsson's definition.

5 Q In Claim 1 that recites a monitored
6 first computer system, can the virtual machine be
7 the first computer system?

8 MR. PETERS: Object to form.

9 A The virtual machine requires -- it's
10 emulating, emulating a computer system. And it
11 requires a computing device to operate on.

12 So the '872 patent defines AVM as an
13 emulating computer systems, which is very similar
14 to what Dr. Jepperson says.

15 Q (By Mr. Hart) In this embodiment that
16 we've been discussing of the decoy network device
17 that includes one or more virtual machines,
18 looking at Claim 1, it describes monitoring
19 activities on a first computer system.

20 What is the first computer system in that
21 example?

22 A Again, the '872 patent clearly notes
23 that the virtual machine is a component of the
24 computer system where the described activity
25 occurs and does not equate computer system and

1 **virtual machine.**

2 **This is my statement in declaration, and I**
3 **stand by it. And point in case, if you look, as**
4 **you pointed out, there's more than one virtual**
5 **machines emulating computer systems.**

6 Q Let's get back to Figure 2. I'm going
7 to try and get an answer that I can follow up.
8 Okay.

9 We have decoy network device 106 depicted
10 in Figure 2 of the '872 patent. We've
11 established that it can include one or more
12 virtual machines, and that activities occurring
13 on those virtual machines are monitored.

14 If I try to align this disclosure with
15 Claim 1, what is the first computer system in
16 Claim 1? Is it the entire decoy network device,
17 or is it just the virtual machine, or something
18 else entirely?

19 MR. PETERS: Object to form.

20 A **As I explained, the patent notes that**
21 **virtual machine is a component of the computer**
22 **system. And as you notice, the entire block that**
23 **you show me in Figure 2 is called memory 206. I**
24 **believe that is encompassed in the entirety of all**
25 **the components in there.**

1 **And I state that CPU memory and network**
2 **interfaces are components of a computing -- a**
3 **computer system. So a computer system cannot be**
4 **equated with a virtual machine.**

5 Q (By Mr. Hart) Okay. So in Claim 1,
6 the monitored first computer system is not an
7 individual virtual machine, but it is the entire
8 network device that contains the virtual machine.

9 Do I have that right?

10 A **I did not say that is the entire**
11 **network device. It's a computer system would be**
12 **required to execute to run the virtual machines,**
13 **the same way that's depicted very clearly in**
14 **Figure 2 CPU and network interface are all**
15 **components of the computer system.**

16 Q And all of those would be included in
17 the first computer system recited in Claim 1.
18 Correct?

19 A **In our example, that's correct, yes,**
20 **as an exemplar. We're talking about examples**
21 **here.**

22 Q If we go to Claim 2, that further
23 requires monitoring all activities occurring on
24 the first computing system.

25 If the first computer system is everything

1 we see in Figure 2, is there any description in
2 the '872 patent of monitoring all activities that
3 occur across the entirety of Figure 2, which is
4 the decoy network device?

5 MR. PETERS: Object to form.

6 A First of all, let me state what you
7 see in Figure 2 is an example. We do not need the
8 virtual machine, and there is no mention of
9 virtual machine stated in the claims for the
10 patent methods to be applicable.

11 So what you see here is an example that's
12 not all encompassing of what claims can be
13 applied to.

14 So that example that you have in front of
15 you, the virtual machines 216 is being used to do
16 the introspection, but that does not preclude
17 that the absence of a virtual machine, the
18 entirety of the system memory, which would be 206
19 would not be monitoring.

20 So what I'm trying to explain is that --
21 and I apologize. I have noise. Give me one
22 second. I apologize. They're cleaning outside,
23 and there might be small noise, but it's gonna
24 stop.

25 Q (By Mr. Hart) It's not coming through

1 to us, so it's probably a noise only you can
2 hear.

3 **A I'm sorry about that.**

4 Q All right. Are you -- is it okay to
5 move forward?

6 **A Yes.**

7 Q That's okay. We couldn't hear. I
8 think it was just a noise that you were hearing
9 that wasn't coming through the microphone.

10 **A I thought that you were hearing it,**
11 **too. That's why I told them to stop, just in**
12 **case.**

13 Q Sure, sure, sure. I appreciate it.
14 Okay, let's try and get back to where we left off.

15 So we were discussing in terms of support
16 for the idea that all activities occurring on a
17 first computer system are monitored. I think you
18 were telling me that Figure 2 is just one
19 example, but there may be other examples.

20 Can you kind of find your spot where you
21 left off and maybe complete your answer?

22 **A Yes. So if we go to claims, Claim 1**
23 **does not require a virtual machine to be present**
24 **anywhere in the claim. A person of ordinary skill**
25 **in the art would have understood that Figure 2 is**

1 an example that does contain a virtual machine.

2 In the absence of a virtual machine, for
3 example as you notice there, there is a
4 hypervisor virtual machine. The same principles
5 can apply if the hypervisor would have been
6 somewhere in the computing device, outside of the
7 host operating system, for example. I'm just
8 making up an example.

9 In other words, the teachings of the
10 patent does not require this specific layout. In
11 fact, they don't even contain the words "virtual
12 machine" in there.

13 Q You said the patent. You meant the
14 claims.

15 A The claims. I apologize. I'm sorry
16 about that. Yes, the claims. I mean, if we go to
17 Claim 1, for example.

18 Q Claim 1 does not recite virtual
19 machine. Is that your point?

20 A I think so. Am I wrong?

21 Q And I'm trying to get to the bottom
22 of, what intrinsic support is there for the
23 concept of monitoring all activity on a first
24 computer system? Is there any description of
25 monitoring all activity on a first computer system

1 in the '872 patent?

2 MR. PETERS: Objection, form,
3 scope.

4 A I believe there is. And again, this
5 is an exemplar that you have, but it doesn't have
6 to have the same elements. There is memory CPU,
7 interface. There is a computer system. But the
8 presence of virtual machine, in this example there
9 is a virtual machine, but in Claim 1 it talks
10 about a computer implemented method. It doesn't
11 require the virtual machine.

12 In this case, the example states what
13 someone might do, but it doesn't exhaustively do
14 so. They are examples, as I was trying to
15 explain even before.

16 Q (By Mr. Hart) Where in the
17 specification of the '872 patent does it describe
18 monitoring all activities occurring on a computer
19 system?

20 A There are examples where activities
21 that hit both network and nonnetwork origin are
22 described, and it's also stated as part of
23 Claim 2. I mean, that's without saying.

24 But you asked specifically before, that in
25 Claim 2, basically it talks about all activity on

1 the first system, just to be clear. So I think
2 that is the patent itself states that in Claim 2.

3 Q Just to be clear, before we get to the
4 claims, where in the written description of the
5 invention does it describe monitoring all
6 activities on a computer system, lending support
7 to Claim 2?

8 Do you understand my question?

9 MR. PETERS: Objection, form and
10 scope.

11 A It provides exhaustive examples. And
12 I can point you. Let me go actually, since we
13 want to discuss that if you don't mind, go to
14 column 15.

15 Middle of the page, it says clearly, 15,
16 yes, it says clearly in the middle -- and I'm
17 there -- 25, The decoy network device identifies
18 604, a plurality of activities being performed on
19 the virtual machine. Each of the activities
20 includes an activity source.

21 For example, the activity between the file
22 X 310 and process B-314, Figure 3D, includes the
23 file X. And goes on and on, and providing, for
24 example, a file, activity type provided of the
25 file, a user, an instruction such as computer

1 processes or systems calls, a thread, a thread of
2 processes, data stream, network packets and
3 network socket connections or sockets.

4 In some embodiments, the respective
5 activity target is an internet protocol address.

6 So when there's a specification in the
7 patents that I have reviewed, people provide
8 examples. I think this is examples of showing
9 the type of activity that are being recorded,
10 including in Figures 3, set of Figures 3 and set
11 of Figures 4 and set of Figures 5.

12 Q (By Mr. Hart) Is this describing
13 monitoring all activities occurring on a computer
14 system?

15 MR. PETERS: Object to form.

16 THE WITNESS: Again, I'm sorry.
17 Go ahead, Steve.

18 Q (By Mr. Hart) You can go ahead. He
19 just objected.

20 A So for a person skilled in the art, a
21 level of description of the type of activities and
22 examples would here pointed toward because -- and
23 because of the purpose that is to basically
24 construct and attack and understand what has
25 happened in the system, the method should collect

1 **in claim to all activities, to be able to**
2 **construct, as we have discussed.**

3 Q You started off reading column 15,
4 line 25 that begins, The decoy network device
5 identifies a plurality of activities being
6 performed at the virtual machine.

7 Do you see that?

8 **A I do.**

9 Q And I believe you testified that a
10 virtual machine is not a computer system. It is a
11 component of a computer system.

12 Did I get that right?

13 **A I testified that it doesn't equate to**
14 **a computer system, exactly.**

15 Q Okay. So how does this portion of the
16 specification support monitoring all activities on
17 a computer system if this is describing monitoring
18 a virtual machine which cannot be a computer
19 system?

20 **A Again, if you go a little bit above,**
21 **it talks about, In some embodiments, the**
22 **monitoring further includes monitoring all**
23 **activity on the virtual machine. And all activity**
24 **on the virtual machines is shown to be**
25 **unauthorized, in some embodiments. In this**

1 context, it's used as an exemplar.

2 It does not have to be a virtual machine.

3 A computer system -- a computing system is what
4 is claimed in the claims. Here examples talk
5 about a virtual machine, but they're not
6 exhaustive.

7 Q Does the '872 patent ever describe
8 monitoring all activities on anything other than a
9 virtual machine?

10 MR. PETERS: Objection, form,
11 asked and answered.

12 A Again, I would point you to the patent
13 claims. They do not have the words "virtual
14 machine" in them. They talk about computer
15 device.

16 If the virtual machine limitation was
17 important or necessary, that would be included in
18 the claims, but it's not there.

19 Q (By Mr. Hart) I wasn't asking about
20 the claim. I was asking about the description of
21 the invention.

22 Is there any description in the '872 of
23 any embodiment where all activities are monitored
24 on anything other than a virtual machine?

25 MR. PETERS: Same objections.

1 **A** **Again, the patent shows examples. For**
2 **some reason they chose to show examples with**
3 **virtual machines, which are more complex, to make**
4 **sure that virtual machines are covered as part of**
5 **the examples.**

6 **But virtual machines are not necessary for**
7 **the method to be implemented. In fact, as**
8 **pointed out by CrowdStrike documents that I**
9 **viewed, they did not have a virtual machine**
10 **necessarily necessitating the presence of the**
11 **monitoring. That's another example.**

12 **I don't have to look at the patent. The**
13 **patent has the claims, and you asked for an**
14 **example. That was an example, for example, that**
15 **you can have a host system that performs the**
16 **same. It doesn't claim anywhere that the**
17 **introspection monitor, the relationship of**
18 **introspection monitor in the computer system is**
19 **not prescribed.**

20 **Q** **(By Mr. Hart) Is CrowdStrike's system**
21 **relevant to the intrinsic support for Claim 2 in**
22 **the '872 patent?**

23 **MR. PETERS: Object to scope.**

24 **A** **Will you please repeat the question?**

25 **Q** **(By Mr. Hart) Sure. I'm trying to**

1 get to the bottom of what intrinsic support there
2 is, if any, for Claim 2 in the '872 patent. And
3 you discussed CrowdStrike's system that does not
4 use a virtual machine. I'm trying to understand
5 the relevance there.

6 Does CrowdStrike's -- is CrowdStrike's
7 system relevant as intrinsic support for Claim 2
8 in the '872 patent?

9 MR. PETERS: Object to scope.

10 A Again, not opining about that. But
11 what I can tell you is that when I looked at
12 one-day monitoring activity, or basically
13 monitoring all activity, host is described as
14 tracking all execution on all hosts at all times.
15 It doesn't talk about virtual machines. It talks
16 about hosts.

17 So if we want to be precise, there is a
18 host, and providing host described as tracking
19 all execution on all hosts at all times and
20 providing maximum visibility into all adversary
21 activities, Exhibit 2016 at 1.

22 In this case, I don't see the mention of a
23 virtual machine here. And in fact, in the
24 brochures, there was no mention of virtual
25 machine anywhere.

1 Q (By Mr. Hart) It sounds to me like
2 there's a fundamental disconnect between what
3 CrowdStrike is doing and what's described in the
4 '872 patent, which is obviously relevant for a
5 number of reasons, but I'm not sure that it's
6 relevant to the question of intrinsic support for
7 Claim 2 in the '872 patent.

8 So just to confirm, is there any
9 description in the '872 patent itself of
10 monitoring all activities on anything other than
11 a virtual machine?

12 MR. PETERS: Object to form, asked
13 and answered, object to scope.

14 A I will repeat that I'm reading the
15 claims of the patent. I do not see the words
16 "virtual machine" present. I see exemplars that
17 they use virtual machine.

18 But again, a person of ordinary skill in
19 the art would realize that the virtual machine is
20 not a necessary component of the computing
21 system. It's part of the examples. They
22 probably make examples to avoid someone claim on
23 virtual machine is not a commuting system.

24 Virtual machines do not equate to computer
25 systems that are components of computer systems,

1 **and I agree with that.**

2 Q (By Mr. Hart) Okay. So all exemplars
3 are described in the context of a virtual
4 machine. Is that right?

5 A **I have not exhaustively looked at all**
6 **exemplars. The ones that we discussed, the**
7 **virtual machine is a component. But again, the**
8 **virtual machine here, it tries to exemplify and**
9 **illustrate the fact that the decoy operating**
10 **system is emulated within the computer or**
11 **computing system, but it does not -- it doesn't**
12 **require it to be part of the computing system for**
13 **the patent or method to be applied.**

14 Q Are you aware of any exemplars
15 described in the '872 patent that are not virtual
16 machines?

17 MR. PETERS: Object to form.

18 A **Again, the way that, for example,**
19 **Figure 2 is laid out, the person of ordinary skill**
20 **in the art could have understood that the**
21 **different components could be a different layer.**

22 **I would not extrapolate from an example**
23 **that it's meant to be an exemplar what is the**
24 **method or all possibilities of the method and**
25 **what the method describes.**

1 **I would repeat that the claim does not**
2 **require the virtual machine. And the virtual**
3 **machine is a more complex way of performing the**
4 **patent than simply having a host sensor that**
5 **would perform the same tasks as an introspection**
6 **piece.**

7 Q (By Mr. Hart) Let's shift gears a
8 little bit back to your declaration. Let's
9 scroll down to paragraph 74 in your declaration.
10 It's the beginning of a section where you address
11 the petition's proposed combination of Capalik
12 and Goel.

13 Do you recall that analysis that you
14 performed?

15 A **I perform the analysis, yes.**

16 Q You note that, A person of ordinary
17 skill in the art would not have been motivated to
18 combine the teachings attributed to Capalik and
19 Goel. As noted above, Capalik describes an
20 undetectable decoy system that records and
21 analyzes attacker activity, quote, without
22 knowledge of the attacker, end quote, by running a
23 rootkit in the hypervisor while leaving the decoy
24 operating system unmodified. Undetectability is
25 central to its design, is your claim.

1 Do you see that?

2 **A Yes, sir.**

3 Q Okay. Paragraph 75, you note that,
4 Goel in contrast is not a decoy system and is not
5 concerned with hiding from attackers. You also
6 note that Goel's authors report a significant and
7 measurable performance overhead, with a potential
8 7 to 36 percent decrease in throughput.

9 Is it your opinion that Capalik's system
10 analyzes attacker activity with no noticeable
11 slowdown that might be noticeable to the
12 attacker?

13 **A It is my opinion that Capalik's design**
14 **goal is to remain undetected and avoid**
15 **modifications that would be either detected by the**
16 **attacker, sophisticated attacker, or avoided. And**
17 **that includes a performance recordation that could**
18 **have been measured externally.**

19 **I go on, and I'm reading from the same**
20 **place. From a security practitioner's**
21 **perspective, a system that introduces that level**
22 **of overhead and requires kernel-level hooks is by**
23 **design more likely to be detectable or be**
24 **subverted by a sophisticated adversary.**

25 **This point is consistent with other work**

1 showing that monitoring mechanisms placed inside
2 or coupled to the guest operating system can
3 introduce observable effects and expose attack
4 surfaces.

5 And I give an Exhibit 2050 as an example,
6 Yin. And also I continue, if you don't mind,
7 discussing tools that detect kernel hooks and
8 proposing methods to detect installation of any
9 hooks into the system.

10 Then further on, Exhibit 2052, Jones,
11 describing how rootkits target kernel-resident
12 monitoring and how VMM-level techniques attempt
13 to avoid detectability.

14 Then I say that a person of ordinary skill
15 would appreciate that combining Goel's
16 kernel-level logging with Capalik's decoy system
17 would undermine the very property that Capalik
18 emphasizes, remaining hidden from the attacker.

19 I can go on, but it's explained clearly
20 there.

21 Q And if we focus for my next question
22 solely on Capalik, is it your opinion that Capalik
23 is able to analyze attacker activity with no
24 noticeable slowdown that might be detectable by
25 the attacker?

1 A Again, I think you are
2 misunderstanding my point. The goal here is for
3 the attacker to not observe changes in the
4 behavior by analyzing the behavior before it
5 became -- or looking at kernel hooks or
6 modifications of the decoy that would not appear
7 otherwise on regular computers. That includes,
8 but not just their performance analysis.

9 And here the important part is adding
10 pervasive kernel hooks and acceptable performance
11 modification, directly counter to instigator of
12 the attack with no discoverable impact on the
13 decoy operating systems.

14 And that is my statement, that having the
15 pervasive kernel hooks modifies the operating
16 system because it can substantially affect
17 performance, which would have been obvious to a
18 sophisticated attacker.

19 I'm not opining on what Capalik's
20 performance in fact is. I'm noting that
21 basically the Goel combined with Capalik would
22 require pervasive kernel hooks and would use
23 additional noticeable performance, based on what
24 Goel is saying.

25 Q So if one were to incorporate Goel's

1 process, including its hooks and these other
2 features that you're describing here, it would
3 result in a modified Capalik system that would be
4 detectable by attackers.

5 Do I have that right?

6 MR. PETERS: Object to form.

7 **A Again, I believe that it's simplified,**
8 **but yes. In a simplified manner, I would say yes.**

9 Q (By Mr. Hart) Going back to paragraph
10 74, I'm not sure I'm yet clear on your opinion.
11 If we just look at what you're saying in
12 paragraph 74, Capalik describes an undetectable
13 decoy system that records and analyzes attacker
14 activity without knowledge of the attacker by
15 running a rootkit in the hypervisor while leaving
16 the decoy operating system unmodified.

17 Are you suggesting that an attacker would
18 notice nothing out of the ordinary when
19 interacting with Capalik's system?

20 **A Again, I am pointing out that**
21 **Capalik's design at that time was -- design goal**
22 **at that time was to remain as undetectable as**
23 **possible.**

24 **Goel's design did not care about**
25 **additional kernel hooks, excessive log, that the**

1 host company wanted to operate under observation.
2 And these two are by design opposite directions,
3 and combining the two is basically not what
4 Capalik would have liked.

5 The system would have opposed that because
6 Capalik criticizes prior art honeypots as
7 generally not useful against sophisticated
8 attackers who can detect and effectively avoid
9 the honeynet. This is from Capalik 006.

10 To avoid that problem, Capalik is using
11 the rootkit to be hidden from the instigator of
12 the attack with no discovered impact on the decoy
13 operating system's performance.

14 That is not what I'm saying. I'm reading
15 Capalik, and I'm reporting that. In contrast, it
16 is not the decoy system and is not concerned with
17 hiding from attackers. That is what I'm pointing
18 out in this part.

19 Q Okay. I have no further questions for
20 you. Thank you very much for your time,
21 Dr. Stavrou. Your counsel may have redirect.

22 MR. PETERS: Yeah, can we get
23 about 20 minutes to come back?

24 MR. HART: Sure.

25 (Recess.)

EXAMINATION

QUESTIONS BY MR. PETERS:

Q Dr. Stavrou, do you recall being -- do you recall discussing Figure 3 in relation to raw forensics data in the '872 patent?

A Yes, sir.

Q Can you turn to Figure 3 in the '872 patent, just on your local copy.

A Yes, sir. I'm there.

Q When I say Figure 3, I mean 3A, 3B, 3C, 3D, collectively. Understand?

A Yes, sir.

Q How does the '872 patent describe Figure 3?

A So if we go to Figure 3, I can share my screen, description. Give me one second. It's on column seven. Let me share my screen if you don't mind for the sake of the reporter.

It says at the Figures 3A to 3D and 4A to 4E illustrate exemplar network diagrams representing unauthorized activity on a computer system, e.g. the virtual machine 113-1 in accordance with various embodiments, and continues although Figures 3A and 3B and 4A and 4B, illustrate unauthorized activity on the

1 virtual machine. Analogous methods can be used
2 to represent and analyze unauthorized activities
3 on non-virtualized computer systems.

4 And here there's mention of a
5 non-virtualized computer system, which answered
6 the question also that was asked if this patent
7 has any mention of non-virtual machines or like
8 non-virtual systems. I believe that qualifies
9 here. But yes, I'm here.

10 Q Does the '872 patent describe Figure 3
11 as raw forensics data?

12 A No, sir.

13 MR. HART: Objection, leading.

14 Q (By Mr. Peters) And where did you
15 refer to Figure 3 when you were answering your
16 question about raw forensic data?

17 A I was looking at Figure 3 as an
18 example of the types of information. I will go to
19 Figure 3. I'd be looking at Figure 3, for example
20 Figure 3C, for the type of information that may be
21 included inside this information inside the --
22 inside the forensics, raw forensic log or raw
23 forensic data.

24 This is the type of information. It
25 doesn't have any annotation or any of that. It

1 just attaches information, for example the packet
2 stream or socket or process.

3 To that extent, I gave an example of what
4 might be inside this information, inside the raw
5 forensics log.

6 Q Did you intend to equate raw forensic
7 data in the '872 patent with a graph form or the
8 structure that's shown in Figure 3A?

9 MR. HART: Objection, leading.

10 A No. That was not my intention.

11 MR. PETERS: I have no further
12 questions.

13 MR. HART: Nothing else from
14 Petitioner.

15 THE REPORTER: Would you like to
16 read and sign?

17 MR. PETERS: We'll read and sign.

18 (The witness was excused, and
19 the deposition ended at 1:54 p.m.)
20
21
22
23
24
25

CERTIFICATE OF REPORTER

I, Sandra Tippins, Certified Court Reporter
(Missouri) and Certified Shorthand Reporter
(Kansas), do hereby certify that the witness whose
testimony appears in the foregoing deposition was
duly sworn by me pursuant to Section 492.010 RSMo;
that the testimony of said witness was taken by me
to the best of my ability and thereafter reduced to
typewriting under my direction; that I am neither
counsel for, related to, nor employed by any of the
parties to the action in which this deposition was
taken, and further that I am not a relative or
employee of any attorney or counsel employed by the
parties thereto, nor financially or otherwise
interested in the outcome of the action.



Certified Court Reporter
State of Missouri No. 254

Certified Shorthand Reporter
State of Kansas No. 1613

1 I, DR. ANGELOS STAVROU, do hereby certify:

2 That I have read the foregoing deposition;

3 That I have made such changes in form
4 and/or substance to the within deposition as
5 might be necessary to render the same true and
6 correct;

7 That having made such changes thereon, I
8 hereby subscribe my name to the deposition.

9 I declare under penalty of perjury that
10 the foregoing is true and correct.

11
12 Executed the _____ day of _____,
13 20____, at

14 _____.

15
16 _____.

17
18
19 My Commission Expires:

20 _____

21 Notary Public:

22 _____

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Errata Sheet

Witness: DR. ANGELOS STAVROU

In Re: CROWDSTRIKE, INC. v. GOSECURE, INC.

Upon reading the deposition and before subscribing thereto, the deponent indicated the following changes should be made:

Page Line Should read:
Reason assigned for change :

Page Line Should read:
Reason assigned for change :

Page Line Should read:
Reason assigned for change :

Page Line Should read:
Reason assigned for change :

Page Line Should read:
Reason assigned for change :

Page Line Should read:
Reason assigned for change :

Page Line Should read:
Reason assigned for change :

Page Line Should read:
Reason assigned for change :

Page Line Should read:
Reason assigned for change :

Page Line Should read:
Reason assigned for change :

Page Line Should read:
Reason assigned for change :

Reporter: Sandra Tippins

Lexitas Legal
1608 Locust Street
Kansas City, Missouri 64108

Phone (816) 221-1160 * Fax (816)221-1160

March 13, 2026

MR. STEVEN W. PETERS
CLEARLY, GOTTLIEB, STEEN & HAMILTON
1841 Page Mill Road
Palo Alto, California 94303

In Re: CROWDSTRIKE vs. GOSECURE

Dear Mr. Peters:

Please find enclosed a copy of the deposition
of DR. ANGELOS STAVROU, taken March 11, 2026,
in the above-referenced case. Also enclosed is
the original signature page and errata sheets.

Please have the witness read this copy of the
transcript, indicate any changes and/or
corrections desired on the errata sheets, and sign
the signature page before a notary public.

Please return the errata sheets and notarized
signature page to Production Department, 1608
Locust Street, Kansas City, Missouri, 64108,
for filing within 30 days of receipt of this
letter.

Thank you for your attention to this matter.

Sincerely,

Sandra Tippins

CC: Mr. Paul R. Hart

Exhibits 205356_Angelos_Stavrou_031126_EX 1 2:8 15:1 18:12 0 0015 103:15 0027 59:9 105:25 004 100:15 0049 59:9 64:12,22,23 65:22 102:21 104:6 105:25 0051 59:16,22 106:8,14 0052 59:16 0059 59:9 105:25 006 147:9 013 100:15 022 100:15 055 100:15 1 1 10:21 11:9 12:12 13:21 15:1 16:23 17:7 18:8,12 19:4,23 20:3 26:18 27:25 29:14 31:18,	21 33:17 44:16 55:11 70:21 71:13 74:24 75:11 105:10 106:23 107:3, 5,10,11,12,18 108:3,13,14, 17,24 109:1, 6,14,15,18 110:15,23 111:15 113:2, 3,10,11,22,24 114:8,20 127:5,18 128:15,16 129:5,17 131:22 132:17,18 133:9 139:21 10 82:20 83:11 89:3 103:16 100 26:17 27:8,11,20 28:3 29:18 41:10,20 103:17 1001 68:23 1002 112:2 102 41:4 44:22 113:5 114:2,6,13,19 103 32:24 33:16 37:22 50:25 51:4 104 113:7 106 113:6,15, 22 114:3,4,6, 12,19,23 115:2,10,24	116:9 120:25 125:15 128:9 110 116:15 117:2 112 67:6 69:4, 6,16,18 70:1 86:22 118:2, 5,9 119:13 112-1 118:19 113-1 93:23 118:18 126:12 148:22 113-1e 125:8 113-2 117:7 125:9 113.1 117:6 114-1 117:8 114-2 117:8 116 117:11, 20,24 118:2 118 117:25 12 62:14 75:25 120 118:3,6 119:4,9 121:2 128 74:2,18 83:1 116:18 130 74:3 83:3 86:4 116:20 123:17 15 134:14,15 136:3 15:41 60:9 62:7 1613 151:23	17 55:2 18 14:24 15:4, 25 1:42 48:10 1:54 150:19 1A 26:18 27:13,25 29:14 30:18, 20 110:16 1C 40:20 41:8 44:5,16 46:18,25 47:25 81:17 82:8,11 90:15,24 91:16 92:18, 24 93:18 1D 33:17 35:1 36:25 37:1 39:23 40:18 95:16 2 2 10:21 11:9 12:13 13:22 16:23 17:7 18:8 19:4,23 20:3 58:25 59:1 103:7 105:18 106:24 107:6 109:5 110:17 114:22 115:2, 16,17 118:14, 15 119:14 120:17,23 122:9 123:11 128:6,10,23 129:14,22 130:1,3,7	131:18,25 133:23,25 134:2,7 138:21 139:2, 7 140:7 141:19 20 55:5,6 57:23 103:21 147:23 152:13 2013 10:20,25 11:12 12:8,12 13:20 16:22 17:6 18:5,24 19:3 20:6 31:22,23 32:2 2015 12:8 18:25 21:4 32:24 35:9,10 37:19 38:4 51:23,25 2016 20:10,15 21:2,9,18 22:13 25:4 27:2 28:16, 22,25 29:18, 20 31:2,15,17 32:9 38:4 39:15 54:11 139:21 2017 12:9 18:25 27:7 29:18 41:9,24 42:13 45:11, 13 46:16 48:10 2018 11:13 202 115:25 2031 10:11 54:25
--	--	--	--	---

2050 144:5	15,17,19	107:19,23		60:3,8 61:24
2051 12:9	30 73:22	492.010 151:6	6	62:2,7,14
18:25 33:3	82:22 103:18,	4A 60:10 62:7	60 75:15,17	63:1 64:2
34:14 37:20	19	76:2 81:5	604 134:18	66:9,11,25
39:15 51:23	302 93:24	148:19,24	61 20:9 95:12	67:8,11 68:7,
2052 144:10	304 93:25	4B 148:25	127:3	8,22 70:10,21
206 128:23	306 94:1	4D 60:10 62:8	64 95:18	72:24 73:17,
130:18	308 94:1	4E 76:2 81:5	66 95:12,18	19,22 75:19,
208 116:2	310 94:2	148:20	67 59:1 60:15	25 79:17
21 66:11	134:22	5	105:18	80:23 81:4
214 117:4,10,	312 94:3	5 135:11	69 60:1 62:1	82:1,2,18
13 118:5	32 103:20	508 59:12,19	63:1	85:20 90:6
216 117:5	34 55:2	106:3,12	6A 121:14,16,	92:12,13,14
122:17 124:1,	36 143:8	512 65:2	18	98:21 101:4
4 125:11	3A 76:2 81:5	102:25 104:8	6B 121:23	105:13 107:4,
130:15	93:11 148:10,	52 106:8	7	5,21 108:4
226 74:4 83:4	19,24 150:8	538 65:2	7 143:8	110:13,15,25
86:5	3B 93:20	102:25 104:9	74 142:9	111:14 112:2,
23 69:21	148:10,24	558 65:24	146:10,12	19 113:2
103:16	3C 76:2 81:5	58 69:1	75 143:3	114:22
234 106:9	93:21,22	59 127:3	76 112:2	115:11
236 74:2,5	94:25 148:11	5A 75:22 76:2,	8	121:10
83:2,5	149:20	16,18 80:25	872 10:21	122:21
25 134:17	3D 134:22	81:5 84:7	11:1,9 12:13	123:15
136:4	148:11,19	85:1,3,11	13:22 16:17,	124:15 125:4,
254 151:21	4	93:2 94:22	23 17:8,24	20 126:12,23,
26 62:14	4 135:11	95:7	18:8 19:4,23	25 127:1,2,
29 126:3,9	43 58:25	5B 76:24	20:4 23:25	12,22 128:10
2:11 48:11	111:9	84:10 85:1,5,	26:18 27:25	130:2 133:1,
3	45 75:25 81:4	12 94:22 95:8	29:14 44:17	17 137:7,22
3 75:4 83:8,13	47 60:9 62:7	5C 75:22 76:3,	54:23,25	138:22 139:2,
85:21 88:12,	48 76:1 81:5	24 81:1,6	55:4,6,14,19,	8 140:4,7,9
15,20 135:10	49 101:23	84:12 85:1,8,	21 56:24	141:15 148:5,
148:4,7,10,	102:9 105:11	12 93:2 95:8	57:11,22 58:1	7,13 149:10
14,15 149:10,				150:7
				9
				98 10:15,18
				16:19 18:18,
				20
				99 20:8

A	111:9 116:10, 11,12,13,14 123:10 125:10 129:20 131:3 132:16 133:10,25 136:21 137:5, 14,19,20 139:10,15,16 146:24 147:23 149:16	accurately 101:19	20,22 120:5, 24 121:1,7, 11,12,21 122:2,4 123:16,24 124:16,18,21 125:5,20 127:19 128:12 129:23 130:2 131:16 133:18,20 134:6,18,19 135:13,21 136:1,5,16 137:8,23 139:21 140:10 149:2	82:13,14 83:9,13 84:9, 16 85:4 88:21,24 89:22 90:1 95:14 96:8 97:5,10,14, 19,20,24 98:4 100:6,20 101:6 102:12 103:25 105:19,22 106:2 107:7 108:18 109:4, 7,12 110:16, 20 117:18 118:25 121:19,24 122:22 124:17 126:14 127:24 132:23,25 133:25 134:20,21,24 135:5,9 136:23 139:12,13 142:21 143:10 144:23 146:14 148:21,25	
abilities 107:9		achieved 92:5			
ability 104:24 151:8		acquire 69:4, 16			
able 14:13 31:9 42:20 44:1 50:10,23 53:2 54:15 89:17 93:17 123:21 136:1 144:23		across 33:1 34:8 35:7,23 38:14 52:23 59:10 106:2 130:3			
about 8:13, 19,23 11:16, 17,19 14:14, 18,19 15:22 16:21 17:3,23 18:3 21:23 22:14,15 24:3,15 26:3, 7 29:1 30:18 31:9 32:1 34:7 35:15 36:22,23 41:22 42:2, 17,23 44:6 46:13,22 51:4,17,24 54:12,13,19 56:13,17 58:25 61:7 63:14 68:5,9 69:5,16 76:16 77:18 78:13 81:16 83:20 89:19 90:4,5, 11 95:17 97:4 98:15 99:12 102:16 104:11 105:1 106:22 107:9, 13,14,15	above 59:5 60:17 105:22 136:20 142:19	act 29:8			
	absence 130:17 132:2	action 151:11, 15			
	absolutely 93:10 98:23	actions 52:15 60:5 62:4 63:4			
	abstract 90:5	activates 117:21	activity 20:19 22:15,21,23, 25 23:17,20 24:13 26:4,20 28:1,4,11,25 30:19 31:1,10 33:21 34:20 37:14 40:22 42:24 43:11 47:25 48:1 51:8 55:7,11 57:6 59:2,6, 10 60:11,17, 25 61:14 62:3,11,13,17 63:3,21 65:12,13,19 66:14,15,21 67:3,9,10,16 68:11,12,18 69:6,18 70:7, 8,23 71:8 72:2,3,15 75:1,2,6 76:3 78:16 79:9 81:20,21		
	acceptable 145:10	active 40:22 89:4			
	access 7:21 8:18 103:21	activities 27:6 36:7 39:25 40:1,24 43:12 46:3,4 48:2 59:4 60:4 61:9,19,22 62:10,23,25 63:8,9,13 64:4 66:5,13 68:16 70:24 74:10 75:3,23 78:17 79:10 81:2,22 83:25 93:10 94:13 97:16 99:16, 18 101:11 105:21 106:1 108:18,21,24 109:6,9,10, 16,19 119:15,			
	accordance 84:9,11,13 85:5,7,9 115:19 148:23				
	according 28:16 29:25 34:6 35:4 36:1 38:18				
	Accordingly 34:25				
	accurate 10:1,2,4 57:4			actually 53:19 64:10 84:5 87:18 97:3 108:19 115:22 127:1 134:12	
				adding 76:9 91:12 145:9	
				addition 96:8 100:20	

additional 71:18,21 91:5,8 92:8 95:3 145:23 146:25	again 9:23 17:4 18:2 19:19,21 20:24 24:7 29:17 30:9,18 32:9,18 35:6, 9,12 36:9,22 38:3 40:7 43:14 47:18 48:10 50:4,15 51:25 54:11, 12 58:21 59:16 62:13 65:22 67:13 69:13 71:3,22 72:9 77:17 78:10 79:21 80:17 81:14, 23 82:11 83:15 84:10, 23 86:2 87:9, 19 89:7,12 90:4 91:19 92:11 95:2 97:8 98:2 100:18 104:5 107:8 108:6 111:17 112:4 113:14 114:11 115:12 116:4, 23 117:14 122:19 123:5, 8,18 124:2,3, 25 125:18 127:22 133:4 135:16 136:20 137:12 138:1 139:10 140:18 141:7, 18 145:1 146:7,20	against 35:16 53:4 147:7 age 5:17 ago 13:8 14:9 15:10 23:24 30:4 agree 55:21, 23 56:2,6,23 62:22 64:2,7 141:1 AGREED 5:1 ahead 15:24 19:12 25:25 42:10 52:4 96:23,24 97:2 100:3,4 135:17,18 aids 87:15 algorithms 91:6 align 128:14 aligned 32:15 92:23 aligning 80:8 aligns 114:7 all 8:23 9:4 10:18 12:8 16:1 22:13 23:3,4,8,21, 22 24:15,16, 18,19 26:7,8, 15 27:6 28:10,11,15, 24,25 29:3,6, 7 30:25 31:1, 2,3,7,15,16 32:5,11,19 41:16,17 42:17,18	43:22,23 44:1 46:10,11,13 47:19,21,22 48:10 52:5 54:13,14,19, 20 59:2,10 60:9,24 65:12 67:3,16 71:19 75:17 77:7,18 80:19 81:6,24 94:4,12,15 105:19 106:1 107:7 109:4, 11,16 110:9, 14,19 111:12 116:23 122:1, 2 124:18 125:17 127:3 128:24 129:14,16,23 130:2,6,12 131:4,16 132:23,25 133:18,25 134:5 135:13 136:1,16,22, 23 137:8,23 139:13,14,19, 20 140:10 141:2,5,24 alleged 57:24 58:14 allow 20:5 44:3 96:11 100:13,23 124:5 allowing 45:20 allows 43:9 87:13 alluding 58:3	alone 52:11 92:12 along 22:24 50:22 already 80:12 84:17,20 95:10 also 5:12 7:16 21:3 27:4,7 36:1 38:13 46:8 62:7 71:20 74:16 86:14 87:19 98:6 103:6,16 109:21 116:15 117:4 118:3 133:22 143:5 144:6 149:6 although 86:9 87:23 102:16 148:24 among 36:3, 16 Analogous 149:1 analysis 10:23 12:15, 19 20:2 28:7, 8 29:25 30:14 31:7 32:15 34:6 35:5 37:6 38:18 39:18 40:5 44:15 47:9 67:18 74:2 83:2 86:16 142:13,15 145:8 analytics 53:22
---	--	--	--	---

analyze 144:23 149:2	113:18 115:7 120:11 123:18 124:9 128:7 131:21	149:7,25 151:10,13	applied 130:13 141:13	135:20 140:19 141:20 142:17 147:6
analyzed 8:13 12:16,25 13:4 16:15 17:23 19:6,17 24:5 25:22 30:3 38:22 72:18	answered 28:21 29:16 30:17,20 32:8 37:8,9 39:9 40:14 42:3 80:17 104:19, 21 106:20 137:11 140:13 149:5	anybody 26:4 anyone 7:6,10 9:11 10:6 anything 6:13 8:22 9:5 21:24 31:5 102:20 120:5 137:8,24 140:10	applies 17:1 apply 132:5 appreciate 64:18 131:13 144:15 appreciated 86:9 87:22 approach 76:10	as 6:10 10:5 12:5,20 15:10 16:4,19 19:1 20:11 21:19, 20 23:7 25:18,22 27:1,12,20 29:8 31:22 32:24 34:10 35:12 36:9,16 38:13 39:17 40:18 41:14 42:16 45:19 48:23 53:16 54:17 55:13, 15,18 56:3, 11,12,19 57:25 58:4 59:5,13 60:4, 16 61:4,9 62:4,6,12 63:3,10 64:5 65:11,19 66:5 67:15 72:22, 23 74:2 75:20 77:2,5 78:5 79:17 80:1 81:8 82:4,7 83:1 86:18 90:7 91:7 92:15,21 94:7,24 95:6, 23 96:10 97:5,10,16, 19,20 99:20 100:21 105:21 106:5 109:14,23 110:18 111:20,22
analyzer 74:4 83:4 86:5		anywhere 29:9 121:7 124:22 131:24 138:16 139:25 apart 49:15 50:2,12 apologies 8:9 73:9	approach 76:10 approximately 6:3 9:15 10:25 12:7 18:24 31:22, 23 architecture 118:13 argue 95:20	
analyzes 142:21 143:10 146:13	answering 6:21 149:15	apologize 42:8 64:16 76:16 99:12 100:25 121:17 122:8 130:21,22 132:15	argument 46:15 argumentative 105:15 arguments 13:17	
analyzing 145:4	any 6:13,24 7:9,12 8:18 12:2 13:1 15:11,22 16:9,15,16 17:24,25 25:21 29:21 45:19 51:20 56:14 59:17, 18 62:16 63:20 65:7 70:12 76:8 79:11 80:5,20 88:14 90:12 92:21 95:24, 25 97:12 99:13 106:9, 10,17 111:13 112:18 120:19 121:10 123:23 124:13,14,21 125:3,4,19 130:1 132:24 137:22,23 139:2 140:8 141:14 144:8	appear 145:6 appears 11:2 151:5 applicable 130:10 application 25:7,10,15 35:15 36:11 applications 38:6 86:12 87:25	Armstrong 112:2,11,20 around 10:2, 20 array 112:12 art 8:2 22:5 48:12,23 55:14 57:11, 22 90:18 91:2 92:2 93:4 111:19 131:25	
and/or 29:12 152:4				
Angelos 5:3, 16,24 152:1 153:2				
annotation 149:25				
annotations 7:22				
another 73:11 84:12 85:8 91:6 100:19 117:14,22 123:12 138:11				
answer 6:23, 25 14:7 15:6 21:12 42:11 47:5 74:19 83:18 85:14 89:11,18 99:2,13 100:1 104:15 105:8 108:6 109:3				

112:1,5,7,8, 12 113:3,22 114:3,13,16 115:2 117:8 118:13,16 120:12 121:7 122:3,5 124:6,10,15, 23 126:25 127:12 128:3, 20,22 129:20 132:3 133:14, 22 134:25 136:2 137:1 138:4,7 139:7,13,18 142:5,19 144:5 146:22 147:6 149:11, 17 152:4 ASCII 65:5 103:3 ask 6:12,13, 14,19 7:4 8:12 12:24 19:16 30:9 40:6 95:17 104:21 107:9 125:18 asked 11:7,17 12:5,10 13:18,19 16:20 18:3,21 28:21 29:16 30:17 32:8 36:22 37:7 39:8 40:13 47:4 77:17 94:17 104:18 105:1 107:1,2 111:3 112:17 124:12 133:24	137:11 138:13 140:12 149:6 asking 8:19, 22 14:17 24:3,23 40:3 48:22 56:16 57:20 68:5 81:16 92:12 102:3,4,16 104:13,14 105:5 108:11 111:12 124:8 137:19,20 aspect 6:14 aspects 55:3 113:11 assessed 40:10 assessing 47:1 assigned 69:3,15 118:8 119:11 153:6, 8,9,11,12,14, 15,17,18,20, 21 associated 34:23 37:16 39:25 51:11 59:6 60:17,25 61:14 105:23 association 93:15 associations 33:22 34:21, 24 37:14,17 40:1,23 42:25 43:1,12 44:25 45:3 46:4	47:13 48:1,8, 18 49:8,22 50:18 51:9,12 66:14 67:9 68:11,17,18 70:8,24 71:9 72:3,16 75:3, 24 76:5 77:2 78:17 79:10 80:22 81:3,21 82:14 94:12 assumes 106:14 assuming 43:2 at 6:17 8:23 10:20,21 12:12 13:21 16:22,23 17:5,6,7 18:7, 18 19:4,16 20:3,25 21:17 23:4,8,22 24:16,18 26:7,9 28:10, 19,25 29:7 30:7,25 31:3, 15,22 38:5 43:10 46:11 47:3 48:10 49:11 54:14, 19 55:4 63:25 69:1 70:21 73:19,22 79:24 80:10 81:24 82:22 83:8 91:2 93:25 94:2 97:1 100:11 103:17 120:23 121:21 123:11	124:14,20 127:18 136:6 138:12 139:11,14,19, 21 141:5 145:5 146:11, 21,22 148:19 149:17,19 150:19 152:13 attaches 150:1 attachment 112:14 attack 53:15 56:8 59:14 61:4,7,21 62:23,25 64:5 65:17 69:6,18 73:24,25 74:6,10,15 82:24,25 83:6,10 85:16,19 86:5,6,7,10, 11,12,13,17 87:1,7,23,24 88:1,2,4 89:2 96:7,15 97:4, 13,15,23,24 98:3,11,18,20 99:7,15 100:7,9,11,19 101:7,10,11 102:12,13 103:12,16,25 104:2 106:5 107:25 108:22 109:20 135:24 144:3 145:12 147:12	attack-related 61:19 attacker 59:7 60:19 61:2, 15,17 63:11 64:25 65:10, 13 93:14,24 102:23 104:6 105:24 106:16 142:21,22 143:10,12,16 144:18,23,25 145:3,18 146:13,14,17 attackers 21:7 35:17 38:11 52:21 53:5 143:5 146:4 147:8, 17 attacking 53:7 65:18 attacks 22:20 33:22 34:22 35:21 36:8 37:16 38:12 51:10 52:19 53:11,19 54:3,16 56:24 66:18 96:16 97:12 attempt 144:12 attempts 65:6,8 103:4, 5 attention 83:21 attest 15:12
---	--	--	--	--

attorney 151:13	44:10 60:15 66:8 73:14 76:15 82:17 83:7,15 90:10 95:10 99:1 110:10,12 119:14 120:13 122:7, 8 126:18 128:6 131:14 142:8 146:9 147:23	105:17 108:25 109:1 112:15 114:3, 15 119:3 122:1,15 133:25 135:23 139:12 145:21 147:3	107:10 133:15,24 134:3 145:4 153:4 begin 97:7 beginning 97:1 142:10 begins 18:18 64:25 102:23 104:7 136:4 behalf 5:18 behavior 145:4 behaviors 66:23 believe 8:4,6 10:24 12:1 27:17 30:19 31:11 36:9,14 37:10 39:21 42:3 45:16 46:22 48:5 49:1 53:12 57:14 61:25 66:7 67:13 68:8 71:17 74:16 77:7 78:13 80:12, 17,23 87:11 88:7 93:9,10 95:8 96:19 106:20 113:3 119:2,6 128:24 133:4 136:9 146:7 149:8 below 55:16 benefit 69:12 benefits 35:20 53:3	best 6:18 151:8 better 25:1 55:17 74:22 between 5:2 9:24 17:14, 17,24 19:9 23:5 34:5 39:2 41:17 42:18 43:2,23 44:25 45:4 47:22 48:9,19 49:9,23 50:11,18 51:15 54:17 55:13,18 57:10,21,25 63:23 66:14 67:9 68:11,17 69:5,17 70:9 75:24 76:5 80:6 81:3 82:5 88:3 92:17 94:17 98:18 101:4 116:7 118:4 122:13 134:21 140:2 beyond 45:10,17 78:7,21,24,25 79:1 big 71:20 binary 65:5 103:3 binder 7:14 bit 14:17 32:22 51:1 54:23 78:11 95:10 110:18 116:12
attributed 65:14 142:18		112:15 114:3, 15 119:3 122:1,15 133:25 135:23 139:12 145:21 147:3		
attribution 21:6 38:10 52:14,20		basics 56:3 basis 86:19 112:16 became 145:5 because 7:3 14:14 15:13 28:15 32:19 33:4 34:12 36:15 39:14 42:25 43:4,8 45:25 47:10 53:17 54:12 63:16 64:9 71:22 78:11 83:20 84:17, 19 88:7,16 91:3 92:5 93:1,2 98:4, 12,13 99:8,9, 11 102:1 105:4 108:8 114:16 118:21 122:16 123:19 125:7 135:22,23 145:16 147:5 before 5:25 7:19,20 11:15 12:5 18:3 35:14 44:14 49:11 62:16 63:20 101:1		
authorized 84:8				
authors 143:6				
automatic 95:2	bad 33:7			
automatically 91:9	based 15:15 19:22 24:10 29:21 31:2, 14,16 36:13, 17 38:2,25 46:17 47:18 50:8,23 52:8, 17 62:20 70:13 82:2 88:9 92:14 145:23			
AV 87:25				
available 66:3 91:25				
AVM 126:25 127:12				
avoid 99:17 140:22 143:14 144:13 147:8, 10	basic 34:17 50:17 116:17 117:12			
avoided 143:16	basically 11:16 20:4 23:19 28:13 31:1,5 33:6, 11 34:11,14 36:3,24 40:17 42:22 43:2,4, 15 52:12 53:3,15 54:2, 9 57:18 58:5, 8 73:7 76:22 77:19 78:14 82:13 87:13, 19 97:8 100:10,12			
avoiding 23:2,18				
aware 141:14				
Aziz 112:1,8, 10,20				
B				
B-314 134:22				
back 15:4 18:17 24:23 26:13 28:22				

136:20 142:8 Blanket 15:21 block 115:17 122:16,17 128:22 both 14:6 55:21 56:5,6, 23 64:2 84:15 88:7,8,10 89:1,9,16 133:21 bottom 69:21 81:25 120:22 132:21 139:1 box 123:25 breadth 108:23 109:9 break 35:9 44:8 73:11 110:4 breaking 110:1 bring 42:12 50:16 51:25 64:10,13 75:15 101:17, 24 102:22 bringing 38:4 broad 54:21 brochures 139:24 broke 44:14 73:15 bullet 35:19 38:13 bullets 52:17 buses 116:2	business 22:17 36:7 but 8:5,24 10:4,14 11:23 14:7,21 15:12,17 17:4 19:15 20:3 24:22 27:17, 22 31:14 32:12 33:11, 13 42:14 46:16 51:2 54:3,8 56:15 57:16 58:8,22 60:13 71:4,6, 15,23 72:18, 22 73:7,10 76:17,21 77:8,21 78:6 87:16,19 91:8 92:1,7 97:11 98:5 101:15 108:24 109:6, 13,23 110:2 114:13,18 115:4 120:2, 11 121:22 122:3 125:1 129:7 130:16, 23 131:19 133:5,7,9,13, 24 137:5,18 138:6 139:10 140:5,18 141:7,11 144:19 145:8 146:8 149:9 by 5:2,4,20 7:17 11:10 12:14,25 13:9,23 14:16 15:3,25 17:9 18:11,20,23	19:14,24 20:8 23:1,2,3,18, 21 24:15 29:6,23 30:20 32:14 33:15 35:17 37:1 39:16,23 40:20 41:22 42:2 43:20 44:10 45:17, 20,23 46:18 47:7 49:2,10, 24 50:10,19 53:5 54:2 56:16 57:8 59:21 60:2 61:3,8 62:1, 13,25 64:24 65:9,10,15 66:2,4,13,23 67:17 68:4, 16,21 70:6, 15,20,25 71:12,14,20 72:17 73:4, 14,16 75:12, 17 77:11 78:3,8,18,22 79:2,16 80:23 81:9,23 82:6, 17 83:17 84:21 85:17, 23 87:6 88:10,16 89:10 90:6,8, 23 91:10 92:11 93:7 94:8 95:3,9, 19 96:7,12, 13,20 97:5,9, 14,22 98:7,8, 16,19 99:1,4, 17,23 100:4, 12,15,16,19	102:10 103:13,17 104:13 105:9 106:13,18,22 108:11 109:11,25 110:9 111:11, 14 112:17,24 113:17 114:5, 21 121:1,25 123:4 125:3 127:4,15 128:3 129:5 130:25 133:16 135:12,18 137:19 138:8, 20,25 140:1 141:2 142:7, 22 143:15,22, 24 144:24 145:4 146:4, 9,14 147:2 148:2 149:14 151:6,7,10,13 C called 86:14 116:5,15 117:4 119:3 128:23 calls 11:5 67:4 77:15 86:21 91:17 135:1 cannot 10:3 15:12 17:3 38:20 70:12 98:11 99:7,21 129:3 136:18 capabilities 52:16	Capalik 55:15,19,21 56:23 57:12 58:1 59:5,9, 16,18,22 60:17,25 61:4,8,9,13, 19 62:20,22 63:7,9 64:3, 11,12,15,18, 20 65:17,18 66:5 76:7 78:1 79:12 81:18,24 95:14,25 96:14 97:3, 15,22 98:3,6, 19 99:3,16 100:12,15 101:4,6,9,13, 17,20,22,23, 24 102:4,8, 15,16,17,19, 21 104:5 105:2,12,22, 25 106:8,10, 14,18 107:3, 9,20,23 142:11,18,19 144:17,22 145:21 146:3, 12 147:4,6,9, 10,15 Capalik's 60:20 76:9 96:7 100:18 101:10,16 102:6,11 103:10,25 104:17 105:12 107:20 108:12,13 109:18 143:9,
--	---	--	---	--

13 144:16 145:19 146:19,21 capture 6:17 27:8 30:21 31:1 41:10 43:9 97:11 124:13 125:17 captured 41:22 42:1 43:10 66:2 94:7,10 captures 20:17 26:10 27:3 41:20 65:3,24 73:24 82:23 103:1 104:9,11 capturing 125:15 care 146:24 careful 116:24 case 8:14 13:2,3,6,10, 15 14:4,18,23 16:14 17:1,22 56:15 64:9 72:17 104:25 119:18 128:3 131:12 133:12 139:22 cases 6:7,9 56:11 cause 63:23 center 37:22 central 142:25	certain 18:21 51:24 67:19, 20 certainly 14:19 CERTIFICATE 151:1 Certified 151:2,3,21,22 certify 151:4 152:1 cetera 41:12 42:6 43:18 67:5 87:25 challenge 11:11 change 153:6, 8,9,11,12,14, 15,17,18,20, 21 changer 33:4 changes 145:3 152:3,7 153:5 character 86:16 characteristic 108:12 characteristic s 49:25 50:11 characterized 100:9 characterizing 101:20 chat 13:24 14:1 chipset 116:6	chose 138:2 circuitry 116:5 cite 21:4 37:18 52:18 66:25 cited 95:24 citing 112:1 claim 26:18 27:25 29:14 30:5,7 31:18, 21 33:17 34:19 39:12, 19 44:16 50:6 55:11 58:25 59:1 67:20 68:15 70:21 71:13 72:5,25 74:21,24 75:4,11 77:13 78:4,13 80:1 82:11 83:8,13 85:21 88:12, 15,20 90:24 105:10,18 106:23 107:3, 5,6,10,11,12, 18 108:3,13, 14,17,24 109:1,5,6,14, 15,18 110:15, 17,23 111:15, 20 113:10,24 114:8 126:7 127:5,18 128:15,16 129:5,17,22 131:22,24 132:17,18 133:9,23,25 134:2,7 136:1 137:20	138:16,21 139:2,7 140:7,22 142:1,25 claimed 16:17 17:14,17,24 37:13 51:7 68:10 74:23 77:1 78:20 79:4,19 80:14,15 83:12 85:21 87:3 88:5 90:11 105:13 107:21 108:18 110:11 111:1 137:4 claiming 46:7 82:2 claims 10:21 11:1,9,13 12:12,16 13:21 16:23 17:7 18:7 19:4,23 20:3, 7 23:24 24:2 55:10 56:11, 15,17 58:10 66:12 67:10, 21 68:8 70:10 80:8 83:7 85:25 110:12 130:9,12 131:22 132:14,15,16 134:4 137:4, 13,18 138:13 140:15 clarification 24:24 clarify 6:15	33:12 47:11 57:19 clean 7:14,16, 21 8:15,20 13:24 cleaning 130:22 clear 6:12 24:7 29:17 33:13 35:10 39:22 63:14 64:12 67:13 72:11,12,14 76:19 78:13 80:19,23 81:8 86:23 93:4 99:22 134:1,3 146:10 clearly 22:22 23:16 24:12 28:10,24 31:12 36:2,15 38:9 48:16 49:6 53:24,25 61:25 65:9 71:9 72:22 76:13 78:2,25 79:5,8 93:3 100:15 104:6, 16 127:22 129:13 134:15,16 144:19 clears 102:22 cloud 26:11 36:12 cloud-based 25:10,15 52:25
---	--	--	--	---

cloud-managed 25:7 36:10	coming 21:1 24:23 107:25 130:25 131:9	comparison 19:22 112:16	35:3 37:2,3,4, 5,12,16,25 38:1,23,24 39:5,6,12,13, 17,24 40:10, 11 51:6,11 55:8,12 59:2, 3,11 75:7 83:10,13,25 88:22 89:4,23 90:1 95:15 105:19,20 106:2 108:19 109:8 110:11, 17,20,24 111:5,9,13, 15,17,20,21 112:5,9,12, 18,21 113:4, 5,6,9,12,22, 23 114:2,6,7, 19 125:4,7,19 126:8,11,13, 15,20,21 127:1,6,7,10, 13,19,20,24, 25 128:5,15, 21 129:3,6, 11,15,17,25 131:17 132:24,25 133:7,10,18 134:6,25 135:13 136:10,11,14, 17,18 137:3, 14 138:18 140:24,25 141:10 148:21 149:3, 5	145:7 computing 112:4,8 127:11 129:2, 24 132:6 137:3 140:20 141:11,12 concept 11:21 33:5 132:23 concepts 25:21 concerned 23:7 143:5 147:16 concluded 30:4,6 conclusion 11:6 conducting 7:3 configured 69:2,14 confirm 140:8 connect 120:15 connected 45:20 112:6 connection 59:6 60:18 61:1,14 63:10 65:3,10,15 103:1 104:10 105:23 111:23 connections 60:7 62:6 63:6,18 135:3
collaborative y 33:11	commercial 16:6	complete 131:21		
collect 135:25	Commission 152:19	completely 58:9 77:22		
collected 61:8 66:17 90:6 97:9,10 98:3, 6 99:2	common 50:11	complex 138:3 142:3		
collecting 97:4	communicate 10:6	component 50:21 126:13, 21 127:23 128:21 136:11 140:20 141:7		
collectively 148:11	communicate d 74:1,17 82:25	components 19:5,16 25:9 111:22 116:3, 7 128:25 129:2,15 140:25 141:21		
column 62:14 67:1 68:24,25 69:1,22 73:19,22 75:25 81:4 82:18,20,22 83:11,22 84:23,25 86:3 89:3 116:14 127:3 134:14 136:3 148:17	communicatin g 122:7	comprehensive e 109:23		
	communicatio n 7:10 113:7 116:2	comprised 25:9		
	communicatio ns 116:1,7	comprises 103:19 110:19		
combination 91:13 142:11	community 33:1,5 34:8 35:8,23 38:14 52:23	comprising 75:5		
combine 142:18	commuting 140:23	computer 26:20,23 27:12,14,15, 21 28:2,5,6,8, 14,18 29:11, 13,24 30:13, 19 31:6,10 32:4,15 33:14,19,23 34:1,5,18,22		
combined 145:21	company 147:1			
combining 144:15 147:3	comparable 76:7			
come 111:3,6, 7 115:23 147:23	compare 13:19			
comes 50:21 80:7	compared 12:16 23:23 47:4			
	comparing 10:24 24:2			

connects 59:8 60:19 61:2,16,17 64:25 102:23 104:7 105:24 106:16	132:1,11	contrast 60:1, 2 62:2 75:20 143:4 147:15	152:6,10	court 6:16 151:2,21
consider 18:21 32:18	containing 125:11	control 120:14	correctly 39:20 70:17 101:9 105:6	cover 112:3
consideration 13:17 16:5 17:2,25	contains 87:16,18 94:19 129:8	controls 116:6	correlate 97:13	covered 27:16 51:1 82:19 110:18 138:4
consideration s 11:21 12:2 13:1,5 16:16 17:13,15,18	contemplated 77:20	conversation 44:13 56:20	correlated 91:23	covers 31:4, 11 111:23
considered 16:4 47:14 48:17 49:7 51:19	contend 57:25 67:19, 21 91:16 92:23	conversion 92:16	correlates 20:17 27:3 36:4	CPU 129:1,14 133:6
consisted 38:5,6	contents 69:24	convert 91:4 93:17	correspond 44:24	create 7:20 43:9 45:21 71:5 74:15 79:22 87:18 89:21
consistent 67:10,21 68:8,15,20 70:7 75:11 80:4,7,13 83:11 85:20 87:3 88:5,11, 24 89:3 111:1,14 113:10,23 143:25	context 41:14 42:16 70:1 84:6 103:9 137:1 141:3	converts 90:13	cost 52:22 54:6	created 8:14 18:23 71:14 94:24
constantly 53:21	contexts 41:16 42:18, 20 43:2,23 44:2,24 45:4 47:22 48:9,18 49:8,23	copies 7:14 8:15,25	could 50:8 57:16 73:10 79:23 91:1 92:9 94:9,23 96:16,20 99:17,23 109:2 141:20, 21 143:17	creates 93:25 94:1 97:12
construct 89:9,16 135:24 136:2	continue 76:23 93:19 144:6	copying 16:8	couldn't 131:7	creating 59:14 72:19 75:5 83:8 88:20 106:5
construction 126:8	continues 26:7 35:22 116:11 121:22 148:24	core 25:9	counsel 5:2 7:17 9:13,16 10:1,7 14:25 147:21 151:10,13	creation 27:9 30:23 41:11 42:5 43:16 63:17
contain	continuously 52:9 66:21	correct 7:23 11:2 15:18,19 18:13 30:1 31:19,23,25 34:2,3 42:7 46:4 55:22 61:5,21,22 62:23 64:5 65:20 74:11 88:25 89:5 92:25 94:13 97:17,21,25 98:5 102:5 103:24 109:6, 16,21 113:21 114:1,13 121:4 125:23 129:18,19	counter 145:11	criticizes 147:6
	contradiction 70:14,16		Couple 9:20	Crowdstrike 12:7,11 18:23 19:6,10,24 20:6 22:17,25 23:11,15,16 24:4,12 25:6, 8 52:13 59:17 76:8 95:19,24 106:9 138:8
	contrary 59:19 96:1 106:11		coupled 144:2	
			course 49:13 76:21,22 90:25	

140:3 153:3 Crowdstrike's 10:19,25 11:12 13:20 16:22 18:5 19:3 20:22 21:17 23:19 32:2 138:20 139:3,6 current 11:11 currently 64:23 cut 6:20 42:8	78:2,4,5,7,15, 20,22,24 79:2,4,6,8,16, 19,22 80:11, 13,15,21 81:7,8,10,19 82:5,7,12 83:2,20,21 84:1,8,9,10, 13,16 85:3,4, 6,9,17 86:7,8 87:12,13,14, 16 89:24 90:11,12,13, 14 91:7,15 92:17,22 93:1,7,17 94:8,17,18, 21,24,25 96:9 97:12 100:21 103:2,5 116:19,21 135:2 148:5 149:11,16,23 150:7 database 41:18 42:19 43:10,24 44:4,20 45:1, 21 46:2 47:3, 5,7,12,14,16, 23 48:2,4,6, 13,15,22,23 49:3,11,14, 17,20,25 50:5,6,8,15, 20,22 51:16 74:1,17 83:1 95:6 116:18 databases 45:8 50:1,12 date 80:25	day 152:12 days 9:19,20 decade 23:24 30:4 declaration 7:24 8:7,8 9:8,10 10:9 11:25 12:3 14:2,10,22 15:7,17 16:20 17:5,10 18:10,17 19:12 20:9 26:13,16 27:17,22 28:3 30:15 31:11, 24 37:23 39:22 41:5,25 43:19 44:23 45:14,18 46:9,14 47:20 51:1 54:25 55:3 56:22 57:15,16 58:7,18 60:13 63:14 75:15, 18 95:10,13 98:14 99:10 105:16 106:21 108:7, 9 111:9 126:3,7,22 128:2 142:8,9 declare 152:9 decoy 55:22 56:5,7,24 59:8,11,20 60:19 61:2, 16,18 65:1 67:5 69:3,6, 15,17,25 86:21 97:10	102:24 103:17,19 104:8 105:25 106:2,12,17 108:22 113:4, 5,14,21 114:3,5,6,18, 19,23 115:2, 10,18,23 116:8 118:1, 5,9,18 119:12,17 120:6,25 121:8,11 123:24 124:22 127:16 128:9, 16 130:4 134:17 136:4 141:9 142:20, 23 143:4 144:16 145:6, 13 146:13,16 147:12,16 decrease 143:8 defenders 33:2 34:9 35:8,24 38:15,17 52:24 defense 35:18 53:6 defer 42:10 defined 79:1 126:23 defines 126:25 127:12 definition 127:4	deleting 91:11 delineate 95:5 delineated 71:10 72:22 delineates 76:23 79:8 deny 86:20 dependent 116:18 depicted 77:2,13 78:5 113:10 114:16 115:2 128:9 129:13 depiction 114:23 depicts 93:23 deploy 56:6 deponent 153:4 deposed 5:25 6:4 deposes 5:18 deposition 5:3 7:4,15 8:6 9:6,12,17,22 10:6 120:16 150:19 151:5, 11 152:2,4,8 153:4 derive 88:8 derived 72:16 96:8 100:20 describe 26:19 28:4 29:18 41:6
--	--	---	--	---

50:11 57:10 58:5 60:14 72:24 93:2,3 120:4 122:21 123:7,15,20 133:17 134:5 137:7 148:13 149:10 described 21:19 44:21 45:10,18 51:22 59:5 62:6,20 71:23 73:6 78:2 79:17 83:11 85:19 90:7 110:25 111:14 112:5 113:3 114:13 115:5 118:14 122:3 124:23 126:14 127:24 133:22 139:13,18 140:3 141:3, 15 describes 20:15 21:5,9 27:2,7 32:25 33:3 41:9 45:13 55:19 75:21 80:24 84:22 92:15 97:23 99:15 112:11 115:3 121:6 124:4 127:18 141:25 142:19 146:12 describing 103:7 135:12	136:17 144:11 146:2 description 31:15 48:20 52:8 66:8 72:11 80:3 81:7 82:20 90:12 92:3 101:20,22 118:22 121:10 123:23 125:4, 19 130:1 132:24 134:4 135:21 137:20,22 140:9 148:16 descriptions 58:5 design 95:4 142:25 143:13,23 146:21,24 147:2 Designed 52:9 desired 93:17 detail 45:13, 17,19 55:23 60:12 73:7 detailed 86:15 details 19:8, 25 detect 54:15 60:10 62:9 122:16 144:7, 8 147:8 detectability 144:13	detectable 143:23 144:24 146:4 detected 62:15 63:20 143:15 detection 22:16 23:5 29:4 35:15 36:11 52:14 55:7 98:7,9, 10 99:3,5,6 detects 22:19 38:11 52:18 determination 40:16 determine 121:6 determined 35:17 53:5 device 30:10, 13 32:5 36:19,23 67:24 98:8 99:4,17 113:6,14,22 114:3,4,6,20, 23 115:2,10, 18,23 116:9 120:6,25 121:8,12 123:25 124:22 127:11,16 128:9,16 129:8,11 130:4 132:6 134:17 136:4 137:15 devices 23:13 32:6 95:22	96:4,13,15 98:20,22 100:17 112:6, 9 113:8 121:25 diagram 115:17 diagrams 148:20 difference 57:9 80:6 82:5 differences 56:21 57:18 60:14 different 27:18 41:17 42:18 43:24 44:1 47:22 49:17,19 50:4,5 58:10 61:24 62:19 71:16 76:12 77:22 114:17, 18 116:24 118:16,21 141:21 differs 55:18 72:6 difficult 42:14 91:4 dig 96:6 directing 83:21 direction 151:9 directions 147:2 directly 24:19	42:24 49:2 117:21 145:11 disagree 64:6,8 95:22 disagreement 56:4 disclose 13:13 discloses 60:3 62:2 63:2 66:12 disclosure 59:17 76:7 106:9 124:15 128:14 disclosures 74:22 disconnect 140:2 discoverable 145:12 discovered 147:12 discuss 51:21 58:7 67:22 107:11 111:9 134:13 discussed 29:4 35:14 56:21 60:16 93:18 105:22 114:17 136:2 139:3 141:6 discusses 51:24 discussing 16:15 44:15 45:21 73:15
--	---	--	--	---

95:13 126:7 127:16 131:15 144:7 148:4 discussion 16:2 51:2 54:24 57:23 67:25 73:18 82:18 83:19 85:15 106:23, 25 107:8,22 display 50:21 displayed 77:7,9,24 disputing 102:2 dissemination 52:16 distinct 86:13 88:1 distinction 55:13 57:10, 13,21,25 58:2,15,16 63:23 96:6 97:6 98:18 101:4 108:3 distinctions 58:23 distinguish 50:1 distinguishes 87:2 105:12 107:20 distributed 113:4 DNS 38:7 document 8:13,19,24	14:6,10,12,14 15:12,13,14 22:8,9,11,14 23:15 24:8 25:1,4,18 32:19 36:2 43:15 documents 9:7 25:22 138:8 doing 33:7 118:24 119:5 140:3 done 13:12 18:11 21:12 26:10,11 28:24 30:25 91:3,9 92:7 95:3 100:2,5 113:17 double-check 8:18 down 26:17 32:22 43:21 50:25 51:4 58:6 68:24 70:20 74:21 76:24 86:2 98:12 99:9 114:21 116:12 121:16 142:9 Dr 5:3,16,21 6:1 15:3 16:12 17:20 18:15 21:13 22:12 25:12 26:21 40:25 44:11 45:5 73:15 74:7 75:8 100:4 105:9 107:17	110:10 113:18 114:24 127:4, 14 147:21 148:3 152:1 153:2 draft 5:10,13 43:3 drawing 63:22 drivers 27:9 30:23 41:11 42:5 43:17 drives 117:22 drop 13:23 14:1 duly 151:6 during 125:16 E e.g. 45:2,3 48:7,8 55:10 67:3 87:25 126:11 148:22 each 33:5 75:22 76:3 81:1 102:2 103:20 112:11 118:8 119:12 134:19 EAM 23:1,2, 19 24:13 29:5 earlier 51:1 82:19,22 83:8 90:10 ease 14:16,17	easier 44:12 easiest 9:1 easily 94:24 effectively 18:13 147:8 effects 144:3 efficient 27:5 eight 67:1 either 88:3 89:9,16 122:25 123:19,20 125:2 143:15 electronically 15:1 element 114:11 elements 71:7 76:12 77:7 79:22 95:5 114:14,17,18 118:16 133:6 else 77:11 121:7 123:4 124:22 128:18 150:13 email 38:8 embodiment 85:24 123:10, 22 127:15 137:23 embodiments 67:2,14,19,20 84:10,12,14 85:5,7,10 86:3 115:19 116:4,8,23	117:14,19 123:8 124:18 135:4 136:21, 25 148:23 emphasizes 144:18 employed 151:10,13 employee 151:13 emulated 141:10 emulating 126:25 127:10,13 128:5 enabling 66:22 encompass 111:21 encompassed 128:24 encompassin g 130:12 end 6:20 10:15 68:25 109:2 142:22 ended 150:19 endpoint 22:15,23,25 23:12,16,20 24:13 26:3 30:10,12 32:5,6 66:22 67:24 96:15 99:17 endpoints 26:5,9 36:3 54:10
--	---	--	--	---

enforced 43:20	129:4	96:1	132:1,3,7,8, 17 133:8,12 134:21,24 138:11,14 141:18,22 144:5 149:18, 19 150:1,3	54:13,14,20 139:14,19
engine 74:3 83:3 86:4 123:17	equating 126:15	evolved 50:15		exemplar 67:15 93:6,13 94:9,16 116:5 124:3,4,11 129:20 133:5 137:1 141:23 148:20
enough 40:15 82:11	equipment 54:5	exact 10:3		
entered 102:13	Errata 153:1	exactly 31:2 46:7 68:2 72:9 92:19 106:25 115:14 120:7 136:14	examples 31:14 32:12 51:20 56:11, 12 77:6 85:10 92:3 93:20 95:7 110:24 111:4,6,12 116:25 124:25 125:22 129:20 131:19 133:14,20 134:11 135:8, 22 137:4 138:1,2,5 140:21,22	
entering 65:17 104:2	escaped 53:23	EXAMINATIO N 5:19 148:1		exemplars 77:4 92:4 140:16 141:2, 6,14
enterprise 22:20	established 128:11	examine 69:3, 14		exemplary 84:8,10 85:3, 6,8 93:1 116:23
enterprises 22:18	et 41:12 42:6 43:17 67:4 87:25	examined 5:17		
enters 93:25 101:7,12	even 62:16 63:20 132:11 133:15	examines 69:24		exemplify 141:8
entire 33:1 34:8 35:7,23 38:14 52:23 128:16,22 129:7,10	event 53:16 65:16 76:3 101:3 107:24	example 27:1 28:17 32:3 36:18 41:8 53:17,18 58:19,20 67:14,22 68:14 76:21 77:10,21 78:12 79:25 82:15 84:12 93:5 94:14,15 95:6 111:7, 13,25 112:7, 18 117:1,14 118:11,12,23, 25 119:2,10, 25 120:2,3,8, 12,24 121:8 122:19 123:10,11,12, 13 125:8 127:21 129:19 130:7, 11,14 131:19		exercised 55:25
entirely 78:10 84:20 128:18	event-driven 53:1		excerpts 76:11 84:5	exhaustive 20:1 103:23 126:1 134:11 137:6
entirety 30:20 128:24 130:3, 18	events 20:18 27:4,8 30:22 36:5 41:10, 20,22 42:2,7 62:15 63:19, 23 93:24		excessive 146:25	exhaustively 133:13 141:5
entities 39:2	ever 13:4 122:21 137:7		exclude 109:18	exhibit 10:11 15:1,22 18:7, 12 20:10,15 21:2,4,18 25:4 27:2,7 28:23 29:18 32:9,24 33:3 34:14 37:19 41:9,24 42:13 43:16 45:11, 13 46:17 48:10 51:23 54:25 68:23 112:2 139:21
entitled 83:24 105:3	every 15:23 104:21 123:9		excused 150:18	
entity 112:13	everybody 73:11		execute 129:12	
environments 117:16	everything 7:21 8:5,11 26:10 129:25		Executed 152:12	
equate 127:25 136:13 140:24 150:6	evidence 17:12,15,18		execution 20:20 23:3,21 24:16,19 26:8,9 29:6 31:3,16 46:11	
equated				

144:5,10 exhibits 7:15 9:9 12:8 18:24 45:24 46:14 47:19, 20 50:9 existed 23:24 31:22 existing 35:18 53:6,23 expert 17:2 Expires 152:19 explain 21:20 25:19 41:4 48:5 62:24 64:8 78:12 101:1 105:10 107:2,18 115:13 130:20 133:15 explained 16:19 29:20 48:14 50:7 55:15 92:25 128:20 144:19 explaining 19:9 30:21 explains 41:13 42:15 84:18,20 explanation 72:13 explicitly 60:3,23 62:2 63:2 85:1 expose 144:3	express 102:4 123:23 expressed 18:10 expressly 5:7 75:20 80:24 107:2 extended 24:10 extent 16:24, 25 21:18 32:10 41:23 45:10,23 47:24 61:6 66:1 95:19 108:21 122:6, 12 150:3 external 39:7 externally 143:18 extract 53:9 87:14 extrapolate 141:22 extrinsic 112:20 F face 22:18 fact 15:15 26:6 31:5 32:22 43:20 54:19 78:1 132:11 138:7 139:23 141:9 145:20 factors 16:4,5	failure 16:10 23:2,18 Falcon 12:11 18:6 19:1,3,6, 10,17,24 20:2,6,12,15, 22 21:5,8,9, 10,17,19 22:17,25 23:11,16,20 24:4,12 25:6, 8,9,25 26:19, 24 27:3,7,20 28:3,7,9,19 29:19,23 30:10,21 31:21 32:2,25 34:4 35:1,6, 13 36:10,25 37:11,24 38:2,6,7,17 39:1,4,7,11, 13,19 40:5,9, 12,16 41:3,6, 9,15,19 43:21 44:5,15,21 45:8,20 46:1, 10 47:16 48:21 49:4, 12,15,20 50:2,13,15 51:5 52:13 54:12 fall 67:19 falls 85:24 familiar 11:20,23 49:10 far 23:7 25:18 72:22 120:23 fashion 98:2	feasible 72:22 feature 107:3 features 146:2 feel 69:10 few 7:4 9:18, 23 14:9 95:17 Fewer 9:25 figure 38:25 76:16 84:7 85:1,5,8 93:11,20,21, 22 94:25 103:6,7 112:10 113:2, 3,11,22 114:20,22 115:2,16,17 118:14,15 119:14 120:17,23 121:14,16,18, 23 122:8,9 123:11 128:6, 10,23 129:14 130:1,3,7 131:18,25 134:22 141:19 148:4, 7,10,14,15 149:10,15,17, 19,20 150:8 figures 60:10 62:7 75:22 76:2,24 77:2, 14 78:6 80:24,25 81:5 94:22 135:10, 11 148:19,24 file 60:5 62:4 63:3,15 65:4	94:2 103:2 134:21,23,24, 25 files 60:11 62:10 65:5 94:2 96:10 100:22 103:3 final 5:10,13 financially 151:14 find 29:5 131:20 fingerprint 70:3 74:3 75:6 83:3,9, 12 84:11,13, 16 85:7,9,21 86:4,14 87:4 88:11,14,21, 23,24 89:3, 22,25 116:19, 21 123:16 fingerprints 66:16,17 67:23,24 68:13 finish 6:22 42:11 100:1 firewall 113:7 first 14:5 22:15 26:20, 23 27:21 28:1,2,5,6,8, 17 29:3,13,24 30:13,19 31:6,10 32:4, 15 33:19,25 37:3,5 38:24 41:19 55:12 59:2,3 60:24
--	--	---	--	---

75:7 80:19 83:10,13 88:22 89:4,23 90:1 105:19, 20 108:19 109:8 110:16, 17,20 127:6, 7,19,20 128:15 129:6, 17,24,25 130:6 131:17 132:23,25 134:1 flexible 22:22 52:14,21 flipping 10:14 flows 62:21 69:22 focus 40:16 55:6 56:20 58:11 76:12 78:18 144:21 focuses 33:5 follow 89:17 128:7 following 25:6 44:12 104:1 112:22 117:3 153:4 follows 101:7 footnote 126:6,9 for 5:2,22 7:15 9:2,5,12, 16,22 10:5,7 11:6 14:15 16:7 17:1,12, 22 20:3 24:24 27:1 28:14 33:22 40:3,23	41:8 42:14,19 43:12 44:1 46:4,25 47:25 48:1 49:3 55:1,2 58:19 65:12 66:12 67:22 69:8,12 70:24 71:10 74:2 75:3,14, 22 76:3,8 77:16 78:17 79:6,10 81:1, 21 83:2,24 84:15,16 86:11,15,19 87:24 91:18 93:3 94:16 96:12 98:7 99:3 100:8,16 101:24 103:7, 21 104:14 110:4 111:12, 25 112:7,10, 16 115:13 116:2,16,17 119:10 121:8 122:20 124:5 125:8 130:9 131:16 132:2, 7,17,22 134:21,23 135:20 138:1, 6,13,14,21 139:2,7 140:4,6 141:12,18 144:21 145:2 147:19,20 148:18 149:19,20 150:1 151:10 153:6,8,9,11, 12,14,15,17, 18,20,21	foregoing 151:5 152:2, 10 forensic 70:2, 6,19,25 71:14,19,25 72:6,12,17,25 73:16,18 74:2,5,10,14 75:11 77:23 78:1,7,22 79:2,6,16 80:11,13,20 82:5 83:1,5 85:17 86:15 89:24 90:4,6, 11,13,20 91:14 92:17, 22 93:7 94:8, 24 149:16,22, 23 150:6 forensics 23:3,6,21 24:15 29:6 72:4 148:5 149:11,22 150:5 form 11:5 12:4,21 16:18 18:1 19:7,20 28:20 29:15 30:16 32:7 36:21 37:7 39:8 40:13 43:13 45:15 46:5 47:2 48:24 56:9 57:1 65:21 67:12 68:1,19 70:11 71:2 72:8 73:2,8 75:13 77:3,15 78:9 79:8	81:13 82:10 83:14 85:22 87:5,8,12 88:6,13 89:6 90:3,16,23 91:5,6,17 95:1 96:18 97:18 98:1,24 99:19 102:7, 14 104:2,4,18 105:15 108:5 109:22 111:2 112:23 113:13,25 114:10 124:24 127:8 128:19 130:5 133:2 134:9 135:15 137:10 140:12 141:17 146:6 150:7 152:3 format 87:13 formation 71:6 formed 19:22 39:16 47:18 forms 49:18, 19 50:4 forth 14:22 30:14 112:14 forward 95:21 131:5 found 112:9 foundation 25:2 55:20 56:2,18 fourth 38:13 free 69:10	frequency 76:20 Friday 5:11, 13 from 10:19 12:7 15:7 17:6,10 18:5 21:1 23:15 24:8,19 25:5, 21 26:18,24 29:17,20 30:3 33:25 35:16 36:5,8 38:3,6, 12 39:4 44:5 46:12 49:15 50:1,2,12 52:19 53:4 54:10 55:7 59:16,23 61:24 62:19 63:10 65:3 72:4,6,11,25 75:5,18 76:17 83:21 85:2,16 86:13 88:1,20 89:8,13,15,20 90:13 91:5, 14,15 92:22 93:16 94:24 95:12 96:3,9 99:18 100:20 102:8 103:1 104:5,10 105:11,12 107:19,20 118:14 123:21 124:20 141:22 143:5, 19,20 144:18 147:9,11,17 150:13
---	---	--	---	---

front 23:15 24:8,11 29:22 36:2 50:24 77:21 102:19 124:25 127:2 130:14 full 5:22,24 42:21 115:7 fully 6:25 103:19 functionality 82:21 functioning 103:19 functions 53:3 fundamental 140:2 fundamentally 62:19 further 17:11 42:15 43:19, 20,21 45:1 47:11 48:6 55:15 58:6 75:4 76:24 86:2 93:19 110:19 116:12 127:4 129:22 136:22 144:10 147:19 150:11 151:12 future 33:22 34:22 37:15 51:10 96:12 100:14,24	G game 33:4 gap 92:5,6 gave 150:3 gears 54:22 95:9 142:7 generally 48:22 147:7 generate 45:8 46:1 66:17 74:5 83:5 86:6,10 87:24 89:25 96:15 generated 70:19 71:14 73:16 75:12 85:16 98:19, 20 100:12 generates 70:2 94:2 116:20 generating 86:19 97:23 generation 74:3 83:3 86:4 116:20 123:17 generic 71:4 get 5:22 40:15 56:3 57:8 79:14 80:9,14 81:25 92:22 105:7 108:14 110:10 124:20 128:6, 7 131:14 132:21 134:3 136:12 139:1	147:22 getting 56:1 give 22:9 28:17 31:13 32:12,23 36:17 41:8 92:21 114:1, 14 115:14 119:7 120:8 122:24 126:4 130:21 144:5 148:16 given 12:7 13:20 55:8 90:19 92:2,8 124:14 gives 94:14, 15 global 36:5 52:25 76:20 go 6:11 15:23 19:8,12,25 26:13 27:17 28:22 32:22 42:10 52:4 58:24,25 59:25 60:1,12 62:1 64:22 66:8 68:22 69:21 74:21 76:15,18 82:17 83:7,22 84:23,25 85:11 93:11, 20 96:23,24 97:2 98:12,13 99:9,10 100:2,4 101:23 103:6 107:10 108:17 112:15	113:15 115:12 116:11 118:20 119:14 121:22 122:7, 8 126:18 129:22 131:22 132:16 134:12,13 135:17,18 136:20 143:19 144:19 148:15 149:18 goal 20:1 143:14 145:2 146:21 Goel 142:12, 19 143:4 145:21,24 Goel's 143:6 144:15 145:25 146:24 goes 22:24 25:24 33:23 86:22 104:10 116:10,22 117:9 121:20 134:23 going 8:11 14:1,5,17 15:4 16:1 30:9 40:6 44:6,11 54:24 55:4 58:24 60:15 68:23 73:10,21 90:10 91:14	99:1 102:1 104:5 106:8 110:7,12 115:6,12 118:10,15 120:13 126:2 128:6 146:9 gonna 66:3 130:23 good 5:11,21 9:4 10:18 14:11 15:20 68:21 109:25 Gosecure 10:7 16:14 17:22 153:3 got 15:6 gotten 120:22 graph 41:18 42:19 43:9,24 44:4,20 45:1, 3,8,21 46:1 47:3,4,7,11, 13,16,23 48:2,4,6,8,13, 14,17,21,23 49:3,7,11,14, 17,20,25 50:6,8,12,20, 22 51:16 150:7 ground 6:11 56:18 guess 84:17, 19 94:22 guest 118:1 144:2 guidance 92:21
---	---	--	--	--

guys 33:7 52:5 110:3	56:16 57:8 66:4 67:17 68:4,21 70:15 71:12 73:4,9, 14 75:17 77:11 78:3,18 81:23 82:17 83:17 85:23 87:6 88:10,16 89:10 90:8 91:10 92:11 95:9 96:20 97:22 98:16 99:1,23 100:2,4 102:10,15,18 104:13,20 105:5,9 106:22 108:11 109:25 110:9 111:11 112:17,24 113:17 114:5, 21 125:3 127:15 129:5 130:25 133:16 135:12,18 137:19 138:20,25 140:1 141:2 142:7 146:9 147:24 149:13 150:9, 13	hearsay 14:6	130:11 135:22 137:4 139:23 141:8 145:2,9 146:2 149:4,9	139:13,18 142:4 147:1
H				
half 78:19 110:4	help 56:20 61:23 91:13 96:20 98:23 114:16	hereby 5:1 151:4 152:1,8	host's 22:25 23:16 24:13	
halfway 51:4	helpful 75:16	hidden 144:18 147:11	host-based 20:11,16,21, 24 21:11,16, 20,22,25 25:11,16 26:1,2,12 29:4 35:14 36:11	
handle 9:1 31:5	helping 33:5	hiding 143:5 147:17	hosts 23:4,8, 22 24:16,18 26:5,6,7 28:10,15,24 29:6 30:25 31:3,7,15 32:11,20 46:10 54:14, 17,19 139:14, 16,19	
handling 116:16	here 10:17 13:25 17:22 20:9 22:22 25:2 27:16,23 29:9 31:2 32:24 33:13 34:7,14,18 35:7,12,19,25 36:9,23 38:6, 21 40:18 44:13 45:13, 22,24 46:8, 13,16 49:2,19 50:7 51:18 52:2,18 54:18,20 55:24 57:19 58:9,22 60:12 63:12 65:23 66:10 69:23 72:2,11 74:24 75:19 76:18 77:24 80:5 82:3 83:7 85:3 87:11 93:14,23 95:18 96:6 105:18 111:18 112:10,25 115:20,23 118:10,17 122:18 123:10 129:21	high 19:16	hour 44:7 73:10 110:5	
happen 71:11 124:8		highlighted 34:13 73:21	hours 9:18, 23,25 110:7	
happened 123:13 135:25		highlighting 46:16	how 6:3,6 9:15,19,21 16:21 20:4 30:6 45:19 46:24 47:15 50:7 55:18 56:11 57:7 61:23 71:25 72:6,11,13, 18,25 74:22 77:11 79:25 90:12 91:21 92:22 93:1,5 94:17 100:11 107:2 112:21, 22 115:9	
happening 57:3 92:19		highly 27:5		
happens 26:9 96:1		hit 133:21		
happy 58:6 107:13 108:6 120:11		honeynet 147:9		
hardware 29:12 116:17 117:21,23		honeypots 147:6		
Hart 5:11,20 11:10 12:14, 23,25 13:9,23 14:16 15:3,25 17:9 18:11,20 19:14 20:8 29:23 32:14 33:15 37:1 39:16 40:20 44:6,10 45:17 46:18 47:7 49:10,24 50:10,19	having 142:4 145:14 152:7	hooks 143:22 144:7,9 145:5,10,15, 22 146:1,25		
	hear 70:16 131:2,7	host 20:12,16 21:8,9,17,19 22:1,17 23:11,20 24:14 25:6,9, 25 26:11 27:3 29:19,24 30:10,12 31:8 35:13 36:10, 13 38:7 97:12 116:15 117:2 132:7 138:15		
	hearing 131:8,10			

120:8 136:15 144:11,12 148:13 huge 97:6 hunt 22:20 hypervisor 103:14 116:15 117:4, 7,11,15,16, 19,24,25 118:2 132:4,5 142:23 146:15	67:18 75:22 76:4 81:1 95:5 106:9 112:18 119:8 121:20,24 identifying 33:20 34:19 39:23 46:2 51:7 66:13,14 68:10,16,17 72:2 83:24 109:7 IDS 95:21 96:13 100:16 IDS/IPS 59:15 67:23 96:2,11 100:23 106:7 if 6:13,20 8:5, 21 9:5 10:14 11:4 12:10 13:13,21 15:5,14 19:12 20:5 21:24 22:10 26:16 27:18 29:2 32:1,22 33:15 36:23 40:16 50:16 51:25 52:2,3 56:15 57:15 58:11, 24,25 60:1,13 64:10,12,13, 22 70:20 75:15 76:15, 22 77:13 79:15 80:10 83:22 84:22 87:9 88:3 91:23 93:10, 11,19 99:13 100:2,25 101:17,23	102:4 103:6 104:13 105:5, 6 108:7,14,17 109:3,11 110:6 111:11 113:11 115:8 119:14 120:18 121:6, 15,22 122:7 124:8 126:18 128:3,14 129:22,25 131:22 132:5, 16 134:13 136:17,20 137:16 139:2, 17 144:6,21 145:25 146:11 148:15,17 149:6 illustrate 141:9 148:20, 25 illustrated 60:9 62:7 illustrates 75:21 76:13 80:25 84:7,12 85:3,6,8 93:10 illustrating 115:18 illustration 115:20 122:20 immediately 21:4 77:24 101:6,11 104:1 impact 36:8	86:17 145:12 147:12 implementatio n 91:20 92:9 implemented 118:17 120:9 133:10 138:7 implies 33:9 important 6:11,16 28:12 54:8 55:3,25 57:7 72:10 137:17 145:9 impossible 120:15 in 5:3 7:6,25 8:3,6,7,8,14 9:7,9,11,16 10:10,18,19, 25 11:1,12, 13,25 12:2,12 13:1,5,12,20 14:2,4,6,13, 18,22,23 15:3,9,17,25 16:2,14,17, 19,22 17:1,9, 12,24 18:10, 17,20,23 19:3 20:6,8,22 21:8,16 22:1, 5,14 23:11, 14,15 24:4,8, 11,22 25:4 26:6,10,16 27:13,16,19, 22,25 28:2,6, 7,25 29:13,22 30:13,14 31:6,17,21, 22,24 32:14, 22,23 33:17	34:4 36:2,5 37:5,21,22 39:3,14,18 40:21 41:3,4, 7,8,17,24 42:18,19 43:24,25 44:16,21,22, 23 45:1,3,8, 10,13,18 46:8,14,15, 18,19,21,23, 25 47:8,11, 16,19,22 48:6,12,17,23 49:7,20 50:24,25 51:22,23 53:19 54:1, 15,19,25 55:2,5,10,14 56:6,11,12, 14,20,21,25 57:4,11,15, 19,22,23 58:3,17 59:17 60:9,11 62:6, 7,10,20 63:10,14 64:2,3,9,20 65:16,20 66:5,11,16, 19,25 67:2,8, 14,18 68:7,23 69:4,16,23 70:1,10 71:10,15,24 72:6 73:6,17, 18,19,21,23 74:12,19,24, 25 75:4,10, 20,25 76:3,11 77:2,6,13,14, 19,21 78:1,5,
I				
idea 131:16 identification 66:22 71:7 identified 34:23 37:13, 17 39:22 41:2 51:12 57:21 59:4 105:21 113:21 identifies 21:6 38:10 40:22 43:3 45:2 46:20 47:12 48:7,15 52:19 54:9 57:24 67:8 70:22 72:15 75:1 78:15 80:21 81:20 82:13 134:17 136:5 identify 20:18 35:16 49:21 53:4 58:14 59:17 62:12				

15,24 79:1,7, 11,17,18 80:1 81:7,24 82:8, 12,15,18,22 83:7,11,13 84:1,3,6,9,11, 13 85:4,7,9, 12,20,21 86:3,7,11 87:12,15,25 88:12,14 89:2,11,13 90:5,7,18,20, 23 91:1,6,10, 14 92:1,3,5, 19 93:4,12,18 94:22,25 95:6,7,12,18, 24 96:2,8,12 98:2,6,20 99:2,16 100:10,14,15, 20,24 101:5 102:4,9,19 103:7,9,15 104:1,25 105:2,12,13 106:2,17,20 107:19,21,22, 25 108:3,7,9 109:1,5,20 110:13,15,16, 25 111:15,19 112:2,4,9,12, 19 113:2,10, 22,24 114:7, 19,22 115:2, 4,5,6,18 116:4,8,22 117:11,13,16, 19,22 118:13, 14,21,25 119:2,18,24 120:5,23,24	121:7,10 122:22 123:12,13 124:15,16,17, 18,22,25 125:4,15,20 126:3,6,7,9, 10,22,23 127:1,2,5,15, 20 128:2,3, 10,15,23,24, 25 129:5,13, 16,17,19 130:1,7,9,14 131:11,15,24, 25 132:2,6,9, 10,12 133:1, 8,9,12,16,24 134:2,4,16 135:4,6,10, 20,25 136:1, 21,25 137:4, 14,17,22 138:7,18,21 139:2,8,22,23 140:3,7,9,18 141:3,15,20 142:9,17,23 143:4,8 145:3,20 146:3,8,11,15 147:15,18 148:4,5,7,22 150:7,8 151:5,11,15 152:3 153:3 Inc 14:3 153:3 include 16:5 22:18 26:5 43:10 128:11 included 27:21 129:16 137:17	149:21 includes 89:24 103:17 113:5 115:24 116:5,9,16 117:3,10,24 118:3 127:17 134:20,22 136:22 143:17 145:7 including 27:9 30:22 41:11 42:4 55:15 57:12 59:11 65:4 75:22 76:2 80:25 103:2 106:2 117:5 135:10 146:1 inclusion 98:9,10 99:5, 6 incoming 62:12 63:17 103:8 incomplete 99:12 inconsistenci es 80:5 incorporate 145:25 incorrect 60:23 indicate 37:23 39:10 40:8 51:5 81:6 indicated 153:4 indicates 34:11,17	53:24,25 indication 43:25 indicative 43:1 75:6 83:9,12 88:21 89:4,22 90:1 indicators 33:6,11 34:13,16,18 37:12,22,25 39:12 40:10 51:3,7,16,21, 24 individual 31:8 32:5 77:12 112:6 129:7 individually 33:10 individuals 36:16 industries 35:22 53:12 54:3 industry 16:6 infection 23:5 inference 71:19 information 33:1,20 34:8, 10,12,19 35:3,7,23 37:11,13 38:14 39:11 40:15 41:21 42:1,23 44:3 47:25 51:7 52:12,23 53:9,15 54:1,	9,17 59:14 61:7 65:3,25 66:1,3 71:4, 19,20,24 72:17,20 73:8,25 74:5 75:5 77:9,24 79:5,6,23,25 80:2 82:24,25 83:5 86:5,7 87:12,17,18 88:8,9,20 89:8,11,15, 20,21,25 90:5,6,19,21, 22 91:4,11, 12,21,22,24 94:7,19 95:15 96:15 97:4,8, 11,23 98:6, 18,20 99:2,15 100:6 103:1 104:10,11 106:5 149:18, 20,21,24 150:1,4 informed 18:22 46:17 infringement 30:14 31:7 32:14 34:6 35:4 37:6 39:18,23 47:1 infringes 36:24 initial 95:23 97:20 initiated 96:7 97:5,14 100:7,19 initiating 98:4
---	---	---	---	---

inside 66:22 72:20 119:17, 20,22 122:2 144:1 149:21, 22 150:4	intentionally 124:12	interrupted 42:11 96:25	122:15,22,24 123:2 130:16 138:17,18 142:5	21:19,25 22:1,14,16, 22,24 23:8, 10,14 24:11, 14,17 25:5,24 26:3,10,11 27:2,18 28:15,23 29:3,5,8,20, 22 30:1,4,9, 25 31:2,5,7, 13,17,22 32:5,11,12, 20,24 33:4, 12,23 34:7,12 35:7,15 36:4, 10,15 38:4,5, 9,13,19,20 39:3 42:4,13, 14,17,22 43:5,20 45:20 46:2,10 47:10 48:15 49:5,18 50:1,4 51:23 52:2,9 53:7, 12,18,20,24 54:5,9,12,13, 17,19 55:5 56:13 57:2 58:21,25 59:10 60:1 61:3,5 64:13, 14,24 65:23 67:7,14 68:2, 13,20 70:13, 15 71:15,17, 25 72:2,4 73:7 74:13,16 75:4,16,20 76:22,23,25 77:22,24 78:6,14,20 80:4,7,11,15, 19,23 84:6,
insight 36:7	interacting 65:1 102:24 104:7 106:17 146:19	into 5:5 13:23 14:1 19:8,15, 25 22:19 36:7 56:3 57:22 60:16 74:22 87:21 90:11, 14 96:6 101:7,12 110:10 116:25 118:7 119:11 139:20 144:9	intrusion 98:7 99:3 100:13 106:19	
insights 53:22	interaction 69:5,17		invalidity 11:11	
installation 144:8	interactions 122:13		invention 16:6,7,8,9,10, 11,17 17:14, 17,24 74:23 80:14 81:8,10 87:3 88:5 105:13 107:21 111:1 134:5 137:21	
installed 23:12 24:18	intercept 103:8,9 104:1		inventory 7:19	
instantly 20:18	intercepted 103:13	intrinsic 132:22 138:21 139:1, 7 140:6	involved 91:10,14 124:6	
instigated 65:14	interconnecti ng 116:2	introduce 10:23 144:3	IP 96:12 100:14,23	
instigator 145:11 147:11	interconnects 116:6	introduces 143:21	IPR 17:10	
instruction 134:25	interested 151:15	introspection 59:21,24 65:2,24,25 66:2,4 67:3,7, 15 68:14 69:2,13,24 70:7,20,25 71:15 73:16, 19,23,24 74:9 75:12 78:8,22 79:3,16 80:10 82:6,21,23,24 85:17 90:7, 14,22 91:15, 21 93:7,16 94:8,18 102:25 104:9 106:13 118:3, 6,7 119:3,9, 10,21 121:2	IPR2024- 01190 14:2	
instructions 60:5 62:5 63:4	interface 116:9,20 129:14 133:7		IPS 87:25	
instrumented 70:1	interfaces 116:1,13 117:21 129:2		IPS/IDS 68:5	
insufficient 22:21	internal 60:4 62:3,15,23,25 63:3,8,13,19 64:4		irrelevant 13:14	
intelligence 35:21,25 36:4 38:7 52:15 53:11,20	internet 135:5		issued 11:13	
intend 150:6	interposed 118:4		it 5:1 8:10 11:10,13,24, 25 13:8,14 14:19 15:12, 14,23 19:15 20:24,25	
intended 95:20 96:11 100:13,22	interpret 46:24 103:24			
intention 150:10	interpretation 101:9,15 102:3,11			

15,18,20,22, 25 85:10,12 86:3,9,22,24, 25 87:18,22 88:16,17,23 89:19 91:3,6, 11,19 92:7,15 93:9,13,14 94:6,11,14,15 95:2,3,4 96:1, 8,12,14 97:1 98:8,12 99:5, 8,12,13,21,23 100:15,20 101:18,21 102:3,5,9,10, 22 103:7,11, 16 104:6,10, 11,20 106:1 107:5,6 108:8,10,11, 24,25 109:13, 14,17,23,24 111:4,23 113:4,6,20 114:5,9,11, 13,16,18 115:6,14 116:9,10,11, 12,14,22 118:13,21 119:8,9,24 121:18,20 122:1,3,4,20, 25 123:3,7,9, 14,19,21,22 125:1 126:20 127:2,10,18 128:3,11,16, 17 129:7 131:4,8,10,13 133:5,9,10, 13,17,25 134:5,11,15,	16 136:10,13, 21 137:2 138:16 139:15 140:1 141:8,11,12 143:9,13 144:22 145:4, 16 146:2 147:15 148:19 149:24,25 it's 6:12 14:14 15:10,13 21:1 22:2,6 26:11 27:10 28:23, 24 29:17 31:14 33:13 34:14 36:1,3 37:10 43:4 45:25 49:18 50:17 53:16 57:3,6,7 60:9 62:13 67:13, 14 69:8 72:9, 22 73:6 74:16 76:21 77:9 78:24 79:15 82:11 84:3 85:12 88:19 90:20 91:3,8, 23 92:5 94:9, 15 95:2 97:3 98:14,21 100:14 101:22 104:23,24 105:7 108:25 109:5 110:2,6 114:2 115:4, 21 118:23 119:3 120:14 122:1,16 123:20 127:1, 2,9 129:11	130:23,25 131:1 133:22 137:1,18 140:5,21 141:23 142:10 144:19 146:7 148:16 items 77:12 its 10:20 20:25 59:12 86:17 98:19 102:11 106:3 112:13 142:25 146:1 itself 9:8 18:6 22:8 32:19 43:15,16 53:16 54:24 68:22 112:7 122:24 123:3 134:2 140:9 J Jakobsson's 127:4 Jepperson 127:14 job 6:12 Jones 144:10 jump 57:19 just 6:10,19 7:18 8:24 19:15 22:8 35:9 40:4 41:14 42:3,15 46:12 50:20 54:2 56:17 58:11 60:14	64:16 67:14 77:6,9 78:7, 12,18 80:19 81:12,15 89:17 92:14 97:2 99:22 104:22 105:3 108:25 111:13 113:20 114:1 119:7 120:14 122:19,25 126:4 128:17 131:8,11,18 132:7 134:1,3 135:19 140:8 145:8 146:11 148:8 150:1 K Kansas 151:4,23 keep 42:20 44:1 105:11 107:19 120:17 keeping 47:21 keeps 41:16 42:22 43:22 kernel 67:4 117:11,15,17, 19,24,25 118:2 144:7 145:5,10,15, 22 146:25 kernel-level 143:22 144:16 kernel- resident	144:11 key 55:13 57:10,12,25 58:2,5,14,16 60:14 101:3 keystrokes 65:5 96:10 100:22 103:3 kind 96:5 131:20 know 6:15,22 8:4,21 9:9 10:14,16 11:4,10,14,24 13:13 14:9,18 15:14 21:1,15 33:14 38:20 39:6 41:21 47:15 71:22 72:1 91:19 94:22 95:4 110:2 111:4 knowledge 142:22 146:14 L labeled 118:19 lack 22:20 laid 141:19 language 126:11 last 69:23 later 26:3 53:3 57:15 62:11 74:2 83:2 lawful 5:17
---	---	--	--	---

lawyer 11:7	115:12	101:24	21	longer 18:14
lay 25:1 55:20 56:1	120:17	102:20	lines 7:9 62:14 67:1	look 8:23 50:8 63:24 70:21 77:23 79:24 80:10 103:11 115:4,6 128:3 138:12 146:11
layer 117:22 141:21	121:14	107:13 108:2	link 17:17	
laying 56:17, 18	125:18 130:6	109:9,13	list 7:20 52:17	
layout 132:10	134:12	110:7 115:9	listed 45:24 47:19 56:12	looked 17:5 30:7 47:3 49:11 83:8 139:11 141:5
leading 14:21 149:13 150:9	148:17	120:19 140:1		looking 127:18 145:5 149:17,19
leads 36:14	let's 26:13 57:8 60:24	149:7 150:15	live 23:6	looks 39:3 76:22 100:11
least 10:21 12:12 13:21 16:23 17:7 18:7 19:4 20:3 38:5 43:10 91:2 103:17 120:24	letters 48:15 49:5	like-minded 33:2 34:9 35:8,24 36:16 38:15,16 52:24	load 78:1	lot 14:8 42:22 52:12 53:9, 14,25 54:9,17 59:25 60:12 76:1 91:20,24 116:24
leaving 142:23 146:15	level 19:16 29:1 36:6 45:12 135:21 143:21	liked 147:4	loaded 27:10 30:23 41:12 42:5 43:17	low-level 20:17 27:4 69:5,16 96:11 100:23
left 131:14,21	leverages 20:16 25:25 52:25	likely 143:23	local 8:15,20, 25 120:18 148:8	lower-level 45:19
legal 11:6,16, 20 16:2 17:2	library 67:4 86:21 96:3	limitation 26:18 27:13, 25 29:9,14,21 32:10 33:17 34:2 38:21,22 40:20 44:16 46:18,21,25 81:17 82:8 89:7,14 90:15 91:16 92:18, 24 95:16 110:16 137:16	located 22:1 40:2	lunch 110:4
lending 134:6	licensing 16:8	limitations 30:5,8 107:12,14 110:21	location 21:23	
let 6:10,14,21, 22 7:18 8:21, 24 10:16 13:17,23,24 22:8 27:24 29:4 30:11 35:9 52:2 54:11 55:1 57:19 66:9 68:4 83:7 99:25 108:14 110:13 113:15	lightweight 20:11,16,21 21:11,16 26:1	limited 14:3 45:23 60:21 64:9 98:2 101:10	locations 40:3	M
	like 5:9,12 8:10,15 10:13 19:13,21 27:9 30:22 31:13 39:3 41:11 42:4 54:22 55:17 60:13 61:7 64:21 68:2 70:15 71:18 75:14 76:22 85:14 98:16 99:14 100:11	line 69:1 73:22 75:25 81:24 82:22 136:4 153:6, 7,9,10,12,13, 15,16,18,19,	log 71:25 146:25 149:22 150:5	machine 32:16 61:5, 10,20 64:5 65:11,18,20 66:6 93:23 97:16,24 99:16 101:12

104:3 109:20 117:4,5,6,10, 13,25 118:4, 18 119:18,21, 22 120:6,25 121:9,13,19, 21 122:3,12, 17 123:25 125:6,14 126:12,13,15, 19 127:6,9,23 128:1,17,21 129:4,7,8 130:8,9,17 131:23 132:1, 2,4,12,19 133:8,9,11 134:19 136:6, 10,18,23 137:2,5,9,14, 16,24 138:9 139:4,23,25 140:11,16,17, 19,23 141:4, 7,8 142:2,3 148:22 149:1 machine- based 103:13 machines 32:16 56:6,25 117:5 122:6, 7,11,14 124:3,13,17, 19 125:8,11, 12,18,21 127:17 128:5, 12,13 129:12 130:15 136:24 138:3, 4,6 139:15 140:24 141:16 149:7	made 152:3,7 153:5 main 22:17 majority 6:8 make 8:18 12:18 13:24 19:17 23:25 27:24 35:10 40:16 42:13 43:6 56:2,18 58:21 68:6 101:19,23 104:21 138:3 140:22 makes 20:10 32:20 77:22 80:4 making 24:9 80:23 132:8 malicious 65:6,7 66:23 86:21 103:4,5 malware 21:6 38:10 52:20 55:6,18 management 36:12 mandate 46:21 manipulation 65:6 103:4 manner 69:23 146:8 many 6:3,6 9:19 14:8 56:11 107:14 map 20:3 mapped	26:24 28:14 30:7 39:18 47:8 mapping 11:8 12:6 19:9 29:13 49:2,19 maps 42:23 mark 48:16 49:5 marked 12:8 markings 15:11 mask 100:14 massive 53:20 match 96:11 100:23 material 11:8 18:6 19:23 20:5 24:10 29:21 materials 7:12 10:19 12:6,11 13:19 16:22 17:6 18:4,22,24 19:1,2,10 20:2,4 21:10 23:12 26:19, 25 28:4 34:25 36:18 37:23 39:4,10 40:8 41:6 44:4,16, 22 49:12 51:5 matter 95:23 97:6 99:20 matters 11:11 maximum 139:20	maybe 25:1 36:12 79:22 123:12 131:21 me 6:10,14, 19,21 7:18 8:21 10:16 12:7 13:17, 23,24 20:5 22:8,9 23:15 24:9,11,17 26:1,10 27:24 28:17 29:5,22 30:11 31:4 32:23 35:9,25 36:2,14,17 42:8,9,19 43:25 50:24 52:2 53:2,14 54:11,15 55:1 56:15 57:19 61:23 62:24 64:2,21 66:9 68:4 69:8 77:21 81:16 83:7 91:13 96:21 105:10 106:23 107:9, 13,18 108:7, 9,14 110:13 112:19 113:15 114:1, 14 115:8,13, 14 119:7 120:7,12,17 121:14 122:25 124:8 125:18 126:4 128:23 130:6, 21 131:18 134:12 140:1 148:16,17 151:6,7	mean 10:3 11:7 13:16 21:21 28:13, 22 31:4,13 32:11 46:12, 23 49:1 57:5, 16 58:21 62:25 76:23 77:17 78:25 79:1 80:2 81:16 84:1, 21,22 87:14 89:12 98:8 99:4,21 103:11 111:3, 4,5,6,7,17,23 115:3,4,8 120:8,10,12 123:11 125:25 132:16 133:23 148:10 meaning 34:21 37:15 47:25 51:10 means 22:1,2 26:2 29:8 33:9 42:22 meant 100:5, 25 125:17 132:13 141:23 measurable 143:7 measured 143:18 mechanism 77:5 mechanisms 144:1
---	---	---	---	--

medical 6:24	method 31:18,20 32:1,3 74:25 83:24 133:10 135:25 138:7 141:13,24,25	misunderstan ding 145:2	118:3,6 119:3,21 121:2 122:23, 24 123:2	18 57:5 59:1, 18 60:3,21 62:3,19,21 63:2,9,24,25 64:3 65:19 66:5,13 68:10,17 97:15 101:5, 6,10 102:12 105:18 106:10,17 107:7,23 108:18 109:4, 15 110:16,19 115:1,10 118:7 119:1, 5,10 120:4 121:6,11,19 122:2,22 123:3,16,24 127:18 129:23 130:2, 19 132:23,25 133:18 134:5 135:13 136:16,17,22 137:8 138:11 139:12,13 140:10 144:1, 12
meet 9:11	methods 130:10 144:8 149:1	mitigate 52:10	money 23:1, 17	monitors 28:25 59:5 60:17,25 61:13,24 62:22 65:2 67:3,8,16 102:25 103:20 104:9 105:22 109:19 119:21
meeting 9:16, 25	microphone 131:9	mode 119:9	monitor 23:17 31:16 52:9 56:24 59:10 61:4,9,19 63:7 97:20 103:25 106:1 117:4,10,13 118:4 122:4, 14 123:3 138:17,18	more 32:21 33:10,14,18,
meetings 9:13,24	middle 22:14 134:15,16	model 41:15 43:22 84:1	monitor/ intercept 103:18	
memory 40:21 41:7 46:19 65:6 69:3,14,25 71:10 74:25 78:15 80:1 81:19 82:12 91:6 103:4 116:1,10 117:12 118:8 119:11 128:23 129:1 130:18 133:6	mind 11:24 14:16,17 22:10 24:9 29:2 52:1,2 60:1 108:15 121:15 134:13 144:6 148:18	modeled 62:16 63:20	monitored 55:25 59:21 65:11 103:17 106:13,15 108:22,24 109:12 110:24 111:13 112:19 113:9, 12,23 114:7 119:16 121:1 123:4 124:17, 19,23 125:5, 14,21 127:5 128:13 129:6 131:17 137:23	
mention 27:15 57:15 70:12 79:11 80:20 130:8 139:22,24 149:4,7	mine 26:15	modifications 27:10 30:24 41:12 60:5 62:4 63:4,15 143:15 145:6	monitors	
mentioned 41:24 84:3 108:8 109:1,5 115:16	mined 53:21	modified 146:3		
mentioning 81:24	minutes 73:12 147:23	modifies 145:15		
mentions 28:9 43:15,16 56:10 102:9 111:4	mischaracteri zes 46:6	module 59:12,19,21, 22,24 65:2,24 66:2,5 67:3,8 68:14 69:2, 14,24 70:7,20 71:1,15 73:17,19,23 74:9 75:12 78:8,23 79:3, 17 80:11 82:6,21,23 85:18 90:7, 14,22 91:15, 21 93:8,16 94:8,18 102:25 103:14,18,19 104:9 106:3, 11,13 117:25		
merely 23:14 59:20 106:12 126:22,23	mischaracteri zing 81:15			
merits 17:17	misleading 78:11			
	missing 102:2			
	Missouri 151:3,21			
	mistaking 63:12			
	misunderstan d 79:21			

20,23 34:19 35:2,10 37:2, 4,13 38:23 39:24,25 41:13 42:15 46:17 48:22 51:8 56:3 58:4,22 59:25 89:16 93:20 110:1,2 115:24,25 116:1 117:3 124:4,5,16,18 125:8 127:17 128:4,11 138:3 142:3 143:23 morning 5:21 most 6:11 mostly 58:8 69:12 motivated 142:17 move 131:5 Mr 5:11,14,20 11:5,10 12:4, 14,21,23,25 13:7,9,11,23 14:5,16 15:3, 21,25 16:18 17:9 18:1,11, 20 19:7,14,20 20:8 28:20 29:15,23 30:16 32:7, 14,17 33:15 36:21 37:1,7 39:8,16 40:13,20 43:13 44:6,10 45:15,17 46:5,18 47:2,	7 48:24 49:10,16,24 50:3,10,14,19 56:9,16 57:1, 8 65:21 66:4 67:12,17 68:1,4,19,21 70:11,15 71:2,12 72:8 73:2,4,9,14 75:13,17 77:3,11,15 78:3,9,18 81:13,23 82:10,17 83:14,17 85:22,23 86:1 87:5,6,8 88:6, 10,13,16 89:6,10 90:3, 8,16 91:10,17 92:11 95:1,9 96:18,20 97:18,22 98:1,16,24 99:1,19,23,25 100:2,4 102:7,10,14, 15,18 104:4, 13,18,20 105:1,5,9,14 106:22 108:5, 11 109:22,25 110:9 111:2, 11,16 112:17, 23,24 113:13, 17,25 114:5, 10,21 124:24 125:3 127:8, 15 128:19 129:5 130:5, 25 133:2,16 134:9 135:12, 15,18 137:10,	19,25 138:20, 23,25 139:9 140:1,12 141:2,17 142:7 146:6,9 147:22,24 148:2 149:13, 14 150:9,11, 13,17 much 9:15,21 147:20 multiple 32:16 84:3 111:22 118:21 my 5:24 6:12, 18,21,25 7:15 8:6,8 9:7,9 11:24,25 13:18 14:10 16:19,21 17:5 18:9,10,14 19:12,22 20:1,25 21:1 24:9,10 27:16,22 29:1 31:9,11,24 32:10 39:21 40:16 41:4,24 43:19 44:11 45:23 46:9, 14,16 47:18, 19 52:3,6 55:1,5 57:4, 15,16 58:6 60:13 61:3 63:14 66:9 73:9,20 75:15 78:19 81:18 85:14 98:13 99:10 104:24 105:16 106:20,22	107:17 108:7, 9,20 110:13 111:9,11 112:16,22 115:13 124:9 125:18 126:22 128:2 134:8 143:13 144:21 145:2, 14 148:16,17 150:10 151:8, 9 152:8,19 myself 14:12 N name 5:22,24 152:8 nature 40:4 71:20 86:16, 17 necessarily 63:15,16 65:13,14 78:5 79:18 97:11, 13 98:10 99:6 123:9 138:10 necessary 80:22 100:8 137:17 138:6 140:20 152:5 necessitating 138:10 need 8:11 16:9 19:14 28:14 31:12 33:6 41:13,14 42:15,16,21 44:3 47:25 53:9 54:16 71:5 89:16	130:7 needed 54:6 needs 125:7 negative 124:10 neither 151:9 network 36:6 53:1 55:7 59:6,23 60:18 61:1,14 62:16 63:10,17,21 64:25 65:9,15 95:22 96:4,8, 9 97:5,9,14, 19,20 98:4 100:7,21 102:23 103:12,21 104:7 105:23 106:18 111:24 112:7, 9,12,13 113:5,6,14,21 114:2,3,5,6, 13,19,23 115:2,10,18, 23,25 116:9 120:25 121:8, 12 123:24 124:22 127:16 128:9, 16 129:1,8, 11,14 130:4 133:21 134:17 135:2, 3 136:4 148:20 network- based 76:9 networks 113:7
--	--	---	---	---

never 78:2	non-	90:20 91:3,9,	note 66:20	object 11:5
next 17:9 19:9	virtualized	23 92:5,12	95:23 102:14	12:4,21 14:6
29:1 54:23	149:3,5	95:2,24	126:10	16:18 18:1
66:19 121:22	nonnetwork	96:13,14	142:16 143:3,	19:7,20 36:21
144:21	133:21	97:11,13	6	37:7 39:8
nexus 17:14,	nonobviousne	98:7,9,10,11	noted 142:19	40:13 43:13
16,23	ss 11:22 12:2	99:3,5,6,7,17,	notes 7:22	45:15 46:5
no 7:2,8,11	13:1,5	20 100:2,5,16	127:22	47:2 48:24
10:8 13:16	nor 95:25	101:1,13,22	128:20	50:3 56:9
15:1 18:14	151:10,14	102:2 104:13,	nothing	57:1 65:21
28:13 31:12	normal 117:7	14,20 105:3	146:18	67:12 68:1,19
38:20 39:16	not 6:18,19	106:1,9,12	150:13	70:11 71:2
54:5 72:10,12	11:7,14 12:23	107:16 109:1,	notice 35:13	72:8 73:2
76:7 81:15	13:15,16	3,5,10,14,15,	122:5,10	75:13 77:3,15
83:19 89:7,14	14:17 15:5,	18,24 110:7	128:22 132:3	78:9 81:13
92:5 96:24,25	11,14,15	111:3,5,23	146:18	82:10 83:14
98:25 100:5	16:25 17:2	112:7,21	noticeable	85:22 87:5,8
101:17	18:4 20:1,25	115:21	143:10,11	88:6,13 89:6
104:15,17	21:1 24:9,22	118:23 120:2	144:24	90:3,16 91:17
105:3,4,8	25:19 27:23	123:5,6,9,19,	145:23	95:1 96:18
113:1 123:21	32:9,18 36:22	20,21 124:10	notifications	97:18 98:1,24
125:22	38:1,17	126:15,19	43:17	99:19 102:7,
126:22 130:8	39:12,14	127:25 129:6,	noting 126:12	14 104:4,18
139:24	40:2,3,12,15	10 130:7,12,	145:20	108:5 109:22
143:10	43:14 45:10,	16,19,25	now 12:24	111:2 112:23
144:23	18 46:7,12	131:23	19:2 33:16	113:13,25
145:12	51:18 53:17	132:10,18	68:5,6 84:3	114:10
147:12,19	54:2 56:16	136:10 137:2,	88:19 108:21	124:24 127:8
149:12	57:3,20	5,13,18	126:18	128:19 130:5
150:10,11	59:10,17,20	138:6,9,19	number 10:3,	135:15
151:21,23	63:15,16	139:3,10	4 13:13,14	138:23 139:9
nodes 43:2	65:10,12,13	140:5,15,20,	67:17 101:2	140:12,13
45:2,4 48:7,9,	68:4 70:15	23,24 141:5,	124:13 140:5	141:17 146:6
15,17,19	71:23 72:9,	11,15,22	numbers 65:4	objected
49:5,7,9,21,	20,22,24	142:1,17	103:2	135:19
23 50:18	73:6,10 76:8	143:4 145:3,	o	objection
noise 130:21,	77:5,8,13,17,	6,8,19		13:7,11 15:5,
23 131:1,8	20,23 78:2,4,	146:10,24	o'clock 110:3	21 28:20
non-virtual	10,25 79:6,7,	147:3,7,14,16		29:15 30:16
149:7,8	18 81:18,23	150:10		32:7,17 50:14
	82:11 84:20	151:12		86:1 105:14
	87:9,20 89:17	notary 5:4		111:16 133:2
		152:21		134:9 137:10

149:13 150:9	135:13	42:20,21,22	87:2,6,17,23	132:2,6,9,22,
objections	occurs 39:2	43:1,22 44:4,	88:1,3,4,7,9,	23,24 133:8,
49:16 137:25	65:16 100:6	15,16 45:12,	21,24 89:1,4,	17,22 134:4,
observable	101:5 102:12	23 46:9,15,25	9,16,22 90:1,	15,18,19,24
144:3	107:24	47:21 48:2,8,	12,18,21,25	135:1,8,9,10,
observation	126:14	13,20,21	91:1,13,20,	11,21,23
147:1	127:25	49:13,25	22,24 92:1,9,	136:5,11,15
observe	of 5:3,6,17,18	50:17,20,24	13 93:1,3,5,6,	137:20,22
145:3	6:6,8,14,17,	51:8,20 52:8,	24 94:9,12,15	138:4,10,17
observed	21 7:9,14,19	12,15,17,20,	95:6,16 96:5	139:1,22,24
93:16	9:20 10:5,21	21,23 53:1,9,	97:6,10,20	140:5,6,9,15,
observes	11:3,9,13,18,	14,15,25	98:4 99:20	18,20,21,25
66:21	21,24 12:2,6,	54:6,9,17,24	101:2,9,15,	141:3,12,14,
obstructing	13,16,19	55:3,6 56:14	20,22,23	19,24 142:3,
104:24	13:1,5,15,22	57:3,5,6,17	102:5,11,19	10,11,16,22
obvious	14:6,8,14,20	58:11,17	103:9,20,22	143:22 144:8,
28:23 31:14	16:2,6,7,8,10,	59:1,9,18,20,	104:2,11,23	14 145:6,11
37:10 145:17	11,15,19,23,	21,22 60:4,	106:10,12,23	146:14,18
obviously	24 17:7,12,	12,14,24	107:3,5,12,	147:11
14:9 69:10	15,17,18	62:3,17,23,25	15,23,24	148:18 149:4,
140:4	18:8,9 19:4,5,	63:3,7,12,16,	108:12,23	7,18,20,24,25
occur 56:25	22,23 20:2,4,	25 64:5 66:8,	109:3,4,7,9,	150:3 151:1,
63:24 65:20	9,11 21:6,9,	17,23,25	11 110:24	7,8,10,13,15,
66:6 93:5	23 22:5,14,20	67:10,17,20	111:9,13,18,	21,23 152:9,
97:16 101:11	23:15,24	68:10,15,25	23 112:18	12
115:1 119:20	24:9,11,25	69:21,24,25	113:11	off 6:20 15:2
120:5,24	25:9,14,21,22	70:21,24 71:7	114:15,23	18:19 42:8
121:7 123:25	26:16 27:6,	72:19 73:18	116:24 117:3,	131:14,21
124:16 130:3	13,25 28:3,8,	74:6,12,15	15,17,20	136:3
occurring	17,18 29:3,	75:3,6,15,23	118:1,8,12,	offers 23:2,20
34:5 55:8	14,22 31:15	76:1,12,21,22	22,24 119:12,	29:5
64:1 66:21	32:3 33:1,5,7,	77:21 78:17,	18 120:8,14,	on 5:10,13,17
97:24 119:1,	20 34:2,7,8,	19,24 79:8,	18,23 121:11,	9:21 11:24
15 121:12	10,12,13,15,	10,11,25	18,20 122:17	12:1 15:11,15
122:22	16,19 35:8,	80:1,3,19,20	123:23 124:2,	16:1 19:8,22
124:21	13,23 36:2,5,	81:1,7,10,22,	10,13 125:1,	20:9 22:1,2,6
128:12	7,12,18,19,23	24,25 82:3,	4,10,12,19,21	23:3,8,12,21
129:23	37:14,18,19,	15,16,20	126:8,13,21	24:10,16,18
131:16	22 38:1,10,	83:6,9,10,12,	127:2,16,23	25:8 26:11,
133:18	14,17 39:1,	23 84:5,8,11,	128:10,21,24	18,20 27:1,11
	18,23,25	12,13 85:4,6,	129:2,15,16	28:1,5,10,15,
	40:4,5,11,23	9,15,16,19,24	130:2,3,6,8,	24 29:6,10,
	41:4,7,16,17	86:6,10,12,	12,14,17,18	21,24 30:10,
		16,17,25	131:15,20,24	

12,19,25 31:2,3,10,15, 16,21 32:2,20 33:5,15,16,24 34:14 35:21 36:13,17 37:13 38:2,25 43:14 44:22 46:17 47:18 50:8,9,23 52:8,17 53:3, 11 54:3,13,14 55:11 56:2, 19,20 58:11 59:2,3 60:13 61:5,10,20,25 62:20 64:4, 19,23 66:6, 19,20 67:5 69:11 70:13 72:13,16 74:1,17,24 75:6,18 76:12 78:18 82:2 83:1,9,13,25 86:18,21,22 88:9,17,19,21 89:4 90:1 91:20 92:14 93:22 96:16 97:16,24 99:16 103:12, 14 104:10,16 105:19,20 108:18 109:8 110:14,17,20 111:8 112:15 116:10,22 117:9 118:22 120:17 121:18,19,20, 23 126:9 127:11,19 128:13	129:23 131:16 132:23,25 133:18,25 134:6,18,23 135:13 136:16,23,24 137:8,24 139:14,19 140:10,22 143:19 144:10,19,22 145:7,12,19, 23 146:10 147:12 148:8, 17,21,25 149:3 on-premise 21:19,22 25:10,16 on-premises 54:5 once 61:17 65:16 78:24 one 6:17,21 13:14 22:9 28:17 32:3, 16,20,23 33:10,14,18, 20,23 34:19 35:2 36:18 37:2,4,13 38:23 39:24, 25 46:17 51:8 57:21 58:4, 11,13,23 60:13 64:9 68:14 83:22, 23 87:2 91:5 93:11 103:17 110:2 111:22 114:1,11,21	115:14,24,25 116:1,25 117:1,3,6 118:18 119:7, 19 120:24 122:8,25 124:4,6,16,18 125:8,12 126:4 127:17 128:4,11 130:21 131:18 145:25 148:16 one-day 139:12 ones 8:5 141:6 online 7:16 only 6:17 21:18 41:23 54:2 57:21 59:5,7 60:17, 19 61:1,13,15 62:11 63:9 77:5,8 98:12 99:8 101:6 102:12 104:1 105:22,24 106:18 107:6, 24 109:19 114:11 115:21 118:23 120:2 131:1 onto 30:7 open 7:9 10:9 22:9 102:15 opening 22:11	operate 127:11 147:1 operating 20:18 27:4 59:12 65:1 67:5 69:4,6, 15,17 70:1 86:18,22 102:24 103:12,14,20 104:8 106:4 108:23 112:14 116:15 117:2, 15,17,20 118:2,5,9,19 119:12,17 132:7 141:9 142:24 144:2 145:13,15 146:16 147:13 operation 68:14 opine 12:10 13:16,21 14:13 17:3 18:3 36:22 46:22 51:17 77:18 opined 12:1 13:22 16:24 17:4 27:19,22 opining 36:23 139:10 145:19 opinion 11:3, 16,19 13:18 15:9 16:20,21 18:9 19:22 24:10 25:23 31:9,20 32:11	39:17 45:23, 25 46:16 47:18 55:17 57:4 67:7 71:12 96:14 126:19 143:9, 13 144:22 146:10 opinions 43:19 104:24 105:7 opposed 147:5 opposite 147:2 optional 117:6 Orca 14:3 15:8 17:10 order 17:12 42:19 43:25 54:15 69:4,16 ordinary 22:5 62:17 90:18 91:1 92:1 93:4 111:19 131:24 140:18 141:19 142:16 144:14 146:18 organization 80:20 organize 71:25 organized 72:7 79:7,18 81:8,10 82:7 90:23 94:18
---	---	---	--	--

organizes 71:15	out 14:14 21:3 25:5 36:16 38:25 46:8 95:19 128:4 138:8 141:19 146:18,20 147:18	135:2	paragraphs 19:9	57:11,22 58:1 60:3,8 61:24 62:2,6,14 63:2 64:3 66:9,12 67:1, 8,11 68:7,22 70:10,21 72:24 73:17, 19,23 74:13 75:20,25 76:12,13,15, 18 79:17 80:23 81:4,9, 11 82:1,2,16, 18 83:16,17, 23 84:17,20, 22 85:2,20 89:13 90:7 92:3,12,13, 14,21 93:6,12 100:10 101:4 105:13 107:4, 6,21 108:4 110:13,15,25 111:14 112:3, 19 113:3,15 114:22 115:3, 4,5,7,11,12 118:15 120:4, 18 121:6,11 122:21 123:5, 15 124:10,16 125:5,20 126:12,24,25 127:2,12,22 128:10,20 130:2,10 132:10,13 133:1,17 134:2 137:7, 12 138:1,12, 13,22 139:2,8 140:4,7,9,15 141:13,15
organizing 78:6	outcome 151:15	page 20:9 22:15 56:19 58:25 66:19 83:22 110:14 112:2 121:23 126:3,9 134:15 153:6, 7,9,10,12,13, 15,16,18,19, 21	part 10:5 20:11 21:9 25:22 34:14 35:13 37:18, 19 38:1,17 39:18 40:11 59:20,22 64:5 80:1,3 97:10 106:12 117:15,17,20 119:18 122:16 133:22 138:4 140:21 141:12 145:9 147:18	
orient 126:4	outside 67:19 85:24 92:13 121:8 123:25 124:9 125:5, 10,12,21 130:22 132:6	paradigm 55:12 57:24 58:14	particular 64:20	
origin 133:21	over 6:11,18, 19 9:7,13,19 23:24 27:8 30:3,11 41:10,20 50:16 69:22 126:2	paragraph 10:15,18 14:24 15:4,25 16:19 17:9 18:18,20 20:8 24:23 26:17 27:11,20 28:2 29:18 32:24 33:15 37:21, 22 38:3 39:3 41:4,13 44:22 46:9 50:25 51:4 55:2,4,5 57:23 58:3, 13,17 59:1 60:15 62:1 63:1 66:11,19 68:24 69:22 75:15,17 87:2,21 95:12,18 101:23 102:9 103:15 105:11,18 107:19,22,23 111:8 142:9 143:3 146:9, 12	pass 72:11	
OS 116:16 117:7	overall 54:6		passage 95:24 126:10	
other 10:6 13:6 25:21 27:16 33:6,19 34:1,18,22 35:2 37:3,5, 12,16,24 38:1,24 39:5, 6,11,17 40:9, 11 45:19 50:1 51:6,11 65:7 76:3 95:7,15 98:19,21 102:2 103:5 113:7,8 115:25 116:8 120:5,19 121:12 131:19 132:9 137:8,24 140:10 143:25 146:1	overhead 143:7,22		passing 60:21	
others 16:10 126:10	own 9:22 24:9,10 59:12 69:11 106:3 112:13		passive 35:18 53:6	
otherwise 6:24 8:24 145:7 151:14	ownership 54:7		patent 6:6,9 10:22 11:1,9, 13 12:13,17 13:5,22 16:17,24 17:8,24 18:8 19:4,23 20:4 23:24,25 26:18 28:1 29:14 44:17 54:23,25 55:4,6,14,19, 22 56:24	
our 14:20 20:19 36:5 76:17 129:19	p			
ourselves 34:21 37:15 51:10	p.m. 150:19			
	packet 62:12 80:4 93:25 150:1			
	packets 96:12 100:14,23			

142:4 148:5, 8,13 149:6,10 150:7 patent- pending 20:20 patents 58:9 112:20 135:7 path 98:13 99:9 payloads 65:6 103:4 penalty 152:9 pending 98:25 people 33:6 135:7 perceive 49:2 percent 143:8 perform 20:1 31:10 53:2 142:5,15 performance 143:7,17 145:8,10,17, 20,23 147:13 performed 10:24 28:15 31:21 32:2,4 34:11 40:18 57:6,7 92:10 109:8,10 121:21 134:18 136:6 142:14 performing 40:17 116:17 142:3	performs 36:24 59:13 106:4 118:6 119:10 123:3 138:15 perimeter 55:7 perjury 152:9 person 22:5 62:17 90:18 91:1 92:1 93:3 111:18 131:24 135:20 140:18 141:19 142:16 144:14 personally 15:15 111:21 perspective 143:21 pertinent 106:25 pervasive 145:10,15,22 Peters 5:14 11:5 12:4,21 13:7,11 14:5 15:21 16:18 18:1 19:7,20 28:20 29:15 30:16 32:7,17 36:21 37:7 39:8 40:13 43:13 45:15 46:5 47:2 48:24 49:16 50:3,14 56:9 57:1 65:21 67:12 68:1,19	70:11 71:2 72:8 73:2 75:13 77:3,15 78:9 81:13 82:10 83:14 85:22 86:1 87:5,8 88:6, 13 89:6 90:3, 16 91:17 95:1 96:18 97:18 98:1,24 99:19,25 102:7,14 104:4,18 105:1,14 108:5 109:22 111:2,16 112:23 113:13,25 114:10 124:24 127:8 128:19 130:5 133:2 134:9 135:15 137:10,25 138:23 139:9 140:12 141:17 146:6 147:22 148:2 149:14 150:11,17 petition 55:15 57:12 petition's 142:11 Petitioner 5:18 150:14 Petitioner's 95:13 phrase 29:13 46:24 48:13, 23 49:11	50:19 58:22 physical 40:3 117:12 118:7, 8 119:11 physically 21:15 25:15, 16 112:13 pick 31:12 picture 42:21 piece 142:6 pinpoint 53:19 place 64:20 143:20 placed 118:13 144:1 places 57:17 67:18 platform 12:12 13:20 16:22 18:5,7 19:1,3,6,11, 18,25 20:3,6, 12,23 21:5, 10,17 24:4 25:8 26:19,24 27:20 28:4,7, 9,19 31:22 32:3,25 34:4 35:1,6 36:25 37:11,24 38:2,5,17 39:1,5,7,11, 14 40:6,9,12, 17 41:3,6,15 43:21 44:5, 15,21 45:9,20 46:1,10 47:17 48:21 49:4, 12,15,20	50:2,13 51:6 52:9,25 54:13 please 5:22 6:14,21 8:21 10:15 24:25 42:8,10 56:15 83:23 84:25 93:12 96:24 97:2 138:24 plenty 57:17 103:22 plural 122:11 plurality 40:23 48:2 70:24 75:3,23 81:22 109:7 121:20 134:18 136:5 point 21:3 33:12 36:1,16 46:8 47:20 48:10 52:1 56:15 57:16 58:6,19,24 72:19 75:14 83:15,19 86:2 105:25 108:7, 9 110:1 120:7,12 128:3 132:19 134:12 137:12 143:25 145:2 pointed 128:4 135:22 138:8 pointing 17:5 68:3 146:20 147:17 port 64:25 65:4,17 101:7,12
--	--	---	--	---

102:13,23 103:2 104:2,7 106:16 107:25 portion 26:16 73:21 74:12 105:11 107:19 136:15 portions 104:23 ports 103:21 POSITA 94:16 95:20 position 81:18 possibilities 77:18 141:24 possible 146:23 post-processing 77:25 potential 123:9 125:17 143:7 potentially 7:13 33:14 79:24 88:11 122:15 power 110:6 practice 18:7 practiced 10:21 11:12 12:12 13:21 16:23 17:7 19:3 20:6 35:1 36:25 40:18	practitioner's 143:20 praise 16:7 precise 64:17 115:17 139:17 precision 64:18 preclude 123:5 125:1 130:16 precluding 123:20 predetermine d 66:16 68:12 predicated 65:9 prefer 8:16,21 preference 8:12 premise 22:2, 6,7 preparation 9:12,16 prepare 9:5 preparing 9:22 10:5 prescribed 138:19 presence 133:8 138:10 present 71:6, 9,24,25 79:24 113:15 122:17 131:23 140:16	presentation 80:21 presented 14:25 19:24 72:7 90:20,23 presenting 11:15 presume 8:17,20 pretty 28:23 37:10 39:22 78:13 prevent 34:22 37:15 51:10 96:16 122:4 preventing 33:22 prevention 100:13 prevents 38:12 52:19 89:8,15 previous 27:2 46:9 primarily 33:4 primary 19:5 principle 97:6 99:20 principles 14:22 132:4 prior 8:2 13:2, 3,5,12 21:4 55:14 57:11, 22 66:23 97:12 100:7 147:6 privy 11:14 13:13	probably 79:23 124:6 131:1 140:22 probe 104:24 problem 113:1 147:10 problems 22:18 procedures 52:11 116:16 proceeding 7:25 8:3 10:10 11:4 13:6 15:8,18 17:11 68:23 proceedings 13:12 14:13, 15 process 27:9 30:23 41:11 42:4 43:16 62:11 68:10, 15 91:11 92:20 94:1 105:12 107:20 108:12 109:19 134:22 146:1 150:2 processed 72:18 processes 41:17 42:18, 21,23 43:24 44:2 47:22 60:6 62:5 63:5 117:8 135:1,2 processing	59:11,18,19, 22 71:18,21 78:25 91:5 92:16 106:3, 10,11 115:24 produced 5:17 12:6 70:6,25 78:7, 22 79:2,16 80:3 82:6 85:17 93:7 produces 74:9 80:11 product 10:20 17:6 18:6 29:8,10 33:4 36:24 49:3 53:16 products 50:5 profiling 20:20 propagate 62:10 properly 95:6 101:1 property 144:17 proposed 142:11 proposing 144:8 protect 34:21 35:16 37:15 51:9 53:4 98:19,21 protected 95:15,22 96:3,13 98:8 99:4 100:16
---	---	--	--	---

113:6 protection 25:7 protocol 135:5 provide 11:8, 16 12:6 16:20 17:16 22:21 32:10 53:18 61:7 76:8 93:6 135:7 provided 7:17 11:18 12:15 17:19 45:12 46:14 134:24 provides 21:6 27:5 36:6 38:10 52:13, 20,21 76:7 85:10 117:12 123:8,22 134:11 providing 23:5 80:24 86:15 134:23 139:18,20 public 5:4 152:21 published 18:23 purpose 135:23 purposes 46:25 122:20 pursuant 115:11 151:6 pushing 84:4 put 41:24 77:19 116:25	putting 69:11 84:6 90:11 Q qualifies 149:8 quantify 40:2 question 6:14 8:13,19,23 12:22,24 15:23 32:19 37:9 40:6 42:4 47:4 71:3 78:11,19 80:18 85:15 87:20 98:25 99:13 104:21 105:3 106:21, 22 107:17 108:7 111:11 112:22 120:10,11 124:12 125:18 134:8 138:24 140:6 144:21 149:6, 16 questioning 55:5 questions 5:20 6:12,21, 25 7:4 15:22 81:25 95:17 102:16 147:19 148:2 150:12 quick 6:10 7:18 44:7 73:11 110:4 quite 73:10	quote 20:10 142:21,22 R raise 52:22 range 52:14, 21 rationale 76:8 raw 73:24,25 74:4,10,14 75:11 78:7,21 79:2,6,16 82:5,24,25 83:4 86:5,7 90:13 91:14 92:17,22 94:7,24 148:4 149:11,16,22 150:4,6 Re 153:3 reach 72:19 reacquaint 14:12 read 15:13 16:2 19:12,15 22:3,4 23:7 36:13 57:22 60:16 65:22 69:13 73:21 82:21 87:21 89:13 102:8 104:5 150:16, 17 152:2 153:6,7,9,10, 12,13,15,16, 18,19,21 reading 22:13 23:14 24:8, 11,19,21 25:5	38:3 84:4 85:2 87:10 105:11 107:19 136:3 140:14 143:19 147:14 153:4 reads 104:22 real-time 23:3,21 24:15 27:5 29:5 35:20 36:1,5 52:14 53:10, 19 54:2 realistic 57:2 realize 124:7 140:19 really 29:17 realtime 5:10, 13 reason 6:24 118:20 138:2 153:6,8,9,11, 12,14,15,17, 18,20,21 reasons 140:5 recall 10:3 13:9 14:4 44:18 67:25 142:13 148:3, 4 receive 35:20 36:19 53:10 received 54:1 109:20 recenter 113:20	Recess 44:9 73:13 110:8 147:25 recite 60:13 132:18 recited 27:12 31:21 32:4 36:19 41:2,7, 23 44:25 75:10 82:8 88:12 118:14 129:17 recites 37:1 38:23 40:20 55:11 59:1 75:4 87:3 105:18 110:15,18 127:5 reclaim 112:25 recognized 62:17 63:21 record 5:22 15:2 18:19 19:15 57:23 60:16 82:3 87:22 101:24 104:23 recordation 143:17 recorded 135:9 records 142:20 146:13 redirect 147:21 reduced 151:8
---	---	--	--	---

reducing 23:1,17 54:6	30:23 41:12 42:5 43:17	remaining 144:18	require 34:1 71:18,21 77:25 78:5,6 109:15 131:23 132:10 133:11 141:12 142:2 145:22	22:16 52:15 97:19
refer 18:25 54:24 120:19 149:15	regular 145:7	remains 124:9		responses 22:22 52:21
reference 20:10,13,14 33:17 41:19 57:11 59:8 60:8 102:19	reinforced 127:4	remember 11:24		responsive 112:22
referenced 8:6 44:20 55:14 70:10	reiterate 19:21	remiss 11:15 50:16 58:11		restate 109:2
references 8:2 9:9 76:1, 17 103:22 112:1,3,4	related 58:10 151:10	remotely 7:4	required 71:13 90:23 95:16 129:12	restrictions 57:14
referred 23:11 89:2 101:2 108:1	relates 85:15	render 152:5	requirement 56:14 72:14	result 146:3
referring 37:21 50:20 58:17 61:11 63:13 89:11 102:21 114:2	relation 63:10 148:4	reorganizing 91:12	requirements 27:13	results 16:11
refers 24:14 58:13 70:22 112:8	relationship 49:22 51:15 138:17	repeat 18:2 84:7 100:18 138:24 140:14 142:1	requires 33:13 34:17 52:12 53:14 71:17 78:14, 21 82:12 91:8 92:8 95:3,4 107:7 127:9, 11 129:23 143:22	retrieves 70:2
reflected 55:9	relationships 41:16 42:17, 20,25 43:1,23 44:2,24 45:4 47:13,21 48:9,18 49:8	repeatedly 108:1		reveal 53:22
reflecting 74:10 82:7	relative 151:12	rephrase 6:15 13:17 61:12		review 11:8
refresher 6:11	relevance 11:3 18:4 139:5	report 143:6	reserved 5:7	reviewed 135:7
refusing 102:15	relevant 7:13 35:21 44:16 53:11 54:2,3, 12 107:3,5,6, 15 108:3,13 138:21 139:7 140:4,6	reporter 5:5, 9,12 6:16 148:18 150:15 151:1, 2,3,21,22 153:22	reside 20:22 24:6	revisit 51:2
regard 108:3	relying 43:14 64:10	reporting 147:15	resides 21:16 25:15,17 117:11	right 9:4 10:18 11:1 12:24 18:15 22:13 24:14 26:15 27:6,10 31:18 33:16 43:12 47:9 52:5 54:22 56:8 68:5,6 71:16 72:7 73:1 74:15 75:17 78:8 79:20 82:9 93:13 101:21 110:9,14 114:12 119:23 121:3, 18 122:12 126:20 129:9 131:4 136:12 141:4 146:5
regarding 7:5 26:17 53:15	remain 143:14 146:22	represented 55:12	resource 22:21	
registry 27:10		representing 47:16 148:21	respect 16:16 120:23	
			respective 135:4	
			respond 49:1	
			response	

risk 23:2,18 52:22	49:16 50:14 56:19 65:10 66:19 86:3 87:10 100:11 110:14 111:16 114:15 123:18 124:9 129:13 132:4 133:6 137:25 138:16 142:5 143:19 152:5	saying 64:24 75:19 133:23 145:24 146:11 147:14	screen 16:1 18:13,14 26:14 29:2 33:16 44:11, 23 52:3,6 55:1 64:19,23 66:9,20 69:11 73:20 74:24 75:18 88:17, 19 93:22 108:20 110:13 112:25 115:13 120:14,17 148:16,17	18:18 27:18, 19 46:9,23 54:8 126:7 142:10 151:6
room 7:6				sections 118:22
rootkit 103:14 142:23 146:15 147:11		says 5:18 20:14,24 21:18,19,25 22:16,22,24 23:8,14,15 24:12 25:25 29:3,5,10 31:2,17 32:11 34:12 36:2,4, 10 38:5,9,13 42:4 43:5,20 46:10 47:10 52:9,24 53:7, 12,18,20 54:5,17 65:23 67:14 74:13, 16 76:19 84:25 86:3 87:22 103:7, 11,16 114:11, 18 115:14 119:9,24 121:18 127:14 134:15,16 148:19		sectors 35:22 53:12,13 54:4
rootkits 144:11				secure 59:23
rough 5:10,13				security 14:3 36:5 53:1 86:11 87:25 143:20
router 113:7	satisfied 30:4			security- related 27:8 30:22 41:10, 20
RSMO 151:6	satisfies 90:15 91:16 92:18			see 11:25 15:11 16:1,12 17:20 20:9, 13,14 24:22 25:12 26:21 29:9 32:23 35:10 36:9 38:4,9 40:25 44:22 45:5 50:24 51:13 52:2,6 55:5, 10 56:14 68:2 69:7,19 70:4, 12 73:20 74:7 75:8 76:18 79:11 80:2,4 88:14 94:4, 21,22,25 105:17 108:8 110:21 114:24 115:14 118:17 121:17 126:16 130:1,
rule 6:16	satisfy 77:12 79:3,19 80:15 81:16		screen-share 8:22	
rules 6:11	Saturday 5:10		scroll 24:25 26:17 42:14 64:21 68:24 70:20 121:16 142:9	
run 28:10 29:10,20,22 31:13,15 61:10 129:12	Saundra 5:4 44:12 55:1 151:2 153:22		scrolled 114:21	
running 23:12 25:8 29:24 30:10,12 61:20 64:4 99:16 103:14 124:14 142:22 146:15	Saundra's 69:12		scrolling 10:14 50:25	
runs 61:5	saves 23:1,17		second 6:16 22:9 32:23 69:23 78:19 93:11 114:1 115:15 119:7 122:11,25 126:4 130:22 148:16	
S	say 6:5,8 7:20 9:18,23 11:17 14:10 21:22 28:12 42:12 48:5 57:3 62:1 65:11,22 68:20 71:4,23 73:3 96:19,22 99:21 100:5 105:18 114:12 116:22 129:10 144:14 146:8 148:10	scope 12:19 13:7,11 14:7, 15 15:22 18:9 48:25 50:3 64:9 67:20 85:24 90:17 133:3 134:10 138:23 139:9 140:13	secondary 11:21 12:2 13:1,4,16 16:4,16 17:1, 12,15,18,25 section 10:19	
said 12:5,20 15:10 18:2 58:4 89:14 99:2 105:4 132:13 151:7		scratch 98:14 99:11		
sake 148:18				
same 8:23 26:6 40:6				

7,11 136:7 139:22 140:15,16 143:1 seeing 18:14 seem 29:21 70:13,15 109:17 seen 45:7,18 50:8 51:20,22 53:17 segments 69:25 118:8 119:11 sending 67:22,23 sense 51:23 79:1 125:15 sensor 20:11, 16,22,24 21:11,16,20, 22,24,25 23:10 24:4,6, 22 25:11,16 26:1,2,12 29:23 30:12 31:14 41:20, 22 42:2 142:4 sensors 27:8 28:10 29:4,19 30:21 36:6 41:9 53:1 61:6 sent 96:2 sentence 26:6 28:2 52:11 69:23 99:12 separate 49:14 50:1,12 59:23 96:3	112:13 separates 72:4 sequence 93:24 server 74:1, 17 83:1 86:8 116:18 serves 17:16 55:13 57:25 services 116:17 117:12 session 110:2 set 14:22 30:14 50:17 124:2 135:10, 11 setup 7:5 seven 6:5 68:25 69:22 127:3 148:17 several 16:3 shadows 20:17 27:3 share 16:1 18:13 26:15 29:1 33:6,11 35:20 36:3 44:11 52:3,10 53:10 55:1 64:15 66:9 73:20 102:22 108:19,20 112:25 115:13 120:14 148:15,17	shared 36:15 37:11 54:1 75:18 shares 32:25 35:7,23 38:13 39:11 52:23 sharing 26:14 33:9,13 34:7, 10,13,16 35:25 53:14 sharp 75:20 Sheet 153:1 shift 54:22 55:9,13 57:24 58:14 142:7 shifted 55:6 shortening 23:4 shorthand 5:4,5 151:3, 22 should 29:10 56:20 73:20 77:5 79:25 86:9 87:22 135:25 153:5, 6,7,9,10,12, 13,15,16,18, 19,21 show 10:20 11:18 12:11 19:2 20:5 34:25 57:17 95:7 100:10 101:18 110:13 123:13 124:10 125:1, 22 128:23 138:2	showed 18:5 27:1 showing 135:8 144:1 shown 33:16 136:24 150:8 shows 24:17 73:7 77:22 85:12 93:13, 14,15 118:16 123:22 138:1 sign 150:16, 17 signature 5:6 74:5,15 83:5, 10 85:16,19 86:6,10,11, 12,13,14,25 87:1,6,7,19, 23,24 88:1,2, 4 89:1,2,12 96:2,3,7 97:4, 14 98:3 100:19 signature- generation 76:10 signatures 59:14,15 87:14 95:21 100:12 106:6 significant 17:13 143:6 silent 23:2,18 similar 21:8 96:16 99:18 127:13 similarities 56:19	similarly 20:15 21:8 33:3 112:11 simplified 146:7,8 simply 142:4 since 60:2 134:12 single 31:8 32:5 sir 6:2 9:3 10:8 13:3 18:16 21:14 22:13 38:19 41:1 44:19 45:6 64:22 74:8 75:9 87:20 88:18 113:19 114:25 126:5, 17,22 143:2 148:6,9,12 149:12 situational 41:15 43:22 six 6:5 68:24 69:1 116:14 skepticism 16:7 skill 22:5 62:18 90:18 91:1 92:1 93:4 111:19 131:24 140:18 141:19 142:17 144:14 skilled 135:20
---	---	---	--	--

slowdown 143:11 144:24	133:13 140:22	15 75:2,23 77:1 78:16 79:9 80:21 81:2,20 82:13 94:11 121:24	speculate 92:13 104:12	100:14 130:9 133:22
small 69:8 130:23	something 51:18 71:23 72:20 77:20 78:21 90:25 91:2,15 92:4 107:25 123:4 128:17	speak 6:18,19	speculating 104:14	statement 26:2 31:4 61:3,12 128:2 145:14
socket 59:7 60:6,18,22 61:1,15,18 62:6,12,21 63:5,16 93:25 96:9 98:5 100:21 105:24 135:3 150:2	sometimes 116:5	speaking 6:17,22	speculation 77:16 91:18	states 17:11 28:1,3,23 32:13,19 33:18 36:15 53:16 67:2,15 69:2 73:23 102:22 104:6 109:14 118:21 119:7 133:12 134:2
sockets 135:3	somewhere 132:6	specific 13:15 14:14,15 28:14 36:24 41:21 42:1 46:20,23 49:3 71:7 74:12 81:17 90:20 110:24 119:2, 24 123:13 124:4 132:10	spend 9:16,21	stating 95:19 101:13,14 126:23
software 29:12 117:22	sophisticated 54:16 143:16, 24 145:18 147:7	specifically 18:3 24:3 27:23 30:6 49:21 50:7 63:25 94:20, 23 101:5 133:24	spot 131:20	Status 76:20
sold 16:22	sorry 8:8 13:3 15:4 30:11 38:4 68:24 98:15 109:2 111:11 131:3 132:15 135:16	specification 55:10 56:12 80:8 82:15 84:4,5 118:22 119:7 133:17 135:6 136:16	stand 61:3 128:3	Stavrou 5:3, 16,21,24 6:1 15:3 16:12 17:20 18:15 21:13 22:12 25:12 26:21 40:25 44:11 45:5 73:15 74:7 75:8 100:4 105:9 107:17 110:10 113:18 114:24 147:21 148:3 152:1 153:2
solely 144:22	sounds 8:10 140:1	specificity 89:17	standard 16:2	stay 33:15
solution 62:18	source 37:14 44:4 49:21 76:4,5 93:14 134:20	specifics 13:15 56:3	standing 92:12	steal 53:8
solutions 35:18 53:6,23	sources 33:21 34:20, 23 37:17 40:1,22 42:24 43:3,11 44:25 45:2 46:3 47:12 48:1,7, 16 49:6 51:8, 12 66:15 67:9 68:11 70:8,9, 23 71:8 72:2,	specified 39:14	stands 75:20	step 74:25 92:7 94:1 95:3
solved 16:10		specify 38:19 122:1,25 123:6,9,19	start 30:11 55:4,20 60:24 95:19 103:7	
solves 22:17			started 5:23 65:14 122:9 136:3	
some 8:4 56:10,17 67:2,14 76:11 84:9,11 85:5, 7,10 86:3 87:17 107:15 115:19 116:4, 8,22 117:13 123:8 124:17 135:4 136:21, 25 138:2			starting 19:11 69:1 73:22 82:22 93:24 110:23	
someone 22:2,4 93:15 95:4 111:7			starts 25:5 64:24 106:16	
			state 5:22 18:21 26:19 31:24 37:23 40:8 44:23 51:5 60:16 61:13,25 63:1,19 66:11 96:7 99:21 126:9 129:1 130:6 151:21, 23	
			stated 39:4	

steps 71:18 91:8 92:8	150:2	subscribing 153:4	support 46:15 66:25 102:3 131:15 132:22 134:6 136:16 138:21 139:1, 7 140:6	23:23 24:1 26:20,23 27:4,6,12,14, 21 28:2,5,6, 18 29:13,24 30:3,13,19 31:6,11,12 32:4,15 33:20 34:1,18 36:12 37:3,5 38:24 39:12 43:9 46:1 55:8,12 59:2,3,12 60:10 62:9 65:2 66:21 67:4,5 75:7 83:10,13,24, 25 86:18,21, 22 88:22 89:5,23 90:2, 13 98:9,11 99:5,7 100:13 102:25 103:12,15,20 104:8 105:19, 20 106:4,15 108:19 109:8 110:11,17,20, 24 111:5,10, 13,15,17,20, 21 112:12,14, 18,21 113:4, 9,12,22,23 114:7 116:7, 15,17 117:2, 16,17,20 118:2,9,19 119:12 125:4, 20 126:8,11, 14,15,20,21 127:6,7,10, 19,20,24,25 128:15,22 129:3,6,11,
Steve 135:17	streams 60:6 62:5 63:5 65:4 103:2	subsequent 65:19		
Steven 102:18	structure 40:21 41:3,7 46:19,21,25 47:5,8,14 48:3 49:18 70:22 71:1,5, 11,13 72:1,5, 13,14,19 73:1,8 75:1, 10 76:4,9,14, 19 77:1,13,19 78:4,15,21 79:4,8,19,23 80:16 81:8,19 82:7,12 83:21 84:1,8,11,13 85:4,6,9 87:14,16 90:12,14 91:7 92:18,23 93:18 94:19, 21 150:8	substance 152:4		
still 98:17		substantial 59:13 106:4	supports 118:1	
STIPULATED 5:1		substantially 145:16	sure 8:18 12:18 13:24 15:5 23:25 27:24 43:6 56:2,18 68:6 69:8 78:10 84:20 87:9,21 101:19 104:22 108:16 109:3 112:21 121:16 131:13 138:4, 25 140:5 146:10 147:24	
stop 6:22 26:14 102:1 118:10 130:24 131:11		substantive 96:5		
stopped 18:13 99:8		subverted 143:24		
storage 50:20 71:6 86:8		success 16:6		
store 72:2 77:1 78:14 91:6 95:5		such 59:13 60:4 62:4,18 63:3 76:9 86:20 94:24 95:25 96:10 100:21 106:5, 18 117:8,16, 19 134:25 152:3,7		
stored 47:15 71:10 74:1,17 75:5 77:12 79:25 82:12 83:1 87:12 88:20 89:19, 20,21 91:22 93:2 96:2	structures 75:21 80:25 83:20	sufficient 17:14 71:1 79:3 80:7,9, 15 89:21,25	surfaces 144:4	
stores 47:24 116:19	structuring 72:1	suggest 81:19	susceptible 56:7	
storing 40:21 41:7 45:1 46:2,19 47:10,11 48:6 59:13 74:25 78:5 81:19 86:7 106:5	struggling 98:17	suggesting 57:20 60:20 81:15 95:25 146:17	suspicious 62:16 63:20	
stream 62:12 93:25 135:2	submit 15:17	suitable 86:11 87:24	swapping 76:16	
	submitted 7:25 8:3 10:10 14:2 15:8	summarize 55:3	switch 54:11 66:9 95:9 126:2	
	subscribe 152:8		sworn 5:17 151:6	
			system 10:25 11:12 20:18	

15,17,24,25 130:18 131:17 132:7, 24,25 133:7, 19 134:1,6 135:14,25 136:10,11,14, 17,19 137:3 138:15,18,20 139:3,7 140:21,23 141:10,11,12 142:20,24 143:4,9,21 144:2,9,16 145:16 146:3, 13,16,19 147:5,16 148:22 149:5 system's 147:13 systems 27:16 33:19, 23 34:1,6,23 35:3 37:2,5, 16,25 38:1,24 39:5,6,13,17, 24 40:10,11 51:6,11 55:22 56:5,7,24 64:3 66:24 69:4,6,15,17 70:1 92:9 95:15 112:5,8 118:5 119:17 124:6 127:1, 13 128:5 135:1 140:25 145:13 149:3, 8 systems' 37:12	T tactics 52:10 take 7:18 10:14 14:21 20:25 44:7 49:17,18 50:4 70:21 73:17 79:15 104:16 105:10,16 107:18 110:7, 12 112:24 113:2 120:13 121:14 taken 5:3 14:11 77:5 151:7,12 talk 17:23 107:13,15 137:4,14 139:15 talking 30:18 46:13 63:14 68:9 90:4,5 120:15 123:10 125:10,12 129:20 talks 22:14 24:14 26:3,7 29:1 34:7 35:15 42:17 51:24 54:12, 13,19 58:25 89:19 116:10, 11,12,13,14 133:9,25 136:21 139:15 target 71:8 76:5,6 93:15	135:5 144:11 targeted 22:19 38:12 52:19 53:19 targets 33:21 34:20,24 37:14,17 40:1,23 42:24 43:3,11 44:25 45:2 46:3 47:12 48:1,7, 16 49:6,22 51:9,12 66:15 67:10 68:12, 18 70:8,9,23 72:3,16 75:2, 24 77:1 78:16 79:9 80:22 81:2,21 82:14 94:12 task 40:19 tasks 116:18 142:5 teach 71:1 81:19 teaching 82:1 teachings 68:7 101:16 102:4,6,11 103:10,25 104:17 108:13 115:11 120:19 132:9 142:18 technical 11:18 16:21 20:2 techniques 33:8 52:11	66:12 144:12 technology 14:18 20:20 tell 21:23 25:18,24 26:4 42:9 50:23 72:23 94:15 111:8 139:11 telling 105:2 131:18 tells 94:11 ten 9:25 67:1 73:11,20,22 82:18,22 ten-minute 44:7 term 111:18 terms 14:6 78:24 131:15 test 98:11 99:7 testified 80:12 136:9, 13 testifying 43:8 testimony 7:13 23:10 39:20,21 43:7 78:3,20 81:12 82:4 90:10 92:15 94:6,23 104:22 151:5, 7 text 21:1 24:20,21 70:13 than 9:25 10:7	13:6 27:16 33:14,19 37:3,5 38:24 41:14 42:15 46:17 58:4,22 77:23 110:2 120:5 121:12 124:4,5 125:8 128:4 137:8, 24 140:10 142:4 Thank 52:5 147:20 that's 8:10 10:2,4 18:9 21:10 30:1 31:24 32:12 36:13 37:18 39:14 40:18 43:5,25 46:7 53:9 56:13,15 60:23 61:22 71:23 74:13 77:19 84:1 89:23 92:25 97:6 111:18 115:22 118:10 119:6, 24 120:2,3 125:23 129:13,19 130:11 131:7, 11 133:23 138:11 150:8 them 6:8 50:18 58:5,7, 12 75:24 81:3 88:7,9 94:15 95:5,6 107:14,15,16 114:15 131:11 137:14
---	--	---	---	---

themselves 96:17	36:8,18 37:23 39:10,13 40:2,8 41:17, 22 42:2,18,25 43:23 44:1 45:8 47:22 49:12 51:5, 15,21 53:2 62:15 63:19 74:22 76:23 77:2,4,6,7,14 78:6,12 85:24 94:12 108:21 109:9 116:3, 23 122:13 146:1 147:2	this 6:20 7:3, 25 8:3,14 10:10 11:4,8 12:3 13:6,15, 24 14:8,10, 11,14,15 15:7,11,22 17:1,16 19:12,17 20:5,25 21:1, 25 22:14 23:8 25:4,18,22 26:2,16 27:19 28:12 29:10 32:18 33:9,17 34:2 36:19 37:10,21 39:3 41:14 43:9 44:22 46:1, 12,15,23 47:24 50:17 51:1 53:14,20 54:20 55:9 58:3,13,17, 20,21 59:16 61:7 65:9 66:1 68:23 69:11,23 70:6,13,19 71:1,22 72:17,21 74:4,12 76:17,21 77:8 79:13,25 81:7,24 83:4, 17 86:23 87:1,13 89:3 92:2,4,7,11 93:5,13 94:7 96:5 97:9 102:8 104:25 105:10 107:3, 18 109:25 111:1 112:15	113:20 115:3 116:24,25 117:1 118:21, 23,24,25 119:2,3,18 120:9 121:25 122:14,19 123:8,13 124:3 126:6, 10 127:15 128:2,14 132:10 133:4, 8,12 135:8,12 136:15,17,25 139:22 143:25 147:9, 18 149:6,21, 24 150:4 151:11	three 84:23, 25 125:13 through 18:25 20:19 22:20 42:14 55:2 59:7 60:10, 18,21 61:1, 15,17,18 62:8,14,21 67:1 73:24 82:23 85:12 98:4 105:23 110:6 118:20 130:25 131:9 throughout 55:9 throughput 143:8 tie 74:22 time 6:17 9:15,21 10:20 14:8,11,20 17:7 21:17 22:20 23:1,17 28:19 44:12 50:16 65:12 100:11 104:21 124:14 146:21,22 147:20 times 6:3,5 23:4,9,22 24:16,18 26:7 28:11,25 29:7 31:1,3,16 46:11 54:14, 20 84:3 101:2 139:14,19 timestamp 76:20
then 9:8 22:24 24:14 33:23 35:19,22 38:12 52:24 66:2 69:21 71:15 73:25 74:4,14 75:4 81:12 82:25 83:4 93:20 96:6 97:9,10 99:8 103:13 106:14 110:17 112:15 116:11,14,22 121:14,20,22 122:11 144:10,14	thing 87:10 things 9:1 27:9 30:22 41:11 42:4 46:20 91:20 115:22 125:16 think 10:2 15:4 16:25 18:11 19:8 26:14 27:15 28:12 29:17, 19 32:1 37:9 43:14 51:17 53:24 57:2 63:12 71:3 73:5 79:21,22 81:14 83:20 86:23 87:9 89:17 102:1 103:23 110:1, 6 120:13 131:8,17 132:20 134:1 135:8 145:1 third 35:19	those 6:6 8:15 20:7 25:21 37:4 38:16 39:6 40:11 42:7 47:20 48:16 49:5 56:7 63:7 87:2 88:3 89:9,16 91:13 95:5 110:21 112:4 119:22 121:1 122:16 124:17 128:13 129:16 thought 131:10 thread 135:1 threads 60:6 62:5 63:5 threat 25:7 threats 22:19 38:11 52:18		
theory 95:14 there's 13:16 31:12 38:20 53:25 80:6 81:6 91:24 92:5 98:25 128:4 135:6 140:2 149:4 thereafter 151:8 thereon 152:7 thereto 151:14 153:4 these 9:24 11:13 12:10 14:13 16:5, 15,21 18:24 19:1,2,10 20:4 23:11 29:3 30:4,7 33:8 34:25				

timestamps 91:23	21,25 36:1,3, 14,21,22	22,23,24	14,22,23	4,11,14,22,23
Tippins 5:4	37:2,7,12,14,	69:2,3,4,11,	101:3,5,10,	132:16,21
151:2 153:22	15,16,21,24	14,15,16,21,	18,19,23,24	133:6,14
title 84:2	38:18,23,25	22,23 70:11,	102:1,3,7,14,	134:1,3,7,13
titled 10:19	39:5,7,8,11,	22 71:1,2,5,9,	15,20,21,22,	135:15,23
to 5:22 6:12,	17,24 40:4,6,	11 72:8,12,	23 103:6,23,	136:1,13,24
18,19,20,25	9,13,15 41:23	18,25 73:2,8,	25 104:2,4,5,	137:2,12
7:4,13,21	42:10,12,14,	17,21 74:1,5,	7,12,18,21,24	138:2,3,7,12,
8:11,15,18	19,20,21,24	15,17,21	105:3,8,10,	21,23,25
9:1,5 10:13,	43:6,9,13,25	75:13,14,22	16,24,25	139:1,4,9,17
14,15,25	44:1,3,11,16,	76:1,2,9,15,	106:6,8,11,	140:1,6,8,12,
11:2,4,5,8,11,	24 45:8,15,	16 77:3,12,	16,23,25	13,22,24
14,15 12:4,5,	19,21 46:5,8	15,17 78:9,14	107:2,3,5,6,	141:8,12,13,
7,9,10,16,18,	47:2,20,24	79:3,14,22	10,13,18	17,23 142:8,
21 13:3,13,	48:10,11,16,	80:7,9,14,15,	108:1,2,3,5,6,	9,17,18,25
14,16,19,20,	24 49:1,2,6,	19 81:1,4,5,	9,13,14,17,21	143:8,11,14,
21,22 14:1,5,	20 50:3,6,10,	13,16,25	109:22 110:4,	23 144:2,8,
6,11,13,16,	20,23,25	82:10,17,25	7,10,12	13,23 145:3,
17,21,24,25	51:2,6,9,10,	83:5,7,14,15,	111:2,3,6	11,17,25
15:21,22,23	25 52:9,22	19,22 84:17,	112:6,8,17,	146:6,9,22
16:1,16,18,	53:2,8,9,11,	19,23,25	19,22,23,24	147:1,10,11,
20,25 17:5,	14,22 54:3,	85:11,12,14,	113:2,13,15,	23 148:4,7,
13,16,23	11,15,16,22,	15,22 86:5,	20,25 114:2,	15,19 149:2,
18:1,3,17,21,	23,24 55:4,7,	10,20 87:5,8,	10,22 115:4,	15,18 150:3,
25 19:7,11,	17,18,20	13,18,24	6,8,9,11,12,	6,15 151:6,8,
14,15,20,21	56:1,2,4,7,9,	88:6,13 89:2,	16,23 116:22,	10,11 152:4,
20:1,3,10,18	6,8,11,15,17,	6,8,11,15,17,	24,25 117:13	5,8
21:3,4,18,21	11,13,18,19,	21,25 90:3,	118:8,10,15,	today 6:12
22:9,18,20,21	24 57:1,8,16,	10,16 91:4,6,	20 119:7,11,	7:1,7,13 9:2
23:11,24,25	19 58:3,6,8,	15,17 92:13,	14 120:7,11,	14:20 16:15
24:2,7,14,17,	10,13,17,19,	19,21,22	12,13,15,16,	17:23 22:18
25 26:1,10,	20,21,24	93:2,11,17,20	19,22,23	101:3 108:1
13,17 27:17,	59:1,8,15,16,	94:16,17,18	121:5,14,16,	110:18
20 28:12,14,	19,25 60:8,9,	95:1,3,4,10,	20,22 122:4,	today's 9:5,
16,22 29:13,	15,19,21	12,15,17,18,	6,7,8,12	12,17,22 10:5
21,25 30:5,9	61:2,6,11,16,	19,20,21,24	123:21 124:6,	together
31:4,9,12	18 62:7,11,	96:1,2,6,11,	12,20,24	111:22
32:10,20	18,24 63:10,	16,18 97:6,	125:17 126:2,	told 97:1
33:6,17,18,22	13,24 64:12,	13,18,19	4,18 127:3,8,	131:11
34:1,6,17,21,	16,21,22,25	98:1,12,13,	11,14 128:6,	too 26:9 69:8
22 35:3,4,9,	65:11,19,21	16,17,19,21,	7,14,19	115:13
	66:1,8,17	24 99:1,9,10,	129:12,22	131:11
	67:12,23,24	14,17,19,22	130:5,10,13,	
	68:1,2,3,6,19,	100:5,9,13,	15,20 131:1,	

took 106:23 112:19	transmissions 39:24	23:25 30:5 38:25 40:4 79:14 80:9,14 81:25 120:15 121:5 124:20 130:20 132:21 133:14 138:25 139:4	unambiguousl y 80:12	108:2 115:9 124:15 134:8 135:24 139:4 148:11
tools 144:7	transmits 37:12,24 40:9 51:6 95:14		unauthorized 59:4 60:11 62:9,13 66:13 68:16 83:25 84:16 85:4 105:21 121:25 136:25 148:21,25 149:2	understandin g 25:14,21 28:18 36:18 38:2 39:1 40:5 48:12,21 68:13 76:25 79:13,15 82:3 87:20 102:5 104:16
top 11:24 24:25 68:25 121:18	transmitted 35:4 39:4	turn 14:24 54:23 66:16 117:22 148:7		
total 9:25 54:6	transmitting 33:18 37:2 38:23 59:15 106:6	Turning 18:17	unbelievable 105:7	understood 62:18 72:21 90:19 91:2 92:2 95:21 111:19 131:25 141:20
toward 10:15 68:25 135:22	traversed 96:9 100:21	two 10:25 13:14 25:9 58:9 62:14 94:2 110:7,21 112:20 114:15 117:7 119:19 122:5, 6 125:13 126:6,9 147:2,3	unclear 111:12	
trace 74:4 83:4 86:4	treat 112:21	type 36:19,23 57:6 63:12 91:22 104:11 109:9 134:24 135:9,21 149:20,24	uncompromis ed 106:15	Undetectabilit y 142:24
track 41:16 42:20 43:22 47:21	tries 141:8	types 60:4 62:3 63:3,7, 25 149:18	under 35:19 147:1 151:9 152:9	undetectable 142:20 146:12,22
tracking 23:3, 21 24:15 29:6 47:20 139:14, 18	trigger 109:13	typewriting 5:6 151:9	underlying 45:7	undetected 35:17 53:5 66:23 143:14
tracks 24:18 46:10 54:14	triggered 65:15 97:9 106:18	typically 112:9 115:24	undermine 144:17	unexpected 16:11
tradecraft 20:19	triggering 63:23 65:16 101:3 107:24		understand 6:13 12:14, 15,18 17:16 22:6 24:1,21 27:24 30:5 39:20 40:4 43:6 49:19 53:7 55:17 61:23 63:22 68:7 72:10 74:22 82:4 91:13 92:15, 19 94:16 96:21 98:17 99:14 101:8 104:22 105:6	unfortunately 76:17
transcribed 5:5	triggers 86:19,20			unhelpful 104:23
transfer 54:16	true 72:9 152:5,10			unit 111:23
transfers 65:7 103:5	trust 59:20 106:12			units 115:25
transform 91:4	trusted 33:2 34:9 35:8,24 38:15,16 52:24			unmatched 52:13
transition 72:25	truthfully 7:1			unmodified
translate 94:17 115:22	try 6:19 111:6 128:7,14 131:14			
transmission 33:25 34:5, 12,17 36:14, 20 39:2 95:25	trying 12:18	unable 6:25		

142:24 146:16 unprecedented 36:6 until 106:15 untouched 7:17 up 19:17 22:22 24:9, 10,25 35:9 38:4 42:12 50:17 51:25 64:11,14 66:20 75:16 85:12 101:17, 25 102:15,22 103:11 111:3, 6,7 115:6 128:7 132:8 uploaded 96:10 100:22 uploads 65:5 103:3 Upon 153:4 us 5:23 6:17, 22 42:14 92:21 94:11, 14,15 125:1 131:1 use 8:15,24 33:8 44:3 58:22 69:11 73:10,23 82:23 86:11 87:24 96:12, 16 98:7,19 99:3 100:16 120:18 126:10 139:4 140:17	145:22 used 36:3 45:7 48:23 53:22 55:24 73:8 74:15 86:10,15,18, 20 87:23 98:21 99:17, 22,24 111:18 130:15 137:1 149:1 useful 147:7 user 60:5 62:4 63:4 116:9 117:7 134:25 users 23:6 uses 71:13 74:4 83:4 86:5 using 8:20 66:15,16 68:12 84:1 89:8,15 122:20 147:10 usually 26:4,5 79:7 utilities 117:9 utilize 55:22 56:5 V vaguely 11:23 validated 15:16 validity 11:18 value 20:25	variety 78:17 79:10 81:1 various 60:4 62:3 63:2 116:16 148:23 versions 7:16 versus 14:3 67:23 very 9:4 10:18 15:13,20 24:7,12 31:12 50:17 54:20 61:25 63:14 64:9,12 68:21 71:3,20 120:10 127:13 129:13 144:17 147:20 video 42:13 view 57:3 viewed 138:9 virtual 56:6, 25 61:5,10,20 64:4 65:11, 18,20 66:6 93:23 97:16, 24 99:16 101:12 103:13 104:2 109:20 117:3, 5,6,10,13,25 118:4,17 119:18,20,22 120:6,24 121:9,13,19, 21 122:2,5,6, 10,12,13,14, 17 123:25	124:2,5,13, 16,19 125:6, 8,11,12,14, 18,21 126:11, 13,15,19 127:6,9,17,23 128:1,4,12, 13,17,21 129:4,7,8,12 130:8,9,15,17 131:23 132:1, 2,4,11,18 133:8,9,11 134:19 136:6, 10,18,23,24 137:2,5,9,13, 16,24 138:3, 4,6,9 139:4, 15,23,24 140:11,16,17, 19,23,24 141:3,7,8,15 142:2 148:22 149:1 virtualization 118:1 virtualized 65:1 67:5 69:3,15,25 102:24 103:12 104:8 118:9 119:12 visibility 22:19 139:20 visible 32:20 VMM-LEVEL 144:12 W wait 103:7	walk 85:11 want 7:4 14:21 19:11, 15 21:3 22:9 24:7 39:5 42:12 43:6 46:8 51:2,25 53:8 55:20 56:1 58:20,21 60:2 63:24 64:12,16 68:6 73:17 83:15 92:19 95:17 96:6 98:12 99:9 101:19 108:9 110:4, 10 115:8,16 116:24,25 118:20 134:13 139:17 wanted 115:23 147:1 waste 14:20 way 9:1 12:8 48:10 55:24 57:6 58:9 60:9 71:16 77:13 79:18 98:21 115:21 118:23 123:1, 18,19,20 127:3 129:13 141:18 142:3 ways 77:8 we 7:3 8:23 9:13 15:5,25 16:14 18:11 20:8 25:1 27:17 28:22 29:4 32:1,22 33:15 35:12,
---	---	---	---	---

13 41:13,14 42:15,16,21 44:7,14,22 47:25 51:1 56:2,3 69:21 72:10 73:15 76:15 79:24 80:10 82:18, 21 83:8 85:11 87:9,11 89:12 92:22 93:18, 22 94:22,25 95:7 103:6,11 107:8,10 108:17,19 109:4 110:3,6 115:14,21 119:14 120:22 122:9 124:25 126:18 128:9 129:22 130:1, 7 131:7,14, 15,22 132:16 134:3,12 136:2 139:17 141:6 144:21 146:11 147:22 148:15 we'll 110:14 150:17 we're 17:22 56:19 68:9 102:2 120:15 123:10 129:20 we've 44:6 73:9 110:18 127:16 128:10 welcome	44:10 73:14 110:9 well 6:10 15:12 38:22 41:14 42:16 58:13 went 9:7 what 7:19 8:12 9:4 10:24 11:3,18 12:15,16 13:3,18 14:19 17:4 18:2 19:5,16 21:21,22,23 22:2,4 23:14 24:1,11 25:24 26:23 27:12, 13 28:6,8,17 29:12 30:6 31:2,16,24 32:12 33:7 34:5 35:2,12 36:13,19 37:4,18,19 39:2,6 40:18 41:21 42:1 43:5 46:7,20 48:4,12,22 49:2,14,19,24 50:8,24 51:15,22 53:8 55:19 57:3,12 58:2,16 60:14 61:11,24 62:24 65:23 68:2,5,7 72:3 74:13 76:22, 23 78:14 79:1 81:7,12,15 82:1 84:21 85:1,7,12 86:23 89:10,	12,23 91:10, 22 92:14 94:9 98:8 99:4 100:5,25 102:8 103:9 104:11 107:1 108:23 109:9 110:23 111:8, 20 115:14 118:12 119:6, 24 120:7,8, 10,12,22 121:5 124:20 125:14 126:23 127:14,20 128:15 130:6, 11,12,20 132:22 133:12 135:24 137:3 139:1,11 140:2 141:23, 25 145:19,23 146:11 147:3, 14,17 150:3 what's 91:14 92:19 105:2 108:17 140:3 whatever 61:8 when 8:12 10:16 23:7 26:3 31:13 40:8 46:12 64:24 68:9 73:15 80:7 91:23 102:22 104:6 135:6 139:11 146:18 148:10 149:15	where 20:21 21:15 24:6 25:14,16 29:22 32:23 34:4 39:1 40:2 41:2 57:17 58:25 59:2 60:1 67:18 72:1 98:2 105:19 108:7,10 110:3 115:1 118:25 119:15 125:5, 20 126:14 127:24 131:14,20 133:16,20 134:4 137:23 142:10 149:14 Wherein 110:18 whether 11:12 27:20 39:7,17 40:11 80:14 124:21 which 10:10 12:8 13:9,22 14:2 16:24 18:22 20:10 21:4,9 22:1, 11 23:19 24:23 32:20 33:18 34:13, 14 35:3 41:24 42:13,22,23 48:16 49:6 52:17 54:11 55:9,11 56:20 57:24 59:3,12 62:20 63:13 67:2 68:22	69:22 70:21 72:16 77:4, 22,23 80:4 85:15 86:18 87:1,2 88:3 93:23 95:7,16 105:17,20 106:3 107:6, 12 112:1 113:11 114:11,22 115:19 116:4, 18,20 117:6 118:14,18,19 119:18 124:5 127:13 130:3, 18 136:18 138:3 140:4 145:17 149:5 151:11 while 6:20 13:8 14:9 15:10 23:5,17 53:17 55:23 56:10 57:5 71:24 76:11 81:6 108:22 120:15 124:3 142:23 146:15 who 35:17 53:5,7 93:16 147:8 whose 22:7 151:4 why 11:10 24:23 44:7 53:8 64:7,8 99:14 105:10 107:18 110:3 115:22 131:11
--	---	---	---	--

will 6:18 8:17, 19,24 12:24 17:4 18:2,25 29:1 42:13 44:3 52:18 64:8 98:13 99:13 100:18 101:18 105:16,17 109:13 116:11 121:17 122:5 138:24 140:14 149:18 window 23:4 wish 86:25 with 7:6,10, 12,14 9:11, 13,16 10:1,6 11:20 14:12 16:16 18:12 19:11 21:12 23:6 25:5 32:16 34:23 36:9 37:16 39:25 49:10 50:22 51:2,11 55:5 58:8 59:6 60:18, 24,25 61:14 64:2,7 65:1, 17 67:10,21 68:8,15 70:7 73:11 75:11 80:8,13 83:11 84:9,11,13 85:5,9,20 87:3 88:5,11 89:3 91:5,23 92:23 93:24 97:7 98:23 102:3,24	104:8 105:23 106:17 108:3 110:23 111:1, 4,6,7,15 112:13 113:10,17,23 114:7,19 115:19 117:22 118:18 120:23 128:14 129:4 138:2 141:1 143:5,7,10,25 144:16,23 145:12,21 146:19 147:12,16 148:23 150:7 within 39:13 55:8 115:1,10 120:6,25 121:11,13 122:16 123:16,24 141:10 152:4 without 7:22 66:15 68:12 84:5 86:6 100:7 133:23 142:21 146:14 witness 5:6 15:1 102:17, 18 135:16 150:18 151:4, 7 153:2 WIZ 14:3 15:8 17:10 won't 50:23 word 24:22 46:20	words 76:3 132:9,11 137:13 140:15 work 14:4 59:13 106:4 111:22 143:25 works 115:10 would 5:9,11, 12 6:5,8,25 8:14,16,21 9:18,23 10:13 11:15,17 14:10,19 19:21 22:3,4, 6 26:4 32:23 36:19 50:5,16 54:16 55:23 56:6,23 57:3 58:11 62:18 64:21 65:22 68:2,20 71:4, 23 72:21 75:14,16 79:18,19 85:14 86:2 90:19 91:2, 16,19 92:2,16 93:2,4,5,17 95:20 98:16 99:11,14 101:24 102:20 107:12 108:2 111:19 114:12 115:9 120:19 122:15 123:12,18 129:11,16 130:18,19 131:25 132:5	135:22 137:12,17 140:19 141:22 142:1, 5,17 143:15 144:15,17 145:6,17,21, 22 146:2,3,8, 17 147:4,5 150:15 wouldn't 14:13 56:25 71:22 97:1 109:23 written 134:4 wrong 132:20 Y Yeah 99:11 147:22 years 14:9 yes 5:14,24 6:2 8:1,16 9:3 10:3,12 11:2 13:22 18:16 25:3 30:1 35:11 44:19 47:6,10 52:7 61:6 64:22 66:2 68:20 69:10 70:5,18 74:13,19,20 76:18 84:24 88:18,23 90:8,9 94:10 97:21 104:14, 17 105:3,4,8 108:17 109:17 113:16,19 114:4,25	119:25 120:21 126:5, 17 129:19 131:6,22 132:16 134:16 142:15 143:2 146:8 148:6, 9,12 149:9 yet 56:17 146:10 Yin 144:6 yourself 10:15 Z zero-day 22:19 38:11 52:18 66:18 Zoom 9:14
--	---	--	--	---