

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PALO ALTO NETWORKS, INC.
Petitioner,

vs. V.

TAASERA LICENSING LLC,
Patent Owner.

Case ~~No. IPR2023~~IPR-2023-00704
U.S. Patent No. 8,850,517

~~PETITION FOR INTER PARTES REVIEW~~
~~OF U.S. PATENT NO. 8,850,517~~

DECLARATION OF KEVIN JEFFAY, PH.D.

TABLE OF CONTENTS

	Page
Petitioner's Exhibit List.....	viii
I.— Introduction.....	1
II.— Requirements for <i>Inter Partes</i> Review	2
A.— Certification.....	2
B.— Identification of Challenges	3
III.— The '517 Patent.....	3
A.— Effective Filing Date	3
B.— Level of Ordinary Skill in the Art	3
C.— Overview of the '517 Patent.....	4
D.— Relevant Prosecution History	7
IV.— Claim Construction.....	10
V.— Detailed Discussion of the Grounds for Unpatentability.....	10
A.— Overview of the Prior Art	11
1.— Alperovitch (Ex. 1004)	11
2.— Yeh (Ex. 1005).....	16
3.— Chien (Ex. 1006).....	17
B.— Ground 1: Claims 1-24 Are Rendered Obvious by Alperovitch in View of the Knowledge of a POSITA.....	18
1.— Claim 1.....	18
a.— Preamble.....	18
b.— Limitation 1[a].....	19
c.— Limitation 1[b].....	23
d.— Limitation 1[c].....	25
e.— Limitation 1[d].....	27
f.— Limitation 1[e].....	30
g.— Limitation 1[f]	30
2.— Claim 2.....	32
3.— Claim 3.....	33
4.— Claim 4.....	34

5. Claim 5.....	35
6. Claim 6.....	35
a. Limitation 6[a].....	35
b. Limitation 6[b].....	36
c. Limitation 6[c].....	37
7. Claim 7.....	37
a. Limitation 7[a].....	37
b. Limitation 7[b].....	38
c. Limitation 7[c].....	38
8. Claim 8.....	39
a. Limitation 8[a].....	39
b. Limitation 8[b].....	39
c. Limitation 8[c].....	39
9. Claim 9.....	40
a. Limitation 9[a].....	40
b. Limitation 9[b].....	41
c. Limitation 9[c].....	41
d. Limitation 9[d].....	42
e. Limitation 9[e].....	43
f. Limitation 9[f].....	43
10. Claim 10.....	44
11. Claim 11.....	45
12. Claim 12.....	46
a. Limitation 12[a].....	46
b. Limitation 12[b].....	47
13. Claim 13.....	50
a. Preamble.....	50
b. Limitation 13[a].....	50
c. Limitation 13[b].....	51
d. Limitation 13[c].....	51

e. Limitation 13[d]	52
f. Limitation 13[e]	53
g. Limitation 13[f]	53
h. Limitation 13[g]	53
14. Claim 14	53
15. Claim 15	54
16. Claim 16	54
17. Claim 17	54
18. Claim 18	55
a. Limitation 18[a]	55
b. Limitation 18[b]	55
c. Limitation 18[c]	55
19. Claim 19	55
a. Limitation 19[a]	55
b. Limitation 19[b]	56
c. Limitation 19[c]	56
20. Claim 20	56
a. Limitation 20[a]	56
b. Limitation 20[b]	56
c. Limitation 20[c]	57
21. Claim 21	57
a. Limitation 21[a]	57
b. Limitation 21[b]	57
c. Limitation 21[c]	57
d. Limitation 21[d]	58
e. Limitation 21[e]	58
f. Limitation 21[f]	58
22. Claim 22	58
23. Claim 23	59
24. Claim 24	59

a. — Limitation 24[a].....	59
b. — Limitation 24[b]	59
C. — Grounds 2-4: Claims 1-24 Are Rendered Obvious by Alperovitch in View of Yeh (Ground 2), Alperovitch in View of Chien (Ground 3), and Alperovitch in View of Yeh and Chien (Ground 4)	60
1. — Claim 1	60
a. — Limitation 1[a].....	60
b. — Limitation 1[e].....	65
2. — Claim 13.....	65
a. — Limitation 13[a].....	65
b. — Limitation 13[f]	65
D. — No Secondary Considerations Exist	66
VI. The Parallel District Court Proceeding Does Not Warrant a Discretionary Denial.....	66
VII. Mandatory Notices.....	67
A. — Real Parties in Interest	67
B. — Related Proceedings	67
C. — Lead and Backup Counsel	67
D. — Electronic Service.....	68
VIII. Fees.....	68
I. Conclusion	6
8Introduction.....	1
II. Background and Qualification	2
III. Legal Standards Used in My Analysis.....	6
A. Prior Art.....	6
B. Person of Ordinary Skill in the Art.....	7
C. Obviousness.....	8
IV. The '517 Patent.....	11
A. Overview of the Challenged '517 Patent.....	11
B. Relevant Prosecution History	13

V. Claim Construction.....	17
VI. Summary of Cited Prior Art References.....	17
A. Alperovitch (Ex. 1004).....	18
B. Yeh (Ex. 1005).....	24
C. Chien (Ex. 1006)	25
VII. Opinions Regarding Unpatentability	25
A. Ground 1: Claims 1-24 Would Have Been Obvious Over Alperovitch (Ex. 1004) in View of the Knowledge of a POSITA	26
1. Independent Claims 1 and 13.....	26
a. Claim 1	26
b. Claim 13	43
2. Dependent Claims 2-12 and 14-24.....	48
a. Claims 2 and 14.....	49
b. Claims 3 and 15.....	50
c. Claims 4 and 16.....	51
d. Claims 5 and 17.....	52
e. Claims 6 and 18.....	53
f. Claims 7 and 19.....	56
g. Claims 8 and 20.....	57
h. Claims 9 and 21	59
i. Claims 10 and 22	64
j. Claims 11 and 23	65
k. Claims 12 and 24.....	66
B. Grounds 2-4: Claims 1-24 Would Have Been Obvious Over Alperovitch in View of Yeh (Ground 2), Alperovitch in View of Chien (Ground 3), and Alperovitch in View of Yeh and Chien (Ground 4).....	71
1. Independent Claims 1 and 13.....	72
a. Claim 1	72
b. Claim 13	77
C. No Secondary Considerations Exist	78

IX.	<u>Conclusion</u>	<u>78</u>
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TABLE OF AUTHORITIES

Page(s)

Cases

<i>Palo Alto Networks, Inc. v. Taasera Licensing LLC,</i> No. 1-22-cv-02306 (S.D.N.Y.).....	67
<i>Palo Alto Networks, Inc. v. Taasera Licensing LLC,</i> No. 2-22-cv-00314 (E.D. Tex.).....	67
<i>In re: Taasera Licensing LLC Patent Litig.,</i> No. 2-22-md-03042 (E.D. Tex.).....	67
<i>Taasera Licensing LLC v. Palo Alto Networks, Inc.,</i> No. 2-22-cv-00062 (E.D. Tex.).....	67
<i>Taasera Licensing LLC v. Trend Micro Inc.,</i> No. 2-21-cv-00441 (E.D. Tex.).....	67
<i>Trend Micro Inc v. Taasera Licensing LLC,</i> No. 2-22-cv-00303 (E.D. Tex.).....	67
<i>Trend Micro Inc. v. Taasera Licensing LLC,</i> No. 3-22-cv-00477 (N.D. Tex.).....	67
<i>Trend Micro, Inc. v. Taasera Licensing LLC,</i> No. 3-22-cv-00518 (N.D. Tex.).....	67
<i>Taasera Licensing LLC v. Musarubra US, LLC,</i> No. 2-22-cv-00427 (E.D. Tex.).....	67
<i>Taasera Licensing LLC v. CrowdStrike, Inc.,</i> No. 6-22-cv-01094 (W.D. Tex.).....	67
<i>Taasera Licensing LLC v. CrowdStrike, Inc.,</i> No. 2-22-cv-00468 (E.D. Tex.).....	67

Statutes

35 U.S.C. § 314(a).....	66
-------------------------	----

Other Authorities

37 C.F.R. § 42.15	2
37 C.F.R. § 42.22	3
37 C.F.R. § 42.104	2
37 C.F.R. § 42.104(a)	2
37 C.F.R. § 42.104(b)	3
37 C.F.R. § 42.105	2
37 C.F.R. § 42.106	2

VIII. PETITIONER’S EXHIBIT LIST

CITED EXHIBITS

Ex. No.	Brief Description
1001	U.S. Patent No. 8,850,517
1002	U.S. Patent No. 8,850,517 File History
1003	Declaration of Kevin Jeffay, Ph.D.
1004	U.S. Patent App. Pub. No. 2013/0254880 to Alperovitch et al. (“Alperovitch”)
1005	U.S. Patent No. 9,117,075 to Yeh (“Yeh”)
1006	U.S. Patent No. 9,117,078 to Chien et al. (“Chien”)

I. Introduction

Petitioner I, Kevin Jeffay, declare as follows:

1. Introduction

1. I have been retained by Palo Alto Networks, Inc. ("Petitioner"
requests") in connection with its request for *inter partes* review ("IPR") of claims 1-24
("Challenged Claims") of U.S. Patent No. 8,850,517 (the "'517" '517 patent"). All claims").
A copy of the '517'517 patent ~~relate~~ has been marked Ex. 1001. I have reviewed and
am familiar with the '517 patent, which generally relates to "methods and systems
for assessing the runtime risk of an application or device ~~in~~ and identifying a
computer system using cognitive behavior recognition." Ex. 1001, 1:7-10. Specifically, the claimed
invention purports to identify "an action sequence and assess[] a runtime risk and subsequent behavior
score based on the ~~identified action sequence."~~ Id., 2:19-22 assessed runtime risk.

~~To assess runtime risk of an application or device in a computer system, every
claim of the '517 patent involves using an assessment policy that includes at least
one rule that identifies an action sequence to identify a runtime risk for an application
program. The identified runtime risk indicates a risk or threat of an identified action
sequence of the application, and a behavior score for the application program that
executes on the device is identified based on the identified runtime risk. As shown
below and in the declaration of Dr. Kevin Jeffay (Ex. 1003), all claims of the '517
patent would have been obvious to a person of ordinary skill in the art ("POSITA")
in view of U.S. Patent App. Pub. No. 2013/0254880 to Alperovitch et al.
("Alperovitch"), which was not before the Examiner during prosecution of the '517
patent. Alternatively, all claims of the '517 patent would have been obvious to a~~
~~Tasera Licensing's Exhibit 2004, IPR2023-0000704~~

~~obvious by Alperovitch in view of U.S. Patent No. 9,117,075 to Yeh (“Yeh”) and/or U.S. Patent No. 9,117,078 to Chien et al. (“Chien”).~~

~~As explained in this Petition, the claims of the ’517 patent would not have been allowed if the primary reference Alperovitch had been substantively evaluated by the Examiner during prosecution of the ’517 patent. Alperovitch discloses a materially identical method and system for assessing the probability that a mobile application is malicious software based on attributes involving the mobile application and calculating a reputation score for the mobile application. Therefore, the Challenged Claims should be found unpatentable given the strength of the prior art as shown herein.~~

~~H. — Requirements for *Inter Partes* Review~~

~~This Petition complies with all statutory requirements, as well as 37 C.F.R. §§ 42.104, 42.105, and 42.15, and should be accorded a filing date pursuant to 37 C.F.R. § 42.106. The required fee is being paid electronically through PTAB E2E.~~

~~A. — Certification~~

~~Pursuant to 37 C.F.R. § 42.104(a), Petitioner certifies that the ’517 patent is available for IPR, and Petitioner is not barred or estopped from requesting an IPR challenging the claims on the grounds identified herein.~~

~~B. Identification of Challenges~~

~~Under 37 C.F.R. §§ 42.104(b) and 42.22, Petitioner requests that the Board institute this IPR on all claims of the '517 patent and cancel those claims as unpatentable on the following grounds:~~

2. I have been asked to provide my opinions regarding the patentability of claims 1-24 of the '517 patent (the "challenged claims"). This declaration discusses my background and qualifications, the legal standards used in my analysis, an overview of the '517 patent from the perspective of a person of ordinary skill in the art as of the patent's alleged priority date (a "POSITA"), and my opinions regarding the patentability of the challenged claims.

3. My work in this proceeding is being charged to Petitioner at a standard rate of \$800 per hour. My compensation is in no way contingent on the substance of my opinions or the outcome of this proceeding.

4. As set forth more fully below, it is my opinion that the challenged claims of the '517 patent are unpatentable as obvious based on the following grounds below:

Ground	Claims	Basis	ReferenceReferences
1	1-24	103	Alperovitch (Ex. 1004) <u>in view of the knowledge of a POSITA</u>
2	1-24	103	Alperovitch in view of Yeh (Ex. 1005)
3	1-24	103	Alperovitch in view of Chien (Ex. 1006)
4	1-24	103	Alperovitch in view of Yeh and Chien

II. Background and Qualification

5. In formulating my opinions, I have relied upon my knowledge, training, and experience in the relevant art. My qualifications are stated more fully in my curriculum vitae, which has been provided as Appendix A. I provide a brief summary of my qualifications below.

6. I am currently a tenured professor in the Department of Computer Science at the University of North Carolina at Chapel Hill ("UNC"), where I hold the position of Gillian T. Cell Distinguished Professor of Computer Science. I have been a faculty member at UNC since 1989. From 2014-2022, I served as the Chairman of the Department of Computer Science.

7. I received a Ph.D. in computer science from the University of Washington in 1989. Before that, I received a M.Sc. degree in computer science

from the University of Toronto in 1984 and a B.S. degree with Highest Distinction in mathematics from the University of Illinois at Urbana-Champaign in 1982.

8. I have been involved in the research and development of networked computing systems for over 40 years. During this time, I have performed research and taught in the areas of computer networks, computer and network security, distributed systems, real-time systems, operating systems, multimedia networking, network traffic analysis, and network performance evaluation, among others. A major theme of my recent research has been the measurement and analysis of traffic patterns and traffic performance in communications networks. These efforts have been in support of applications such as anomaly and intrusion detection, as well as a broader effort to provide mechanisms and services for quality-of-service provisioning in networks. My work included the design and implementation of network monitoring and analysis devices for passive acquisition and real-time processing of network traffic.

9. Throughout my research and teaching, I have considered problems of the design and implementation of computer networks, including issues of multimedia networking, quality-of-service, network performance measurement and management, and aspects of router design. I have also explored problems in the design and implementation of operating systems. Much of my research has been performed jointly with industry. For example, starting in 2004, in collaboration

with Cisco and Cloudshield, my research group experimented with an in-line network packet analysis engine for real-time network intrusion. I have had similar collaborations with IBM, Intel, AT&T, Lucent, and Cabletron/Aprisma, among others.

10. As part of my research, I regularly build and use clusters of computers interconnected by network switches, bridges, and routers to form and evaluate experimental and production networks. For example, in the late 1990s and early 2000s, my research evolved to consider router-based mechanisms for controlling the performance of network traffic. In much of this research, my students and I built and instrumented network routers and performed large-scale experiments with this equipment. Part of the technology we developed for this research included means for classifying flows within routers and providing differential treatment to flows as a way of providing so-called "better than best effort" forwarding services.

11. The research further included the development of traffic management and scheduling policies and mechanisms to provide guarantees of quality-of-service to packet flows. In addition, part of the experimental infrastructure we developed to support this effort included constructing passive packet-capture devices to classify and monitor the performance of network flows in real time. Based on some of the results of this research, in 2003, my group at UNC won the most prestigious research award for original research in computer networking.

12. I have authored or co-authored over 100 articles in peer-reviewed journals, conference proceedings, texts, and monographs in the aforementioned areas of computer science and others. I have previously served as Editor-in-Chief for the journal *Multimedia Systems* and Associate Editor for the journal *Real-Time Systems*. I have also been an active participant in the Association for Computing Machinery ("ACM") and the Institute of Electrical and Electronics Engineers ("IEEE"). Specifically, I have been a member of the ACM Special Interest Group on Data Communications ("SIGCOMM") Steering Committee, the IEEE Technical Committee on Real-Time Systems, and the ACM Special Interest Group on Multimedia. I was also previously involved in the Statistical and Applied Mathematical Sciences Institute ("SAMSI") program on Network Modeling for the Internet.

13. I have edited and co-edited numerous published proceedings of technical conferences and have edited a book of readings in multimedia computing and networking (with Hong-Jiang Zhang), published by Morgan Kaufman. I am a co-author (with Long Le and F. Donelson Smith) of a monograph related to computer network protocols and a co-author (with Jay Aikat and F. Donelson Smith) of a second monograph related to experimental computer networking.

14. I have served on numerous proposal review panels for the National Science Foundation and other international funding agencies in the aforementioned

areas of computer science. I have served as a program chair or member of the technical program committee for over 100 professional, international, and technical conferences, workshops, and symposia.

15. I am a named inventor on four U.S. patents. These patents are generally related to computer networking and the delivery of services over networks.

III. Legal Standards Used in My Analysis

16. I am not a patent attorney, nor have I independently researched patent law. Counsel for Petitioner has explained certain legal standards to me that I have relied upon in forming my opinions set forth in this Declaration. I set forth some of these legal standards below and may set forth additional legal standards in my analysis in later sections of this Declaration.

A. Prior Art

~~III. The '517 Patent~~

~~A. Effective Filing Date~~

17. I have been informed that the law provides certain categories of information, known as prior art, that may anticipate patent claims or be used to render patent claims obvious. I understand that the references discussed in this Declaration are prior art at least because they would have been available to members of the public as of January 15, 2013, and they are relevant to the subject matter of the '517 patent.

18. The '517 references discussed in this Declaration are from the same field of endeavor as the claimed invention (even if they address a different problem) and/or are reasonably pertinent to the problem faced by the named inventor (even if they are not in the same field of endeavor as the claimed invention).

B. Person of Ordinary Skill in the Art

2.19. I understand that the '517 patent issued from Application No. 13/741,878 (the "'878"878 Application"), filed January 15, 2013. For the purposes of my analysis in this Declaration, I have assumed that the Challenged Claims challenged claims are entitled to a priority date no earlier than January 15, 2013.

B. Level of Ordinary Skill in the Art

20. As of January 15, 2013, a I understand that the assessment of the patentability of the challenged claims of the '517 patent must be undertaken from the perspective of a hypothetical POSITA as of the priority date of the '517 patent. I understand that the POSITA is a hypothetical person of who is presumed to have known all the relevant art as of the priority date. I understand factors that may be considered in determining the level of ordinary skill in the art ("POSITA") in the '517 patent's technical field would have had a bachelor's of a POSITA include (i) the types of problems encountered in the art, (ii) prior art solutions to those problems, (iii) rapidity with which innovations are made, (iv) sophistication of the technology,

and (v) educational level of active workers in the field. I understand that in a given case, every factor may not be present, and one or more factors may predominate.

21. I understand that the hypothetical POSITA to which the claimed subject matter pertains would have had the capability of understanding the scientific and technological principles applicable to the pertinent art. I further understand that a POSITA is also a person of ordinary creativity, not an automaton. Further, I understand that the hypothetical POSITA may comprise a team.

3-22. Based on these factors, my knowledge and expertise, and the prior art to the '517 patent, it is my opinion that a POSITA at the time of the relevant priority date would have had a bachelor's degree in computer science or computer engineering, or an equivalent field, and at least two to three years of experience in computer and network security. ~~Ex. 1003, ¶22.~~ Someone with less or different technical education but more relevant practical experience, or more relevant education but less practical experience, could also be considered a POSITA. ~~Id.~~ This level of skill in the art is reflected by the reference cited in this Petition, the state of the art, and the experience of Dr. Kevin Jeffay, as described in his declaration.

23. I meet this definition of a POSITA today and met this definition by January 15, 2013.

C. Obviousness

24. I have been informed that, even if every element of a claim is not found explicitly or implicitly in a single prior art reference, the claim may still be unpatentable if the differences between the claim and the prior art are such that the claim as a whole would have been obvious to a POSITA at the time the invention

was made. For purposes of obviousness, I understand that a POSITA may rely on a single prior art reference or on multiple references in combination.

25. I have been informed that the following four factors are considered when determining whether a patent claim would have been obvious to a POSITA: (a) the level of ordinary skill in the art; (b) the scope and content of the prior art; (c) the differences between the prior art and the claim; and (d) any "secondary considerations" tending to prove nonobviousness. These secondary considerations, which I understand are also called "objective indicia" or "objective evidence," may include factors such as: (i) the invention's satisfaction of a long-felt unmet need in the art; (ii) unexpected results of the invention; (iii) skepticism of the invention by experts; (iv) commercial success of an embodiment of the invention; and (vii) praise by others for the invention. I have also been informed that there must be an adequate nexus or connection between the evidence that is the basis for an asserted secondary consideration and the scope of the invention claimed in the patent.

26. I understand that when every limitation of a claim is disclosed in the cited prior art references, the question of obviousness turns on whether a hypothetical person of ordinary skill in the art would have been motivated to combine those teachings to derive the claimed subject matter with a reasonable expectation of success. Further, I understand that obviousness does not require

absolute predictability. Only a reasonable expectation that the beneficial result will be achieved is necessary to show obviousness.

27. I have been informed that a claimed invention can be rendered obvious by the combination of teachings in the prior art even if there is no explicit teaching to combine them. Instead, any problem known in the field at the time of the alleged invention can provide a sufficient rationale to combine the elements of the prior art in the manner claimed in the patent.

28. I have been informed that examples of sufficient rationales for establishing obviousness include the following:

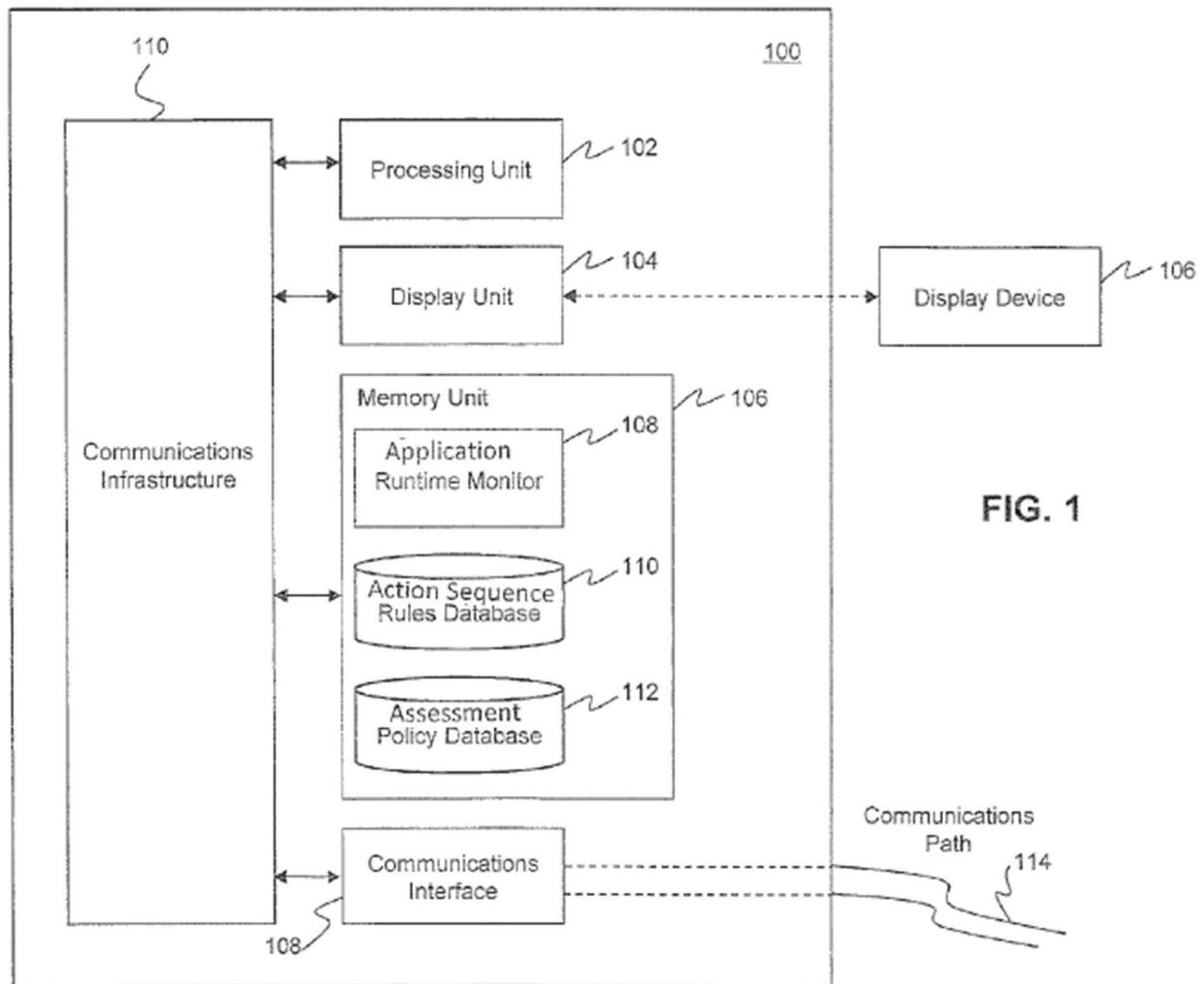
- combining prior art elements according to known methods to yield predictable results;
- substituting known elements for other known elements to obtain predictable results;
- using a known technique to improve similar devices, methods, or products in the same way;
- choosing from a finite number of identified, predictable solutions that would be obvious to try; and
- providing some teaching, suggestion, or motivation to modify the prior art reference or to combine teachings in prior art references to arrive at the claimed invention.

IV. The '517 Patent

A. Overview of the ~~'517~~Challenged '517 Patent

4.29. The ~~'517~~'517 patent ~~is,~~ titled ~~"Runtime Risk Detection Based on User, Application, and System Action Sequence Correlation."~~ ~~Ex. 1001, cover. It,~~ relates to ~~"assessing runtime risk for an application or device."~~ ~~Ex.," Id., 1001, cover,~~ abstract. The ~~'517~~'517 patent purports to address ~~"[e]merging cyber threats, commonly referred to as advanced persistent threats (APT)"~~ that ~~"remain undetected using traditional security programs and approaches. As a result, many harmful threats and infections can attack a system that includes these security programs unbeknownst to the user and system operator, which could have devastating results. For example, it can place companies at risk for the theft of proprietary information, such as confidential information, trade secrets, etc., and individuals at risk for identify theft."~~ ~~Id., 1:26-35. The '517 patent's~~ alleged invention ~~of the '517 patent~~ supposedly addresses these threats by ~~"assessing the runtime risk of an application or device in a computer system using cognitive behavior recognition."~~ ~~Id., 1:8-10.~~

5.30. The '517 patent's Figure 1 below shows a high-level architecture of the '517 patent's system disclosed in the '517 patent for assessing the runtime risk for an application or device in accordance with exemplary embodiments.



Id

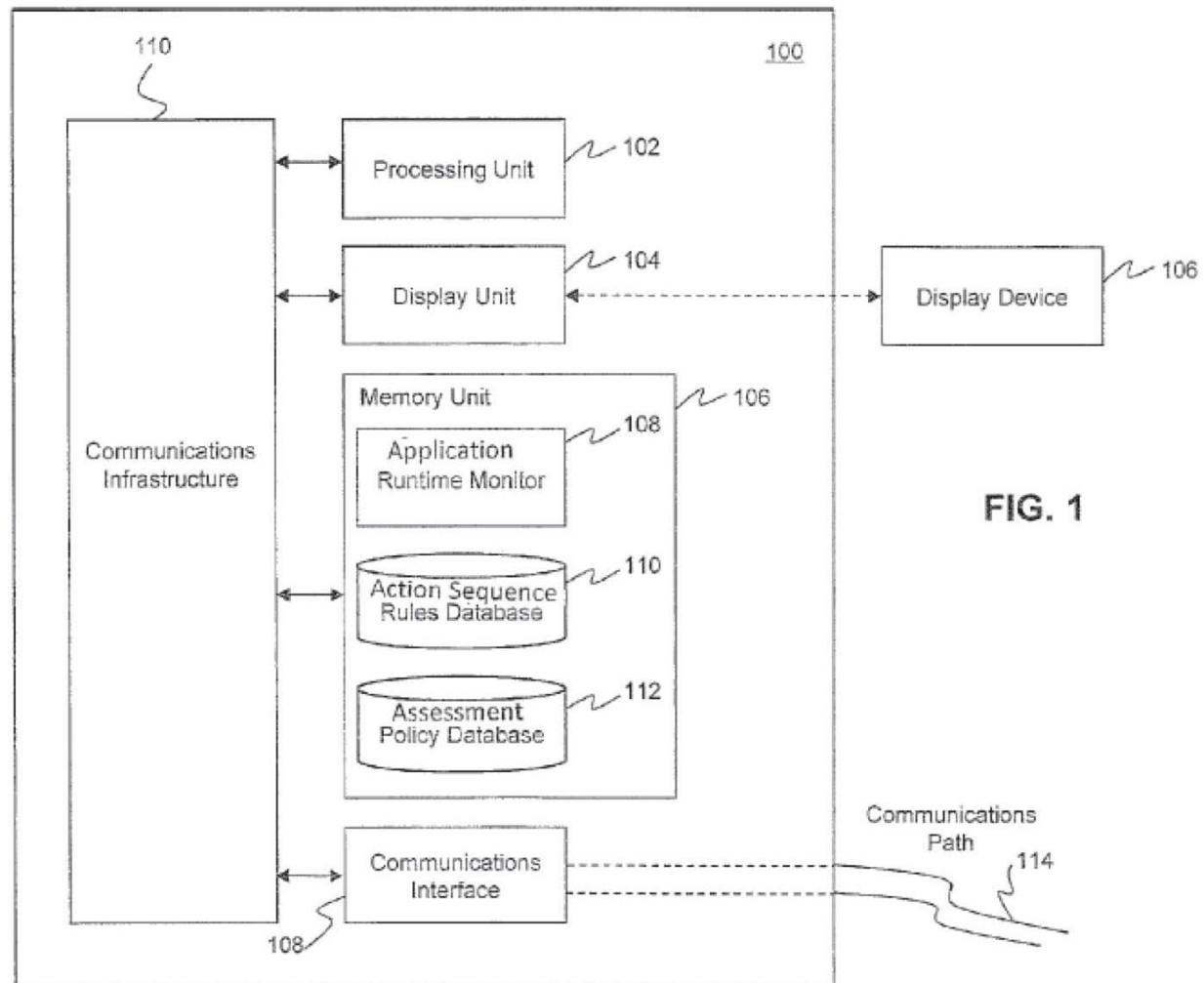


FIG. 1

Id., Fig. 1. “[C]omputing system 100 [is] configured to assess the runtime risk of an application or device and identify a behavior score based on the assessed runtime risk.” *Id.*, 2:40-43.

~~In assessing the runtime risk of an application or device, computing system~~
31. Computing system 100 includes in may include, among other things, a
memory unit 106 “for the storage of data and performing of the functions of the
system. *Id.*, 3:21-24. “The memory unit 106 may include at least a runtime
monitor 108, a rules database 110, and a policy database 112.” ~~*Id.*, 3:38-39.~~ The

runtime monitor 108 ~~uses at least one assessment policy stored in policy database 112 that comprises one or more rules to identify the runtime risk for an application program. *Id.*, 6:14-17.~~

Furthermore, “[t]he rules database 110 may be

an application program stored on the memory unit 106 . configured to assess the

runtime risk of an application (e.g., stored in the memory unit 106 and executed by the processing unit 102) or device (e.g., connected to the computing system 100 externally (e.g., via the communications interface 108) or internally (e.g., via the communications infrastructure 110))." *Id.*, 3:38-51.

The rules database 110 of computing system 100 "may be configured to store a plurality of rules, wherein each rule identifies an action sequence. An action sequence ~~...~~ may include a sequence of at least two performed actions, wherein the performed actions may be one of a user action, an application action, and a system action." *Id.*, 4:12-17.

~~The '517 patent has two independent claims. Claim 1 recites:~~

~~1. A method for assessing runtime risk for an application program that executes on a device, comprising:
storing, in a rules database, a plurality of rules, wherein each rule identifies an action sequence;~~

6.32. ~~storing, in a~~ Furthermore, "[t]he policy database, 112 may be configured to store a plurality of assessment policies, wherein each assessment policy includes at least one rule of the plurality of rules; stored in the rules database 112." *Id.*, 4:17-21.

~~identifying, using at least one assessment policy, a runtime risk for an application program that executes on a device, wherein the identified runtime risk indicates a risk or threat of the identified action sequence of the application; and~~

~~identifying, by a runtime monitor including a processing device, a
behavior score for the application program that executes on the
device based on the identified runtime risk, wherein
the action sequence is a sequence of at least two performed actions,
and~~

~~each performed action is at least one of: a user action, an application action, and a system action.~~

~~Independent claim 13 restates the same steps in the context of a “system.”~~

~~The dependent claims add the concept of identifying a behavior score for the application program based on different identified specific examples (claims 2-4, 14-16) or combinations (claims 5-9, 17-21) of performed actions or based on different correlations between performed actions (claims 10-12, 22-24).~~

B. Relevant Prosecution History

33. I have reviewed and considered the prosecution history of the '517 patent, which is marked Ex. 1002. I provide a brief summary of certain key events during the prosecution of the '517 patent below.

7.34. The Examiner issued a non-final office action rejecting pending claims 1-5, 10-17, 22-24 of the ~~'517~~'517 patent as, ~~inter alia~~among other things, anticipated by

U.S. Patent App. Pub. No. 2013/0096980 to Basavapatna et al. (~~“(“Basavapatna”)-”~~)

and rejecting pending claims 6-9, 18-21 as, ~~inter alia~~among other things, rendered obvious by Basavapatna. Ex. 1002, 61, 65.

8.35. In response, Applicant amended some of the claims, including the independent claims, to overcome § 112 rejections. ~~Id.~~, 96-97. Applicant further argued that Basavapatna did not anticipate the pending claims because the claims of the present application are directed to assessing the runtime risk of an application program that executes on a device, whereas Basavapatna is directed to testing potential countermeasures against known vulnerabilities of systems.-

~~Id., Id., 97. Applicant argued that "Basavapatna does not identify action sequences as part of the risk assessment, but instead uses countermeasures that have been deployed.~~

97. Applicant argued that "Basavapatna does not identify action sequences as part of the risk assessment, but instead uses countermeasures that have been deployed.

Basavapatna also does not identify or predict specific types of threats, but instead assesses risk associated with known vulnerabilities." ~~Id.~~ Id.

9.36. ~~The~~ Subsequently, the Examiner ~~subsequently~~ issued a final office action maintaining, ~~inter alia~~among other things, the rejections of pending claims 1-5, 10-17, 22-24 of the ~~'517~~'517 patent as anticipated by Basavapatna and pending claims 6-9, 18-21 as rendered obvious by Basavapatna. ~~Id.~~, 113, 116.

10.37. In response, ~~Applicant amended~~ independent claims 1 and 13 were amended by Applicant to recite ~~"~~"identifying [~~identify~~], using at least one

assessment policy, a runtime risk ~~for an~~

for an application program that executes on a device, wherein the identified

runtime risk indicates a risk or threat of the identified action sequence of the

application identifies and predicts a specific type of threat” and to add “a runtime monitor.” *Id.*, 130, 133.

In Applicant explained in an interview with the Examiner, ~~Applicant explained how that~~ Basavapatna fails to teach or suggest claims 1 and 13’s “13’s

“identifying, using at least one assessment policy, a runtime risk for an application program that executes on a device, wherein the identified runtime risk indicates a risk or threat of the identified action sequence of the application.” *Id.*, 139.

Applicant explained that “Basavapatna does not identify action sequences as part of the risk assessment, but

~~action sequences as part of the risk assessment, but~~ instead uses countermeasures that have been deployed. Basavapatna also does not

identify a risk or threat of the identified action sequence of the application, but instead assesses risk associated with known vulnerabilities.” *Id.*, 140-141.

~~11.38. Furthermore,~~ Applicant further explained that Basavapatna does not teach or suggest claims 1 and ~~13's~~ 13's similar features of "identifying, by a runtime monitor including a processing device, a behavior score for the application program that executes on the device based on the identified runtime risk, wherein the action sequence is a sequence of at least two performed actions, and each performed action is at least one of: a user action, an application action, and a system action" because Basavapatna fails to disclose "a rules database including a plurality of rules that identifies an *action sequence*" ~~Id.~~ Id., 141 (emphasis in original). Applicant contended that the rules in Basavapatna merely define a countermeasure, which are designed to protect against known vulnerabilities. ~~Id.~~ Indeed, Applicant argued that not only does Basavapatna not teach or suggest action sequences,
"Basavapatna does not teach or Id. Applicant

continued by arguing that Basavapatna does not teach or suggest action sequences and that "Basavapatna does not teach or suggest any *sequence of performed actions*." *Id.* *Id.* (emphasis in original). Accordingly Therefore, Applicant contended argued that while the claimed invention assesses risk of action sequences performed by the user, applications, or the system, and thus, can act as a runtime monitor for detecting real-time threats, Basavapatna only assesses risk for systems based on known vulnerabilities. *Id.*, 141-142.

12.39. Following ~~Applicant's~~ Applicant's Request for Continued Examination (*id.*, 158), the Examiner issued a Notice of Allowance (*id.*, 164), which was followed by an additional ~~Applicant's~~ Applicant's Request for Continued Examination (*id.*, 185) and a Supplemental Notice of Allowability issued by the Examiner (*id.*, 212).

13.40. As discussed below, the above limitations that Applicant argued are not taught or suggested in Basavapatna are taught by the Alperovitch, Yeh, and Chien. prior art references. Alperovitch, Yeh, and Chen, ~~the prior art~~ cited in this ~~Petition~~ Declaration, were not ~~cited, nor~~ considered during prosecution and are ~~they not~~ cumulative of anything cited, ~~during prosecution~~ during prosecution. As discussed below, it is my opinion that Alperovitch alone and Alperovitch in view of Yeh and/or Chien teach all limitations of the '517 patent's claims.

III.V. Claim Construction

~~The Board construes claims under the same standard used in civil actions in federal district court. Petitioner submits that for the purposes of this Petition, the Board does not need to explicitly construe any claim term, and there are no known claim construction disputes that affect the outcome of this Petition.[†]~~

~~IV.—Detailed Discussion of the Grounds for Unpatentability~~

~~The Challenged Claims are unpatentable based on one primary ground and three alternative grounds. Ground 1 establishes that claims 1-24 are rendered obvious over Alperovitch in view of the knowledge of a POSITA. Grounds 2, 3, and 4 establish that claims 1-24 are rendered obvious over Alperovitch in view of Yeh, Alperovitch in view of Chien, and Alperovitch in view of Yeh and Chien, respectively.~~

[†]~~This claim construction analysis is not a concession as to the scope of any claim term in litigation or a waiver of any argument in any proceeding that claim terms are indefinite, invalid, or unpatentable.~~

41. ~~Overview of the~~ Counsel for Petitioner has informed me that language in a patent claim should be construed in accordance with the ordinary and customary meaning of such claim as understood by a POSITA in light of the specification and prosecution history of the patent at the time of the alleged invention.

42. Counsel for Petitioner has also informed me that only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.

43. For purposes of my opinions of unpatentability in this Declaration, no claim construction is necessary because, in my opinion, the challenged claims would have been rendered obvious over the cited references under any reasonable construction and based on their plain and ordinary meaning to a POSITA as of the '517 patent's alleged priority date.

VI. Summary of Cited Prior Art References

44. The prior art references Alperovitch, Yeh, and Chien that are relevant to my analysis are briefly summarized below. I discuss additional elements of Alperovitch, Yeh, and Chien in my analysis of how they invalidate the challenged claims.

~~A. Prior Art~~

~~B.A.~~ Alperovitch (Ex. 1004)

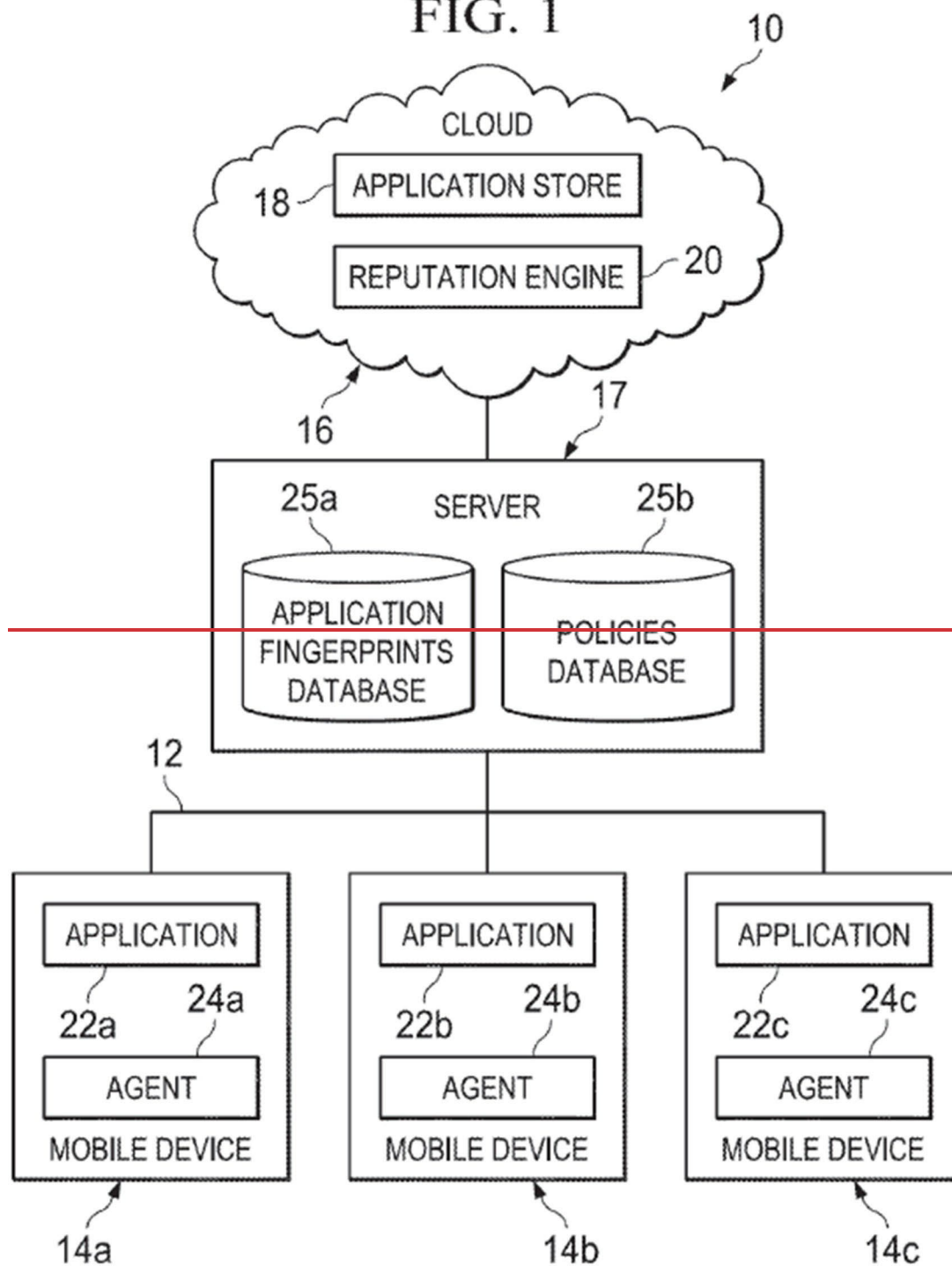
45. I understand that Alperovitch is prior art to the '517 patent at least because it was filed on March 21, 2012 and published on September 26, 2013,~~and is prior art under § 102(e). Ex. 1004, cover.~~

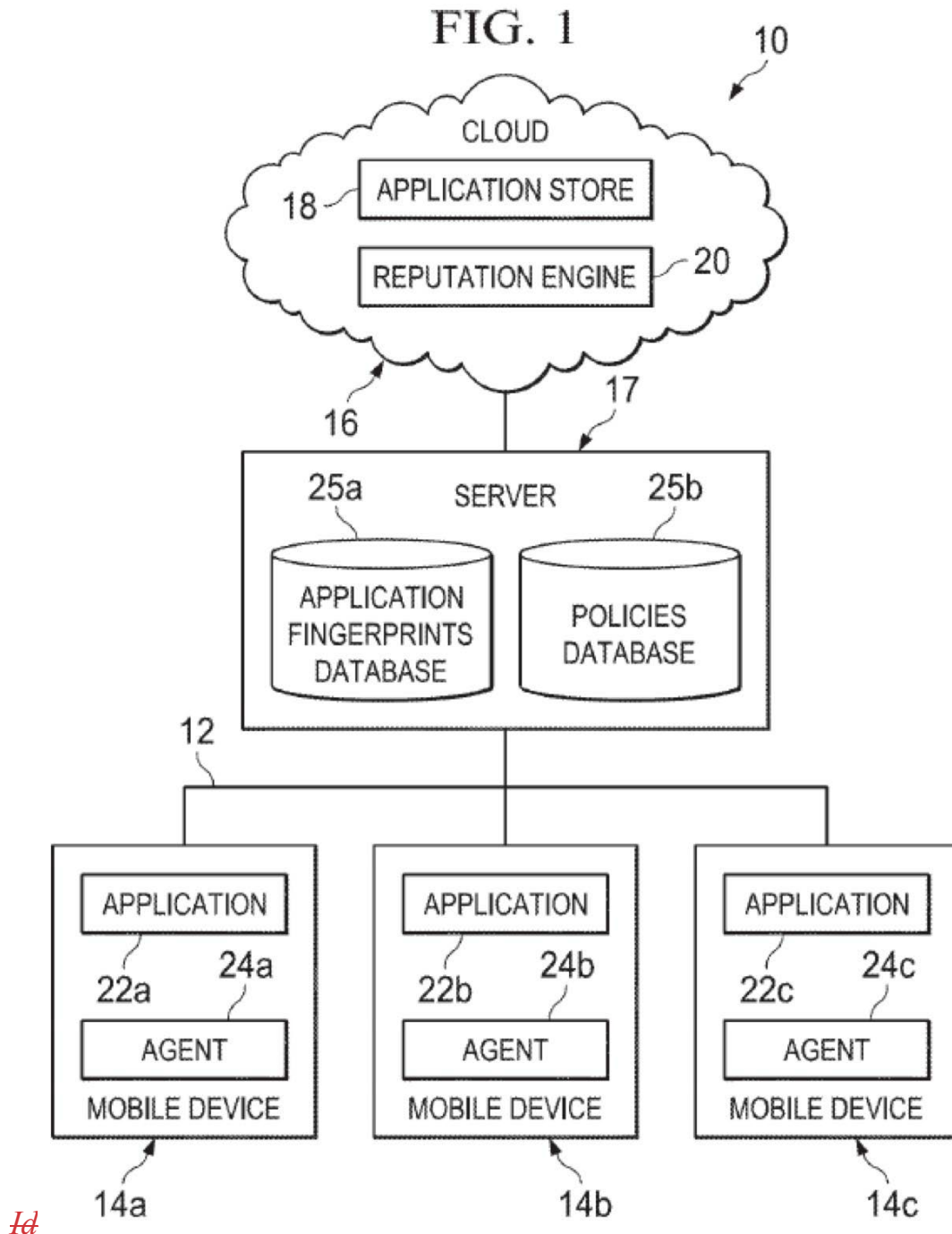
14.46. Alperovitch is titled "System and Method for Crowdsourcing of Mobile Application Reputations." Alperovitch states that it is directed to a system and method for crowdsourcing of mobile application "reputations" that ~~include~~ "includes modules for obtaining a collection of attributes of a mobile application, comparing one or more of the attributes with crowdsourced data associated with other mobile applications to determine one or more trustworthiness indicators, and calculating a reputation score based on the one or more trustworthiness indicators." ~~Id., abstract. Alperovitch's.~~ Id., Abstract, [0001], [0010]. Alperovitch teaches an approach provides "to providing "effective control and management of applications on mobile devices within computer and communication network environments"" that prevents problems related to "unrestricted access to mobile resources and application programming interfaces by applications of an unknown or untrusted origin [that] could result in damage to the user, the device, and the network." ~~Id., if not managed by suitable security architectures and network precautions."~~ Id., [0002].

15.47. ~~Alperovitch's~~ Figure 1 of Alperovitch below depicts an example

implementation of its system for crowdsourcing mobile application reputations.

FIG. 1





Id., FIG. 1. “The exemplary environment illustrates a network 12 connecting one or more mobile devices 14a, 14b, and 14c with a cloud 16.” *Id.* In one example embodiment, mobile devices 14a-c may communicate with cloud 16 through server 17.” *Id.*, [0011]. Mobile devices 14a-c can include “mobile phones, smart mobile

phones (smartphones), e-book readers, tablets, iPads, personal digital assistants (PDAs), laptops or electronic notebooks, portable navigation systems, multimedia gadgets (e.g., cameras, video and/or audio players, etc.), gaming systems, other handheld electronic devices, and any other device, component, element, or object capable of initiating voice, audio, video, media, or data exchanges within system 10 of Figure 1. *Id.*

16.48. *Mobile Alperovitch discloses that mobile* devices 14a-c are permitted to access mobile applications from one or more application stores 18 located in cloud

16. *Id.*, [0012]. Cloud 16 may also “comprise a reputation engine 20 for collecting and assessing mobile application reputations, also called herein as ‘*reputation*’ *reputation* scores,” where “[a] reputation score is a value (e.g., numeric, textual, pictorial, etc.) that denotes a relative level of trustworthiness of the mobile application on a spectrum (e.g., continuous or discrete) from benign (e.g., reputable) to malicious (e.g., non-reputable). Reputation score may indicate a probability that a mobile application is a malicious software. For example, mobile applications that have a high probability of being malicious may have a low reputation score.” *Id.* *Id.*, [0013].

17.49. *Alperovitch discloses that a* reputation score can be calculated by a reputation engine based on *many a number of* factors. *Id.*, [0021]-[0025]. In

certain embodiments, the reputation engine "can calculate reputation scores for mobile applications from real-time activities and requests for resources of the mobile applications. Embodiments of

the present disclosure can also enhance a reputation score for mobile applications from real-time activities and requests for resources of the mobile applications.”

~~Id.~~ Id., [0053]. For instance, “[i]n an example embodiment, each installed application on a mobile device (e.g., 14a-c) may be queried in cloud 16 by reputation engine 20, which can return respective mobile application reputations calculated based on proliferation of the application, its capabilities and longevity, and potentially augmented by manual research analysis.” ~~Id.~~ Id., [0019].

Furthermore, “[i]n yet other example embodiments, the reputation score may be calculated based on capabilities of the mobile application. For example, an application may be assigned a lower reputation score if it asks for a large number of potentially abusable behavior permissions.” ~~Id.~~ Id., [0025].

~~18.50. Agents~~ Along with one or more mobile applications, agents may be provisioned on each mobile device 14a, 14b, and 14c ~~along with one or more mobile applications.~~ ~~Id.~~ Id., [0014]. “Agents 24a-c may monitor behavior and activities of any one or more mobile applications (e.g., 22a-c) on respective mobile devices 14a-c. Agents 24a-c may also access policies stored on respective mobile devices 14a-c to determine if mobile applications 22a- c violate any policy.” ~~Id.~~ ~~For example,~~ “Id. As examples,” a mobile application that automatically, and without authorization, turns on a camera and a microphone (or other recording device) of a mobile device may be deemed to be malicious.” ~~Ex. 1004, [0013].~~ ” and “mobile

device 14 may be provisioned with a policy that applications on a network
accessing

pictures on mobile device 14 are not allowed to run. Agent 24 may track access by applications 22 to pictures on mobile device 14." *fd.*, [0013], [0046].

19.51. Figure 5 of Alperovitch below is a flow-chart illustrating example operational steps of ~~Alperovitch's~~ Alperovitch's system and method for crowdsourcing of mobile application reputations.

FIG. 5

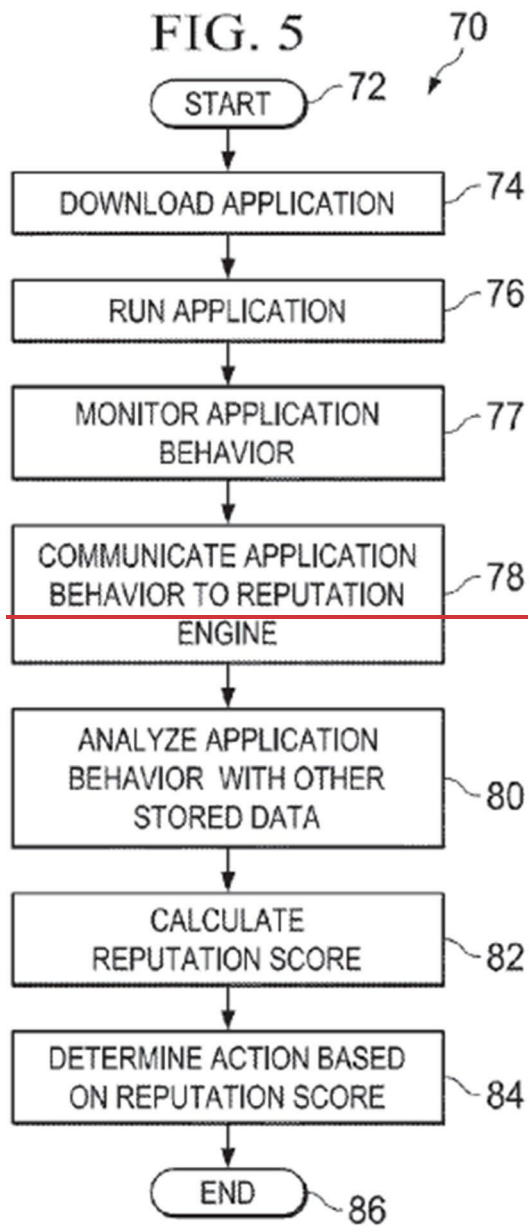
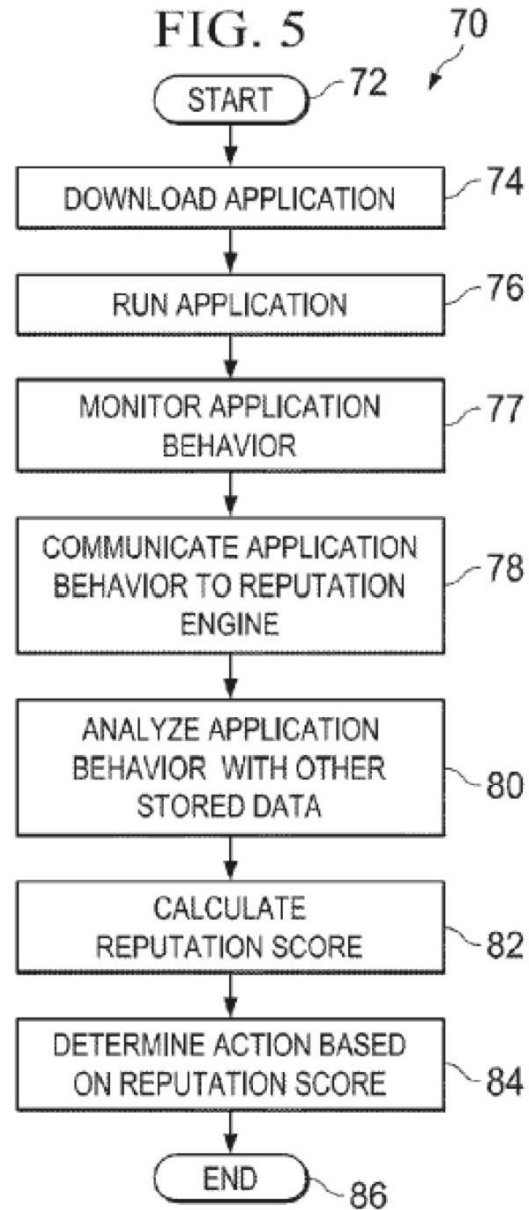


FIG. 5



Id

ld., FIG. 5.

~~20-52.~~ As part of In determining a mobile ~~application's~~ application's reputation, "application behavior (e.g., requests for resources and application actions) may be monitored" by the agent on the mobile device, and the "application behavior may be communicated to reputation engine 20." ~~Id.~~ ld., [0054]. Alperovitch discloses that "[a]pplication behavior may include application requests (e.g., requests for mobile device resources, such as access to files and pictures stored on the mobile device, access to cameras and microphones, etc.) and application actions (e.g., actions initiated by the application, such as turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc." ~~Id.~~ ld. After analyzing application behavior, "[r]eputation engine 20 may calculate a reputation score for application 22 in step 82. Calculation may be performed by any suitable means. ... [T]he In an example embodiment, the calculated reputation score may be an updated (e.g., enhanced) reputation score." ~~Id.~~ ld., [0055].

~~21-53.~~ Moreover, Alperovitch further discloses that a reputation score "may be classified into a plurality of categories," e.g., for example, by colors, based on, for example, the value of the reputation score. ~~Id.~~ ld., [0057]. "In an example embodiment, low reputation scores may be classified as low risk, and assigned a color green. Reputation scores reflecting an unverified status may be

assigned a

color yellow. Intermediate reputation scores may be classified as medium risk and assigned a color orange. High reputation scores may be classified as high risk and assigned a color red.” ~~Id.~~ Id.

B. Yeh (Ex. 1005)

~~54. Yeh~~ I understand that Yeh is prior art to the '517 patent at least because it was filed on November 22, 2010 and issued on August 25, 2015, ~~and is prior art under § 102(e).~~ Ex. 1005, ~~cover.~~

~~22.55.~~ Yeh is titled "Early Malware Detection By Cross-Referencing Host Data." Yeh states that it is directed to malware detection by “cross-referencing host data on a trusted enterprise host computer to compare to a suspect computer.” ~~Id.~~ Id., 1:6-9. Yeh discloses a computer network that “includes a central management computer linking at least one trusted host computer with at least one user computer. Antivirus software on the user computer screens for suspect activity

or features and, if found, the suspect activity or features are compared to rules database.” ~~Id.~~ Id., abstract. Yeh further discloses that if suspect activity, features, or behaviors are “unresolved, the behaviors are compared against any of a number of white lists and known good behavior on the trusted [host] computer to determine if the activity matches that of the trusted computer. If there is no match, then a malware alert may be generated.” ~~Id.~~ Id., 2:7-11.

C. Chien (Ex. ~~1006~~1006)

56. ChienI understand that Chien is prior art to the '517 patent at least because it was filed on September 17, 2008 and issued on August 25, 2015, ~~and is~~ prior art under § 102(e). Ex. 1006, ~~cover.~~

23-57. Chien is titled "Malware Behavior Analysis and Policy Creation." Chien states that it is directed to "[c]reating a policy to be used by a malware prevention system [that] uses multiple events triggered by malware." ~~Id.~~ Id., abstract. Chien discloses that when a sample of malicious computer code or malware is executed in a computer system that is connected to a malware prevention system, "[e]vent data relating to multiple events caused by the malicious code executing on the computer system are captured and stored. The event data is configured using a specific property, such as process, that facilitates malware behavior analysis. A behavior list is created utilizing the multiple events and associated event data. The behavior list is then used, together with data in a malware behavior database, to derive a policy for use in a malware prevention system." Id., 2:47-59.

~~behavior database, to derive a policy for use in a malware prevention system.” *Id.*,
2:47-59.~~

VII. Ground 1: Opinions Regarding Unpatentability

58. In my opinion, the challenged claims are unpatentable based upon one
primary ground and three alternative grounds. Claims 1-24 ~~Are Rendered~~
~~Obvious by~~are obvious over Alperovitch in view of the knowledge of a POSITA
(Ground 1). Alternatively, if it is found that Ground 1 would not have rendered
certain limitations obvious, as discussed below, then Alperovitch in view of Yeh,
Alperovitch in view of Chien,

and Alperovitch in view of Yeh and Chien, Grounds 2-4, respectively, would have rendered those limitations obvious.

A. Ground 1: Claims 1-24 Would Have Been Obvious Over Alperovitch (Ex. 1004) in View of the Knowledge of a POSITA

1. Independent Claims 1 and 13

59. As set forth below, it is my opinion that Alperovitch in view of the knowledge of a POSITA discloses or renders obvious all limitations of independent claims 1 and 13 of the '517 patent.

a. Claim 1

~~a.~~ Preamble

i. ~~The preamble of claim 1 recites “[a]”~~ A method for assessing runtime risk for an application program that executes on a device, comprising.”:

60. To the extent the ~~Board considers the~~ preamble is a limitation, Alperovitch discloses, teaches, or suggests ~~this limitation.~~it. Alperovitch discloses that “[a] system and method in one embodiment includes modules for obtaining a collection of attributes of a mobile application, comparing one or more of the attributes with crowdsourced data associated with other mobile applications to determine one or more trustworthiness indicators, and calculating a reputation score based on the one or more trustworthiness indicators.” Ex. 1004, abstract. A POSITA would have understood that ~~Alperovitch’s~~ Alperovitch’s disclosed method executes on a device, as illustrated, for example, in ~~e.g.,~~ Figure 1 of Alperovitch.

Id., Fig. 1; *see also id.*, [0060] ←

(“System 10 may be implemented in hardware or software, and may be used to assess mobile applications either remotely or locally.”); ~~Ex. 1003, ¶60.~~

24.61.As Alperovitch further explains that “[a] reputation score is a value (e.g., numeric, textual, pictorial, etc.) that denotes a relative level of trustworthiness of the mobile application on a spectrum (e.g., continuous or discrete) from benign (e.g., reputable) to malicious (e.g., non-reputable). Reputation score may indicate a probability that a mobile application is a malicious software.” ~~Ex. 1004, [0013].~~ Reputation scores for applications can be calculated “from real-time activities of and requests for resources of the ~~...~~ applications,” and ~~a POSITA would have understood that Alperovitch’s~~ Alperovitch discloses that its reputation scores are an assessment of runtime risk of application programs. ~~Id.~~, [0053], [0057]; ~~Ex. 1003, ¶61. Indeed,~~ Alperovitch discloses that a reputation score “may be classified into a plurality of categories” based on, for example, the value of the reputation score. ~~Ex. 1004, Id., [0057]. “[L]ow~~ In an example embodiment, low reputation scores may be classified as low risk, and assigned a color green. Reputation scores reflecting an unverified status may be assigned a color yellow. Intermediate reputation scores may be classified as medium risk and assigned a color orange. High reputation scores may be classified as high risk and assigned a color red.” ~~Id. Accordingly, Alperovitch discloses, teaches, or suggests this limitation.~~ Id. ~~Ex. 1003, ¶¶61-62.~~

~~b.~~ Limitation 1[a]

62. Claim 1 continues by reciting “Thus, Alperovitch discloses, teaches, or suggests a method for assessing runtime risk for an application program that executes on a device.”

ii. "storing, in a rules database, a plurality of rules, wherein each rule identifies an action sequence."

63. Alperovitch discloses, teaches, or suggests this limitation— of claim 1.

Alperovitch discloses, teaches, or suggests an application manifest database 32 as a rules database for storing a plurality of rules. ~~"[A]pplication"~~In another example embodiment, application behavior may be aggregated into application manifest database 32 and/or real-time data capture module 40. Data mining module 34 may then extract substantially all relevant information pertaining to application 22 from application manifest database 32 and real-time data capture module 40." Ex. 1004, [0055]. A POSITA would have understood from these disclosures that application behaviors ~~(which operate equivalent to rules in the '517 patent, as explained below)~~ are stored in the application manifest database when they are aggregated into the application manifest database. ~~Ex~~The application behaviors operate equivalent to rules in the '517 patent, as explained below.

~~1003, ¶63.~~

25-64. Alperovitch ~~further~~ discloses that "application behavior (e.g., requests for resources and application actions) may be monitored."" Ex. 1004, [0054]. A POSITA would have understood that the application behaviors that are monitored form the basis of rules in Alperovitch because the reputation engine analyzes data against the monitored application behaviors to determine a

reputation score. ~~See Ex. 1003, ¶ 64; see also~~, e.g., Ex. 1005, 5:47-49 (“A rules database 119 includes activities, behaviors, or other patterns of normal behavior that may occur within a user computer or over

the network by the computer.”). “[R]eputation.”). As Alperovitch discloses, "reputation" engine 20 may analyze the application behavior with other stored data (e.g., previously stored data crowdsourced from a plurality of sources) in application manifest database 32.

... In an example embodiment, data mining module 34 may extract comparable information from application manifest database 32 and/or real-time data capture module 40 for analyzing with application behavior. For example, data mining module 34 may seek information to determine if similar actions have been requested in the past." Ex. 1004, [0055]. In addition, the '517 patent consistently describes rules throughout the specification only as requiring that "each rule identifies an action sequence," which Alperovitch's application behavior does as well, as explained below. Ex. 1001, Abstract, 1:48, 1:63-64, 4:12-14, 6:23-24, 8:61-63. A POSITA would have therefore understood that Alperovitch's application behaviors that have been identified for monitoring and are thus monitored, are equivalent to rules, as described in the '517 patent.

~~module 34 may seek information to determine if similar actions have been requested in the past.” Ex. 1004, [0055]; Ex. 1003, ¶64. Furthermore, the ’517 patent only requires that a “rule identifies an action sequence” (Ex. 1001, Abstract, 1:48, 1:63–64, 4:12–14, 6:23–24, 8:61–63), which an application behavior does as well, as explained below. Thus, a POSITA would have understood that Alperovitch’s application behaviors that have been identified for monitoring and are thus monitored for are equivalent to rules in the ’517 patent. Ex. 1003, ¶64.~~

~~26-65.~~ Moreover, Alperovitch provides a specific example scenario of a rule that identifies an action sequence ~~to monitor for: “:~~ “: In one example scenario, a mobile application that automatically, and without authorization, turns on a camera and a microphone (or other recording device) of a mobile device may be deemed to be malicious.” Ex. 1004, [0013]. ~~The~~ A POSITA would have understood that the exemplary rule here is whether a camera and a microphone (or other recording device) of a mobile

device is automatically, without authorization, turned on, with the identified action sequence being the sequence of the two performed actions of turning on a camera and a microphone (or other recording device) of a mobile device. ~~Ex. 1003, ¶65; see also~~ See, e.g., Ex.

1005, 6:42-45 (~~"([Rules] Database 130 includes rules that ... describe behaviors of the user computer that are allowed and those behaviors that are not allowed."~~)).

27.66. ~~In addition, as~~ Furthermore, Alperovitch discloses, ~~"that "[a]pplication behavior may include application requests (e.g., requests for mobile device resources, such as access to files and pictures stored on the mobile device, access to cameras and microphones, etc.) and application actions (e.g., actions initiated by the application, such as turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc.)"~~ Ex. 1004, [0054]. Alperovitch further discloses that a reputation score is calculated based on one or more trustworthiness indicators (id., abstract, [0010]), and "[t]rustworthiness indicators may include - predefined combination of capabilities of the application (e.g., capabilities of the application being analyzed and other similar applications.)" ~~Ex.~~ (id., [0021]).

~~1004, [0054]. Alperovitch further discloses that a reputation score is calculated based on one or more trustworthiness indicators (id., abstract, [0010]), and~~

~~“[t]rustworthiness indicators may include ... predefined combination of capabilities of the application (e.g., capabilities of the application being analyzed and other similar applications)” (id., [0021]).~~

28.67. A POSITA would have understood that application behaviors are action sequences because the ~~517~~517 patent discloses that ~~“~~the action sequence is a sequence of at least two performed actions.”” Ex. 1001, Abstract, 1:56-57; *see also id.*, 4:12-17, 7:30-32; ~~Ex. 1003, ¶67.~~ A POSITA would have understood an application behavior in

Alperovitch includes a sequence of two performed actions for at least two reasons.

First, “[a]pplication behavior may include application requests ~~...~~ and application actions,” which explicitly ~~envisions~~covers more than a single application request or a single application action. Ex. 1004, [0054]; ~~Ex. 1003, ¶67.~~ Second, Alperovitch discloses that calculating the reputation score is based on trustworthiness indicators that are a predefined combination of capabilities of the application, ~~which, id., [0021]. A POSITA would have understood that a~~ predefined combination of capabilities of the application would also include a sequence of at least two performed actions. ~~Ex. 1004, [0021]; see~~ See also id., [0014] (“Agents 24a-c may monitor *behavior and activities* of any one or more mobile applications (e.g., 22a-c) on respective mobile devices 14a-c.”). (emphasis added); ~~Ex. 1003, ¶67.~~ Indeed, Alperovitch discloses ~~examples of~~ actions sequences of at least two performed actions such as a sequence of requests for “access to files and pictures stored on the mobile device, access to cameras and microphones, etc.” or “turning on the mobile device microphone and camera.” Ex. 1004, [0054]; ~~see also id., [0013] (“[A].” id., [0054]. Some~~ additional exemplary action sequences disclosed in Alperovitch include “a mobile application that automatically, and without authorization, turns on a camera and a microphone (or other recording device) of a mobile device may be deemed to be malicious. ~~...~~

[A] mobile application that merely accesses the mobile ~~device's~~device's processor and memory to facilitate a game of cards may be deemed to be benign."); ~~Ex. 1003,~~
~~"67. Accordingly." *Id.*, [0013].~~

Therefore, Alperovitch discloses, teaches, or suggests ~~this limitation~~ a plurality of rules, wherein each rule identifies an action sequence ~~Ex. 1003, ¶¶67.~~

e. — ~~Limitation 1~~[b]

68. ~~Claim 1 continues by reciting “Thus, Alperovitch discloses,~~
teaches, or suggests storing, in a rules database, a plurality of rules, wherein
each rule identifies an action sequence.

**iii. ”storing, in a policy database, a plurality of
assessment policies, wherein each assessment
policy includes at least one rule of the plurality
of rules.”;**

69. ~~Alperovitch discloses, teaches, or suggests this limitation.~~ of claim 1.
As Alperovitch discloses ~~that “[a]gents 24a-c may monitor behavior and~~
activities of any one or more mobile applications (e.g., 22a-c) on respective
mobile devices 14a-c. Agents 24a-c may also access policies stored on respective
mobile devices 14a-c to determine if mobile applications 22a-c violate any
policy.”

Ex. 1004, [0014]. A POSITA would have understood that the policies
stored on the mobile devices constitute a policy database. ~~Ex. 1003, ¶69. Indeed,~~
~~Alperovitch discloses~~ This is further supported by Alperovitch's disclosure that a
policy database on a server that holds other policies in Alperovitch's
system. “According to the embodiment illustrated in FIG. 1, server 17 may be
provisioned with ~~an application fingerprints database 25a and~~ policies database
25b. ~~FIG. 1 showing mobile devices 14a-c communicating with cloud 16~~

through server 17 is merely representative." Ex. ~~Ex.~~ 1004, [0018]; *see also id.*,
[0065] ("The information being tracked, sent, received, or stored in system 10
could be

~~1004, [0018]; see also id., [0065] (“The information being tracked, sent, received, or stored in system 10 could be~~ provided in any database, register, table, cache, queue, control list, or storage structure, based on particular needs and implementations.”); ~~Ex. 1003, ¶69.”).~~

~~29.70.~~ To the extent that ~~Alperovitch~~ Alperovitch's disclosures of storing policies is ~~found not~~ insufficient to ~~disclose~~ “show ” storing, in a policy database,” use of such a database to store policies in Alperovitch would have been an obvious design choice for a POSITA practicing ~~Alperovitch's~~ Alperovitch's teachings. Use of a database in this context would have been one of a limited number of options for policy storage and would have been well within the level of skill of a POSITA such that a POSITA would have had a reasonable expectation of success of storing policies ~~in a policy database.~~ Ex. 1004, [0065] ~~(“~~ (“ “The information being tracked, sent, received, or stored in system 10 could be provided in any database”); Ex.”). ~~1003, ¶70.~~

~~30-71.~~ Furthermore, as discussed above, the policy database in Alperovitch stores policies to determine if mobile applications 22a-c violate any policy (including a rule identifying an action sequence). ~~“~~”In one example scenario, a mobile application that automatically, and without authorization, turns on a camera and a microphone (or other recording device) of a mobile device may be deemed to be malicious.” ~~”~~” Ex. 1004, [0013]. A POSITA would have understood this as an example of an assessment policy to determine if a mobile application is malicious, and it includes the rule of whether a camera and a microphone (or other recording device) of a mobile device ~~are automatically, without authorization, turned on, with the identified action sequence of the sequence of the two performed actions of turning on a camera and a microphone (or other recording device) of a mobile device. Ex. 1003, ¶71; see also e.g., Ex. 1004, [0013] (“[A] mobile application that merely accesses the mobile device’s processor and memory to facilitate a game of cards may be deemed to be benign.”), [0046] (“In an example scenario, mobile device 14 may be provisioned with a policy that applications on a network accessing pictures on mobile device 14 are not allowed to run.”)~~is automatically, without authorization, turned on. The

~~d. — Limitation 1(c)~~

~~Claim 1 continues~~

identified action sequence of the sequence of the two performed actions is turning on a camera and a microphone (or other recording device) of a mobile device.
Other examples of assessment policies in Alperovitch include "a mobile application that merely accesses the mobile device's processor and memory to facilitate a game of cards may be deemed to be benign," and a "mobile device 14 may be provisioned with a policy that applications on a network accessing pictures on mobile device 14 are not allowed to run. Agent 24 may track access by reciting "applications 22 to pictures on mobile device 14." Ex. 1004, [0013], [0046].

72. Thus, Alperovitch discloses, teaches, or suggests storing, in a policy database, a plurality of assessment policies, wherein each assessment policy includes at least one rule of the plurality of rules.

iv. "identifying, using at least one assessment policy, a runtime risk for an application program that executes on a device, wherein the identified runtime risk indicates a risk or threat of the identified action sequence of the application; and"

~~73. sequence of the application.~~ Alperovitch discloses, teaches, or suggests this limitation. ~~In of claim 1.~~

As disclosed in Alperovitch, the runtime risk (i.e., reputation score for the application) is identified (i.e., updated accordingly) using at least one assessment policy (i.e., policies including a rule (identifying an action sequence) stored on mobile devices to determine if mobile applications violate any policy). ~~As an example, Alperovitch teaches that “an application on a By way of particular mobile device may initiate a spying action. Real-time data capture module 40 may recognize the spying action and consequently, reputation engine 20 may calculate an updated reputation score for the application,” where spying may occur when “a mobile application on a mobile phone could be remotely controlled, and configured to turn on the phone’s camera and microphone, permitting spying.” Ex. 1004, [0044], [0030]; Ex. 1003, ¶73.~~

an example, Alperovitch teaches: "In another example scenario, an application on a

particular mobile device may initiate a spying action. Real-time data capture module 40 may recognize the spying action and consequently, reputation engine 20 may calculate an updated reputation score for the application," where spying may occur when "a mobile application on a mobile phone could be remotely controlled, and configured to turn on the phone's camera and microphone, permitting spying."
Ex. Moreover1004, [0044], [0030].

31.74. In addition, Alperovitch discloses "that "the identified runtime risk indicates a risk or threat of the identified action sequence of the application~~"."~~ As discussed above, "a mobile application that automatically, and without authorization, turns on a camera and a microphone (or other recording device) of a mobile device [i.e., spying] may be deemed to be malicious~~"."~~ and the reputation score is updated accordingly. Ex. 1004, [0013], [0044]; ~~Ex. 1003, ¶74.~~ A "[r]eputation score may indicate a probability that a mobile application is a malicious software. For example, mobile applications that have a high probability of being malicious may have a low reputation score. In one example scenario, a mobile application that automatically, and without authorization, turns on a camera and a microphone (or other recording device) of a mobile device may be deemed to be malicious~~"."~~ Ex. 1004, [0013]. ~~Thus~~ Therefore, the identified runtime risk (i.e., a mobile application may be deemed to be malicious, and thus, have a low reputation score) indicates a risk or threat of the identified action sequence of the

application (i.e., because a mobile

application automatically, and without authorization, turns on a camera and a microphone (or other recording device)), which is against the provisioned policy).

75. Thus, Alperovitch discloses, teaches, or suggests identifying, using at least one assessment policy, a runtime risk for an application program that executes on a device, wherein the identified runtime risk indicates a risk or threat of the identified action sequence of the application.

v. "identifying, by a runtime monitor including a processing device, a behavior score for the application program that executes on the device based on the identified runtime risk, wherein"

76. Alperovitch discloses, teaches, or suggests this limitation of claim 1. Alperovitch discloses, teaches, or suggests that the reputation engine has or is executed by a processor and thus is a processing device. The reputation engine, among other things, calculates reputation scores, and together with an agent on the mobile device work as a runtime monitor that includes a processing device. "A data mining module 34, processor 36 and memory 38 may be provisioned on reputation engine 20 to facilitate calculation of mobile application reputations." Ex. 1004, [0045]; see id., [0051] 1003, ¶74. ("Reputation engine 20 may calculate a reputation score for application 22 in step 62. Calculation may be performed by any suitable means.").

77. In addition, Alperovitch discloses that "[m]obile device 14 may be provisioned with agent 24 that tracks applications 22 and applicable policies 25. In

an example embodiment, agent 24 may include event detection capabilities, communication interfaces, policy manager, etc. In another example embodiment, agent 24 may include software capable of communicating with reputation engine 20 and carrying out instructions from policy managers, event detection components, etc. Agent 24 may be configured to receive queries or information from reputation engine 20." Ex. 1004, [0040]; see also id., [0014] ("Agents 24a-c may monitor behavior and activities of any one or more mobile applications (e.g., 22a-c) on respective mobile devices 14a-c."). Further, "agent 24 on mobile device 14 may monitor the application behavior and communicate it to real-time data capture module 40 in reputation engine 20." *Id.*, [0054]. A POSITA would have understood that an agent on the mobile device that is tracking and monitoring behavior and activities of applications on the mobile device is providing runtime monitoring because it is keeping up-to-date with runtime changes on the mobile device.

78. Furthermore, Alperovitch discloses, teaches, or suggests that the reputation score is based on aspects of the application's behavior. Ex. 1004, [0054] ("[A]gent 24 on mobile device 14 may monitor the application behavior and communicate it to real-time data capture module 40 in reputation engine 20"); [0054] ("[A]pplication behavior (e.g., requests for resources and application actions) may be monitored"). The reputation score calculated by the reputation

engine "may be classified into a plurality of categories. In an example embodiment, low reputation scores may be classified as low risk, and assigned a color green. Reputation scores reflecting an unverified status may be assigned a color yellow. Intermediate reputation scores may be classified as medium risk and assigned a color orange. High reputation scores may be classified as high risk and assigned a color red. - The colors are provided for illustrative purposes only.

e. — Any other classification labels, means, schemes and methods may be used without changing the scope of the present disclosure." Ex. 1004, [0057]. A POSITA would have understood that the runtime monitor including a processing device (i.e., reputation engine and agent) identifies a behavior score for the application program that executes on the device (e.g., a risk category denoted by color) based on the identified runtime risk (i.e., reputation score of the mobile application). Limitation 1{d}

Claim 1 continues by reciting "The '517 patent discloses that "[t]he behavior score may be a number or other value (e.g., a rating)" (Ex. 1001, 6:35-36), and a POSITA would have understood that Alperovitch's risk category denoted by color is equivalent to "a rating."

32.79. Thus, Alperovitch discloses, teaches, or suggests identifying, by a runtime monitor including a processing device, a behavior score for the application program that executes on the device based on the identified runtime risk."
~~Alperovitch discloses, teaches, or suggests this limitation. In Alperovitch, the reputation engine, which has or is executed by a processor and thus is a processing~~

~~device, *inter alia*, calculates reputation scores, and together with an agent on the mobile device work as a runtime monitor including a processing device.—~~

~~“[P]rocessor 36 and memory 38 may be provisioned on reputation engine 20 to facilitate calculation of mobile application reputations.” Ex. 1004, [0045], *see id.*, [0051] (“Reputation engine 20~~

vi. "the action sequence is a sequence of at least two performed actions, and"

80. Alperovitch discloses, teaches, or suggests this limitation of claim 1.

As explained above in § VII.A.1.a.ii, Alperovitch discloses that "[a]pplication behavior may include application requests (e.g., requests for mobile device resources, such as access to files and pictures stored on the mobile device, access to cameras and microphones, etc.) and application actions (e.g., actions initiated by the application, such as turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc.)." Ex. 1004, [0054]. As Alperovitch further discloses, a reputation score is calculated based on one or more trustworthiness indicators (*id.*, abstract, [0010]), and "[t]rustworthiness indicators may include - predefined combination of capabilities of the application (e.g., capabilities of the application being analyzed and other similar applications)" (*id.*, [0021]).

81. Therefore, for at least two reasons, a POSITA would have understood that application behaviors are action sequences that are sequences of at least two performed actions. First, "[a]pplication behavior may include application requests . and application actions," which explicitly covers more than a single application request or a single application action. Ex. 1004, [0054]. Second, Alperovitch discloses that calculating the reputation score is based on trustworthiness indicators that are a predefined combination of capabilities of the application. Ex. 1004,

[0021]. A POSITA would have understood that a predefined combination of capabilities of the application would also include a sequence of at least two performed actions. See also *id.*, [0014] ("Agents 24a-c may monitor ***behavior and activities*** of any one or more mobile applications (e.g., 22a-c) on respective mobile devices 14a-c.") (emphasis added). Indeed, Alperovitch discloses examples of action sequences of at least two performed actions that include a sequence of requests for "access to files and pictures stored on the mobile device, access to cameras and microphones, etc." or "turning on the mobile device microphone and camera" (Ex. 1004, [0054]), as well as "a mobile application that automatically, and without authorization, turns on a camera and a microphone (or other recording device) of a mobile device[, which] may be deemed to be malicious. On the other hand, a mobile application that merely accesses the mobile device's processor and memory to facilitate a game of cards may be deemed to be benign" (*id.*, [0013]).

82. Thus, Alperovitch discloses, teaches, or suggests the action sequence is a sequence of at least two performed actions.

vii. **"each performed action is at least one of: a user action, an application action, and a system action."**

83. Alperovitch discloses, teaches, or suggests this limitation of claim 1. As an initial matter, I note that the '517 patent discloses a user action, application action, and system action as encompassing a broad range of actions. See Ex. 1001,

6:56-62 ("The user action 302 may be any form of explicit input from a user of the computing system 100. For example, the user action may include a program launch, keyboard input, click of a mouse, touch input on a touch screen, moving of a mouse, scrolling or clicking on a click wheel, voice command into a microphone, gestures into a device configured to read human gestures, etc."), 6:63-66 ("The application action 304 may be any activity performed by the application (e.g., stored in the memory unit 106 and executed by the processing unit 102) initiated programmatically by a task in execution of the computing system 100."), 7:15-19 ("The system action 306 may be any operation performed by the computing system 100 (e.g., by one or more components included in the computing system 100) on behalf or, or as a consequence of, an application or user action that changes the state of the computing system."). Therefore, under this broad disclosure in the '517 patent, a POSITA would have understood that any action taken by a computer system would necessarily be at least one of a user action, application action, or system action.

84. Nonetheless, as discussed above in § VII.A.1.a.vi, Alperovitch discloses, teaches, or suggests that performed actions include "application requests (e.g., requests for mobile device resources, such as access to files and pictures stored on the mobile device, access to cameras and microphones, etc.) and application actions (e.g., actions initiated by the application, such as turning on the

mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc.)." Ex. 1004, [0054]. A POSITA would have understood that Alperovitch's application requests and application actions, e.g., requests for mobile device resources, such as access to files and pictures stored on the mobile device, access to cameras and microphones, etc., and other actions initiated by the application, are application actions, as described in the '517 patent. *See* Ex. 1001, 9:18-21 ("The application action 304 may be any activity performed by the application initiated programmatically by a task in execution of the computing system 100.").

Furthermore, a POSITA would have understood that application actions described in Alperovitch include system actions performed by the computing system, e.g., as a result of application actions ("as a consequence of, an application or user action that changes the state of the computing system" (Ex. 1001, 7:17-19)), such as the mobile device's processor turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc.

85. In addition, Alperovitch also discloses, teaches, or suggests a performed action that is a user action. Alperovitch discloses user actions similar to the '517 patent's "program launch" (Ex. 1001, 6:58): "the fact that a user chose to download and install an application could be a tacit assertion by the user that the

application is trustworthy and desirable" (Ex. 1004, [0023]), and "[i]n an example embodiment, a user may provide permission to reputation engine 20 to access mobile device 14" (*id.*, [0041]). *See also id.*, [0036] ("Not shown in system 10 of FIG. 1 is hardware that may be suitably coupled to reputation engine 20 in the form of consoles, user interfaces."). A user choosing to download and install an application and a user providing permission to the reputation engine to access the mobile device are examples of user actions.

86. Thus, Alperovitch discloses, teaches, or suggests each performed action is at least one of: a user action, an application action, and a system action, and meets all limitations of claim 1.

b. Claim 13

i. "A system for assessing runtime risk for an application program that executes on a device, comprising:"

87. To the extent the preamble is a limitation, Alperovitch discloses, teaches, or suggests the preamble of claim 13 for the same reasons discussed above for the preamble of claim 1. *See supra* § VII.A.1.a.i.

88. Thus, Alperovitch discloses, teaches, or suggests a system for assessing runtime risk for an application program that executes on a device.

ii. "a rules database storing a plurality of rules, wherein each rule identifies an action sequence;"

89. Alperovitch discloses, teaches, or suggests this limitation of claim 13 for the same reasons discussed above for the similar limitation of claim 1. See supra § VII.A.1.a.ii.

90. Thus, Alperovitch discloses, teaches, or suggests a rules database storing a plurality of rules, wherein each rule identifies an action sequence.

iii. "a policy database storing a plurality of assessment policies, wherein each assessment policy includes at least one rule of the plurality of rules; and"

91. Alperovitch discloses, teaches, or suggests this limitation of claim 13 for the same reasons discussed above for the similar limitation of claim 1. See supra § VII.A.1.a.iii.

92. Thus, Alperovitch discloses, teaches, or suggests a policy database storing a plurality of assessment policies, wherein each assessment policy includes at least one rule of the plurality of rules.

iv. "a runtime monitor including a processing device"

93. Alperovitch discloses, teaches, or suggests this limitation of claim 13. Alperovitch discloses, teaches, or suggests that the reputation engine, which has or is executed by a processor and is thus a processing device that, among other things, calculates reputation scores, and together with an agent on the mobile device work

as a runtime monitor including a processing device. "[A]gent 24 on mobile device 14 may monitor the application behavior and communicate it to real-time data capture module 40 in reputation engine 20." Ex. 1004, [0054]. "A data mining module 34, processor 36 and memory 38 may be provisioned on reputation engine 20 to facilitate calculation of mobile application reputations." *Id.*, [0045]; *see id.*, [0051] ("Reputation engine 20 may calculate a reputation score for application 22 in step 62. Calculation may be performed by any suitable means."); ~~Ex. 1003, ¶76.~~").

33-94. In addition, ~~"Alperovitch discloses that "[m]obile device 14 may be provisioned with agent 24 that tracks applications 22 and applicable policies 25. In an example embodiment, agent 24 may include event detection capabilities, communication interfaces, policy manager, etc. In another example embodiment, agent 24 may include software capable of communicating with reputation engine 20 and carrying out instructions from policy managers, event detection components, etc. Agent 24 may be configured to receive queries or information from reputation engine 20."~~ Ex. 1004, [0040]; *see also id.*, [0014] ~~("Agents 24a-c may monitor behavior and activities of any one or more mobile applications (e.g., 22a-c) on respective mobile devices 14a-c.")~~"). Moreover, ~~"agent 24 on mobile device 14 may monitor the application behavior and communicate it to real-time data capture module 40 in reputation engine 20."~~ ~~*Id.*~~ *Id.*, [0054]. A

POSITA would have understood that an agent on the mobile device that is tracking and monitoring ~~behavior and activities of applications on the mobile device is providing runtime monitoring because it is keeping up to date with runtime changes on the mobile device. Ex. 1003, ¶77.~~

behavior and activities of applications on the mobile device is providing runtime monitoring because it is keeping up-to-date with runtime changes on the mobile device.

95. Thus, Alperovitch ~~further~~discloses, teaches, or suggests a runtime monitor including a processing device.

v. "identifying, using at least one assessment policy, a runtime risk for an application program that executes on a device, wherein the identified runtime risk indicates a risk or threat of the identified action sequence of the application, and"

96. Alperovitch discloses, teaches, or suggests this limitation of claim 13 for the same reasons discussed above for the similar limitation of claim 1. See *supra* § VII.A.1.a.iv.

97. Thus, Alperovitch discloses, teaches, or suggests identifying, using at least one assessment policy, a runtime risk for an application program that executes on a device, wherein the identified runtime risk indicates a risk or threat of the identified action sequence of the application.

vi. "identifying a behavior score for the application program that executes on the device based on the identified runtime risk, wherein"

98. Alperovitch discloses, teaches, or suggests this limitation of claim 13. As Alperovitch discloses, teaches, or suggests, the reputation score is based on aspects of the ~~application's~~application s behavior. Ex. 1004, [0054] ("[A]gent

24 on mobile

device 14 may monitor the application behavior and communicate it to real-time data capture module 40 in reputation engine 20"; [0054] ("([A]pplication behavior (e.g., requests for resources and application actions) may be monitored"; Ex. 1003, ¶78:"). The reputation score calculated by the reputation engine "may be classified into a plurality of categories. ~~In an example embodiment, low reputation scores may be classified as low risk, and assigned a color green. Reputation scores reflecting an unverified status may be assigned a color yellow. Intermediate reputation scores may be classified as medium risk and assigned a color orange. High reputation scores may be classified as high risk and assigned a color red. ...~~In an example embodiment, low reputation scores may be classified as low risk, and assigned a color green. Reputation scores reflecting an unverified status may be assigned a color yellow. Intermediate reputation scores may be classified as medium risk and assigned a color orange. High reputation scores may be classified as high risk and assigned a color red. - The colors are provided for illustrative purposes only. Any other classification labels, means, schemes and methods may be used without changing the scope of the present disclosure." Id., Ex. 1004, [0057]. ~~A POSITA would have understood that Alperovitch teaches that the runtime monitor including a processing device (i.e., reputation engine and agent) identifies a behavior score for the application program that executes on the device (e.g., a risk category denoted by color) based on the identified runtime risk~~

~~(i.e., reputation score of the mobile application). Ex. 1003,~~

~~¶78.~~A POSITA would have understood that a behavior score for the application program that executes on the device (e.g., a risk category denoted by color) is identified based on the identified runtime risk (i.e., reputation score of the mobile application). The ~~'517'~~517 patent discloses that "[t]he behavior score may be a number or other value (e.g., a rating)" (Ex. 1001, 6:35-36), and a POSITA would have understood that ~~Alperovitch's~~Alperovitch's risk category denoted by color is equivalent to ~~"a rating."~~"a rating." ~~Ex. 1003,~~¶78.

~~f. — Limitation 1{e}~~
~~Claim 1 continues by reciting “~~

99. Thus, Alperovitch discloses, teaches, or suggests identifying a behavior score for the application program that executes on the device based on the identified runtime risk.

vii. "the action sequence is a sequence of at least two performed actions.", and"

34.100. Alperovitch discloses, teaches, or suggests this limitation of claim 13 for the same reasons explaineddiscussed above for Limitationthe similar limitation of claim 1[a]. See supra §V.B VII.A.1.b; Ex. 1003,a.vi.

¶¶80-82.

g.——Limitation 1[f]

Claim 1 continues by reciting *“each performed action is at least one of: a user action, an application action, and a system action.”* Alperovitch discloses, teaches, or suggests this limitation. As discussed above for Limitation 1[e], Alperovitch teaches that performed actions include *“application requests (e.g., requests for mobile device resources, such as access to files and pictures stored on the mobile device, access to cameras and microphones, etc.) and application actions (e.g., actions initiated by the application, such as turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc.).”* Ex. 1004, [0054]. A POSITA would have understood that Alperovitch’s application requests and application actions, e.g., requests for mobile device resources, such as access to files and

~~pictures stored on the mobile device, access to cameras and microphones, etc., and other actions initiated by the application, are application actions as disclosed in the '517 patent. See Ex. 1001, 9:18-21 (“The application action 304 may be any~~

~~activity performed by the application initiated programmatically by a task in execution of the computing system 100.”); Ex. 1003, ¶¶83-84. Furthermore, a POSITA would have understood that application actions described in Alperovitch include system actions performed by the computing system, e.g., as a result of application actions (“as a consequence of, an application or user action that changes the state of the computing system” (Ex. 1001, 7:17-19)), such as the mobile device’s processor turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc. Ex. 1003, ¶¶83-84.~~

101. Thus, Alperovitch discloses, teaches, or suggests the action sequence is a sequence of at least two performed actions.

viii. "each performed action is at least one of: a user action, an application action, and a system action."

102. Alperovitch discloses, teaches, or suggests this limitation of claim 13 for the same reasons discussed above for the similar limitation of claim 1. See *supra* § VII.A.1.a.vii.

103. Thus, Alperovitch discloses, teaches, or suggests each performed action is at least one of: a user action, an application action, and a system action, and meets all limitations of claim 13.

2. Dependent Claims 2-12 and 14-24

In ~~addition~~my opinion, Alperovitch ~~also teaches a performed action that is a~~

user action.

35.104. ~~Alperovitch discloses actions similar to the '517 patent's "program launch"~~ (Ex. 1001, 6:58), such as "the fact that a user chose to download and install an application could be a tacit assertion by the user that the application is trustworthy and desirable" (Ex. 1004, [0023]), and "a user may provide permission to reputation engine 20 to access mobile device 14"in view of the knowledge ~~(id., [0041]). See also id., [0036]~~ ("Not shown in system 10 of FIG. 1 is hardware that may be suitably coupled to reputation engine 20 in the form a POSITA would have rendered each of consoles, user interfaces."). A user choosing to download and install an application and a user providing permission to the reputation engine to access the mobile device are examples of user actions. ~~Ex~~ the following dependent claims obvious.

~~1003, ¶¶ 83, 85.~~

~~Claim~~

~~2. Claim 2~~

a. ~~Claims 2 depends on claim 1 and 14~~

105. Claims 2 and 14 depend from claims 1 and 13, respectively, and
further ~~recites:~~ "recite: "*wherein the user action is any form of explicit input from a*
user of a computing system.""

36-106. Alperovitch discloses, teaches, or suggests this limitation. As
explained above ~~for Limitation in § VTT.A.1~~ [¶].a.vii. Alperovitch discloses, teaches, or
suggests user actions. Alperovitch ~~discloses~~ "has express disclosures of explicit user
inputs such as "the fact that a user chose to download and install an application
could be a tacit assertion by the user that the application is trustworthy and
desirable" (Ex. 1004, [0023]), and "[i]n an example embodiment, a user may
provide permission to reputation engine 20 to access mobile device 14" (*id.*,
[0041]). *See also id.*, [0036] ~~("~~Not shown in system 10 of ~~FIG~~FTG. 1 is hardware
that may be suitably coupled to reputation engine 20 in the form of consoles, user
interfaces"."). A ~~POSITA~~POSTTA would have understood that a user choosing to
download and install an application and a user providing permission to the
reputation engine to access the mobile device are examples of user actions that are
forms of explicit input, e.g., through a user interface, from a user of a computing
system because a user has to explicitly provide an input to initiate the downloading
and installation of an application, and a user has to explicitly provide an input to
grant permission to the reputation engine to access the mobile device. ~~Ex. 1003,~~

~~¶106.~~

~~37.~~107. To the extent that Alperovitch is found not to ~~explicitly~~ disclose this limitation, ~~that~~ a user action that is a form of explicit input from a user of a computing system would have been obvious to a POSITA in view of Alperovitch. Alperovitch discloses that agent 24 tracks applications and has event detection capabilities. Ex. 1004, [0040]. A POSITA would have understood that in the context of ~~Alperovitch's~~ Alperovitch's focus on mobile applications, this would include detecting explicit inputs from a user. It would have been an obvious design variation of ~~Alperovitch's~~ Alperovitch's teachings to include explicit user inputs as part of the performed actions monitored in mobile applications, as it was well-known that user inputs can control an ~~application's~~ application's behavior, which is the core focus of ~~Alperovitch's~~ Alperovitch's monitoring and the basis for ~~Alperovitch's~~ Alperovitch's computation of a reputation score. ~~Ex. 1003, ¶107.~~

108. ~~Claim~~ Thus, Alperovitch in view of the knowledge of a POSITA would have rendered claims 2 and 14 obvious.

a.b. Claims 3 and 15

109. ~~Claim~~ Claims 3 ~~depends on claim~~ and 15 depend from claims 1 and 13, respectively, and further recites: "recite: "wherein the application action is any activity performed by the application initiated programmatically by a task in execution of a computing system.""

38.110. Alperovitch discloses, teaches, or suggests this limitation.

~~For example,~~ Alperovitch discloses, teaches, or suggests as an example that an application can

perform an application action, which includes ~~“~~actions initiated by the application, such as turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc.~~”.~~ Ex. 1004, [0054]. A POSITA would have understood that the activity of, e.g., turning on of the mobile device microphone and camera performed by the application is initiated programmatically by a task in execution of a computing system in response to the ~~application's~~ “application's ”request[] for mobile device resources, such as ~~...~~

~~—~~ access to cameras and microphones.” Ex. 1004, [0054]; ~~Ex. 1003, ¶110. In other words, the application’s]. The application’s~~ request for access to cameras and microphones causes a task in execution of the computing system to initiate programmatically the turning on of the mobile device microphone and camera.
~~Ex. 1003, ¶110.~~

~~111. Claim~~ Thus, Alperovitch in view of the knowledge of a POSITA would have rendered claims 3 and 15 obvious.

b.c. Claims 4 and 16

~~39.112. Claim~~ Claims 4 depends on claim and 16 depend from claims 1 and 13, respectively, and further recites: “recite: "wherein the system action is any operation performed by a computing system on behalf of, or as a consequence of, a user action or application action that changes the state of the computing system." Alperovitch discloses, teaches, or suggests this limitation.”

~~40.113.~~ Alperovitch discloses, teaches, or suggests this limitation. As Alperovitch discloses, an application action ~~that~~ includes “requests for mobile device

resources, such as ~~...~~ access to cameras and microphones~~..~~" Ex. 1004, [0054].

A POSITA would have understood that as a consequence of such application action, which changes the state of the computing system because a request to change the state of a computing resource is being made (i.e., the mobile device microphone and camera is off at the moment), the system action of turning on the mobile device microphone and camera (or at least allowing access to these devices by the application) is performed by the computing system (i.e., the mobile ~~device's~~device's processor). ~~Ex. 1003, ¶113.~~

114. ~~Claim~~ Thus, Alperovitch in view of the knowledge of a POSITA would have rendered claims 4 and 16 obvious.

e.d. Claims 5 and 17

115. ~~Claim~~ Claims 5 depends on claim and 17 depend from claims 1 and 13, respectively, and further recites: "recite: "wherein a first action of the at least two performed actions is performed at a first time, and the second action of the at least two performed actions is performed at a second time:." As a general matter, a POSITA would have understood that claims 5 and 17 recite limitations that would be true of any sequence of two actions occurring in a single processor system, where true parallelism (parallel execution) is not possible.

116. Nonetheless, Alperovitch discloses, teaches, or suggests this limitation. ~~Alperovitch teaches~~ Examples of two performed actions, e.g., "disclosed, taught, or suggested in

Alperovitch are "requests for mobile device resources, such as ~~...~~ access to cameras and microphones" and "actions initiated by the application, such as turning on the mobile device microphone and camera." Ex. 1004, [0054]. A POSITA would have understood that requesting access to cameras and microphones is a first action performed at a first time, and then turning on the mobile device microphone and camera would be the second action performed at a second time because the mobile device microphone and camera would not need to be turned on until after there has been a request to access the cameras and microphones, and there would be no need to request access to the cameras and microphones if the cameras and microphones are already turned on. ~~Ex. 1003,~~ ¶¶115-116.

~~3. Claim 6~~

~~a. Limitation 6[a]~~

~~117. Claim 6 depends on claim 5 and~~ Thus, Alperovitch in view of the knowledge of a POSITA would have rendered claims 5 and 17 obvious.

e. Claims 6 and 18

118. Claims 6 and 18 depend from claims 5 and 17, respectively, and
further ~~recites, among other things:~~ "recite the limitations below.

i. "wherein the first action is a user action."

41.119. Alperovitch discloses, teaches, or suggests this limitation. As discussed above for claim 2, Alperovitch discloses, teaches, or suggests an

example of a user action where "a user may provide permission to reputation engine 20 to access mobile device 14." Ex. 1004, [0041]. A POSITA would have

understood that a user providing permission to the reputation engine to access the mobile device is a first action that is a user action because a user has to provide an input to grant permission to the reputation engine to access the mobile device. ~~Ex. 1003, ¶119.~~

~~b. — Limitation 6[b]~~

~~120. Claim 6 continues by reciting “the second action is a system action.” Therefore,~~

Alperovitch discloses, teaches, or suggests the first action is a user action.

ii. “the second action is a system action, and”

~~42.121.~~ Alperovitch discloses, teaches, or suggests this limitation. As discussed above ~~for Limitation in § VII.A.1 [¶], a.vii,~~ Alperovitch discloses “application actions (e.g., actions initiated by the application, such as turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc.)” ~~Ex. 1004, [0054],~~ ~~which a].~~ A POSITA would have understood that the application actions disclosed in Alperovitch include system actions performed by the computing system, e.g., as a result of application actions “as a consequence of, an application or user action that changes the state of the computing system” (Ex. 1001, 7:17-19)), such as the mobile ~~device’s~~ device’s processor turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc. ~~Ex. 1003, ¶121.~~ The mobile ~~device’s~~ device’s processor turning on the mobile device microphone and camera is a second action that is a system

action. ~~Id.~~

~~e. — Limitation 6[e]~~

122. ~~Claim 6 continues by reciting “Therefore, Alperovitch discloses,~~
~~teaches, or suggests the second action is a system action.~~

iii. “the second time occurs after the first time.”

43.123. Alperovitch discloses, teaches, or suggests this limitation. A POSITA would have understood that to be part of the reputation ~~engine’s~~engine's calculated reputation score, the second action performed at the second time~~—~~, i.e., the mobile ~~device’s~~device's processor turning on the mobile device microphone and camera~~),~~, would have to occur after the first action performed at the first time—, i.e., after the user has provided permission to the reputation engine to access the mobile device~~).~~—Ex. 1003, ¶123. A POSITA would have understood that the reputation engine needs to be provided permission to access the mobile device in order to calculate a reputation score, and if the user has not provided permission to the reputation engine to access the mobile device first, any actions by the mobile device cannot be part of the reputation score calculation.~~—Id.~~

124. ~~Claim~~Therefore, Alperovitch discloses, teaches, or suggests the second
~~time occurs after the first time.~~

125. Thus, Alperovitch in view of the knowledge of a POSITA would have
~~rendered claims 6 and 18 obvious.~~

d.f. Claims 7 and 19

d. — Limitation Claims 7{a}

126. Claim 7 depends on claim and 19 depend from claims 5 and 17,
respectively, and further recites, among other things: “recite the limitations below.

i. “wherein the first action is a user action.”,

44.127. Alperovitch discloses, teaches, or suggests Limitation 7{a} this
limitation for the same reasons discussed above for Limitation 6{a}. the same
limitation of claim 6. See supra § V.B.6.a; Ex. 1003, ¶¶ 127-128 VII.A.2.e.i.

~~e. — Limitation 7[b]~~

~~128. Claim 7 continues by reciting “Therefore, Alperovitch discloses, teaches, or suggests the first action is a user action.~~

~~ii. “the second action is an application action.”₂ and”~~

~~45-129. Alperovitch discloses, teaches, or suggests this limitation. As discussed above for Limitation in § VII.A.1 [ff], a.vii, Alperovitch discloses “application requests (e.g., requests for mobile device resources, such as access to files and pictures stored on the mobile device, access to cameras and microphones, etc.)” (.)~~ Ex. 1004, [0054]), which a]. A POSITA would have understood that an application request disclosed in Alperovitch is an application action, such as an application’s application’s request for access to the mobile device’s device’s cameras and microphones. ~~Ex. 1003, ¶129.~~ The application’s application’s request for access to the mobile device’s device’s cameras and microphones is a second action. ~~Id.~~

~~f. — Limitation 7[c]~~

~~130. Claim 7 continues by reciting “Therefore, Alperovitch discloses, teaches, or suggests the second action is an application action.~~

iii. "the second time occurs after the first time."

~~46.~~131. Alperovitch discloses, teaches, or suggests this limitation. A POSITA would have understood that to be part of the reputation ~~engine's~~engine's calculated reputation score, the second action performed at the second time~~—~~, i.e., the ~~application's~~application's request for access to the mobile ~~device's~~device's cameras and microphones~~),~~ would have to occur after the first action performed at the first time—, i.e., after the user has provided permission to the reputation engine to access the mobile device~~).~~ ~~Ex. 1003, ¶131.~~ A POSITA would have understood that the reputation engine needs to be provided permission to access the mobile device in order to calculate a reputation score, and if the user has not provided permission to the reputation engine to access the mobile device first, any actions by the mobile device cannot be part of the reputation score calculation. ~~Id.~~

132. ~~Claim~~ Therefore, Alperovitch discloses, teaches, or suggests the second time occurs after the first time.

133. Thus, Alperovitch in view of the knowledge of a POSITA would have rendered claims 7 and 19 obvious.

~~e.g.~~ Claims 8 and 20

~~g.—~~ Limitation Claims 8{a}

134. ~~Claim 8 depends on claim~~ and 20 depend from claims 5 and 17, respectively, and further ~~recites, among other things:~~ "recite the limitations below.

i. "wherein the first action is an application action."

47.135. Alperovitch discloses, teaches, or suggests this limitation. As discussed above ~~for Limitation in § VII.A.1(f), a.vii,~~ Alperovitch discloses "application requests (e.g., requests for mobile device resources, such as access to files and pictures stored on the mobile device, access to cameras and microphones, etc.)" Ex. 1004, [0054], which a POSITA would have understood that an application request disclosed in Alperovitch is an application action, such as an ~~application's~~ application's request for access to the mobile ~~device's~~ device's cameras and microphones. ~~Ex. 1003, ¶135.~~ The ~~application's~~ application's request for access to the mobile ~~device's~~ device's cameras and microphones is a first action. ~~Id.~~

h. Limitation 8[b]

136. Claim 8 continues by reciting "Therefore, Alperovitch discloses, teaches, or suggests the first action is an application action."

ii. "the second action is a system action," and"

48.137. Alperovitch discloses, teaches, or suggests ~~Limitation 8[b]~~ this limitation for the same reasons discussed above for ~~Limitation the same limitation of claim 6[b].~~ See *supra* § V.B.6.b; Ex. 1003, ¶¶137-138 VII.A.2.e.ii.

i. Limitation 8[c]

138. Claim 8 continues by reciting "Therefore, Alperovitch discloses, teaches, or suggests the second action is a system action."

i.iii. "the second time occurs after the first time."

49.139. Alperovitch discloses, teaches, or suggests this limitation. A POSITA would have understood that the second action performed at the second time ~~2~~, i.e.,

the mobile

~~device's device's~~ processor turning on the mobile device microphone and camera~~),~~
would have occurred after the first action performed at the first time~~(,~~ i.e., after
the ~~application's application's~~ request for access to the mobile ~~device's device's~~
cameras and microphones~~),~~ because the mobile device microphone and camera
would not need to be turned on until after there has been a request to access the
cameras and microphones, and there would be no need to request access to the
cameras and microphones if the cameras and microphones are already turned on.-

~~Ex. 1003, ¶139.~~

140. ~~Claim~~ Therefore, Alperovitch discloses, teaches, or suggests the second
time occurs after the first time.

141. Thus, Alperovitch in view of the knowledge of a POSITA would have
rendered claims 8 and 20 obvious.

~~f.h.~~ **Claims 9 and 21**

~~j.~~ **Limitation Claims 9{a}**

142. ~~Claim 9 depends on claim~~ and 21 depend from claims 1 and 13,
respectively, and further recites, among other things: "recite the limitations below.

**i. "wherein the action sequence includes three
performed actions."**

~~50-143.~~ Alperovitch discloses, teaches, or suggests this limitation. As
Alperovitch discloses, teaches, or suggests, an example of a performed action is
where "a user may provide permission to reputation engine 20 to access mobile

device 14²² Ex. 1004, [0041]. Alperovitch further discloses, teaches, or suggests examples of performed actions that include "application requests (e.g., requests for

mobile device resources, such as access to files and pictures stored on the mobile device, access to cameras and microphones, etc.) and application actions (e.g., actions initiated by the application, such as turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc.).” ~~Ex. 1004, [0054].~~ ~~Thus~~ Therefore, Alperovitch discloses, teaches, or suggests the action sequence includes three performed actions, such as providing permission to the reputation engine to access the mobile device, an ~~application’s~~ application’s request for access to the mobile ~~device’s~~ device’s cameras and microphones, and the mobile ~~device’s~~ device’s processor turning on the mobile device microphone and camera. ~~Ex. 1003, ¶143.~~

~~k. — Limitation 9~~[b]

144. Claim 9 continues by reciting “Thus, Alperovitch discloses, teaches, or suggests the action sequence includes three performed actions.

ii. “a first action of the three performed actions is a user action.”,

51.145. Alperovitch discloses, teaches, or suggests this limitation. As discussed above, Alperovitch discloses, teaches, or suggests an example of a user action where “a user may provide permission to reputation engine 20 to access mobile device 14.” Ex. 1004, [0041]. A POSITA would have understood that a user providing permission to the reputation engine to access the mobile device is a

first action of the three performed actions that is a user action because a user has to
~~provide an input to grant permission to the reputation engine to access the mobile device. Ex. 1003,~~

~~¶145.~~

~~I. — Limitation 9[c]~~

~~Claim 9 continues by reciting “~~

provide an input to grant permission to the reputation engine to access the mobile device.

146. Therefore, Alperovitch discloses, teaches, or suggests a first action of the three performed actions is a user action.

iii. "a second action of the three performed actions is an application action."

52.147. Alperovitch discloses, teaches, or suggests this limitation. As discussed above, Alperovitch discloses "application requests (e.g., requests for mobile device resources, such as access to files and pictures stored on the mobile device, access to cameras and microphones, etc.)." Ex. 1004, [0054], ~~which a~~. A POSITA would have understood that an application request disclosed in Alperovitch is an application action, such as an ~~application's~~application's request for access to the mobile ~~device's~~device's cameras and microphones. ~~Ex. 1003, ¶147.~~ The ~~application's~~application's request for access to the mobile ~~device's~~device's cameras and microphones is a second action of the three performed actions that is an application action. ~~Id.~~

m.—Limitation 9[d]

148. Claim 9 continues by reciting "Therefore, Alperovitch discloses, teaches, or suggests a second action of the three performed actions is an application action.

iv. "a third action of the three performed actions is a system action."

53.149. Alperovitch discloses, teaches, or suggests this limitation. As

discussed above, Alperovitch discloses "application actions (e.g., actions initiated

by the application, such as turning on the mobile device microphone and camera, initiating a network connection with a rogue IP address, starting a virtual game of cards, etc.)” (Ex. 1004, [0054]), ~~which a~~. A POSITA would have understood ~~include~~ that an application action disclosed in Alperovitch includes a system action performed by the computing system, e.g., as a result of application actions (“as a consequence of, an application or user action that changes the state of the computing system” (Ex.

1001, 7:17-19)), such as the mobile ~~device’s~~ device’s processor turning on the mobile device microphone and camera. ~~Ex. 1003, ¶149.~~

The mobile ~~device’s~~ device’s processor turning on the mobile device microphone and camera is a third action of the three performed actions that is a system action.-

~~Id.~~

~~n. — Limitation 9[e]~~

~~150. Claim 9 continues by reciting “Therefore, Alperovitch discloses, teaches, or suggests a third action of the three performed actions is a system action.~~

~~v. “the second action is performed temporally after the first action.”, and”~~

~~54.151. Alperovitch discloses, teaches, or suggests this limitation. A POSITA would have understood that to be part of the reputation engine's engine's calculated reputation score, the second action would have to be performed temporally after the first action, i.e., the application's application's request for access to the mobile device's device's cameras and microphones would have to occur after the user has provided permission to the reputation engine to access the mobile device. Ex. A POSITA would~~

~~1003, ¶151. A POSITA would~~ have understood that the reputation engine needs to be provided permission to

access the mobile device in order to calculate a reputation score, and if the user has not provided permission to the reputation engine to access the mobile device first, any actions by the mobile device cannot be part of the reputation score calculation.-

Id.

~~e.~~—Limitation 9[f]

152. ~~Claim 9 continues by reciting “Therefore, Alperovitch discloses,~~
teaches, or suggests the second action is performed temporally after the first
action.

**vi. “the third action is performed temporally after
the second action.”.**

~~55-153.~~ 153. Alperovitch discloses, teaches, or suggests this limitation. A POSITA would have understood that the third action~~—~~₂ i.e., the mobile ~~device's~~device's processor turning on the mobile device microphone and camera~~—~~₂ would have to be performed temporally after the second action~~—~~₂ i.e., after the ~~application's~~application's request for access to the mobile ~~device's~~device's cameras and microphones~~—~~₂ because the mobile device microphone and camera would not need to be turned on until after there has been a request to access the cameras and microphones, and there would be no need to request access to the cameras and microphones if the cameras and microphones are already on.~~—Ex. 1003, ¶153.~~

154. ~~Claim~~ Therefore, Alperovitch discloses, teaches, or suggests the third
action is performed temporally after the second action.

155. Thus, Alperovitch in view of the knowledge of a POSITA would have rendered claims 9 and 21 obvious.

i. Claims 10 and 22

156. Claim ~~Claims~~ 10 ~~depends on claim~~ and 22 depend from claims 1 and 13, respectively, and further ~~recites: "recite: "~~ *wherein the runtime risk is identified based on matching rules and probabilistic weights and scores of performed actions on the device."*

Alperovitch discloses, teaches, or suggests this limitation. As Alperovitch discloses ~~that "[a]~~ *an overall reputation score may be determined based upon the calculated probabilities and provided to agent 24a on mobile device 14a."* Ex. 1004, [0035]. The calculated probabilities include *"aggregated behaviors of the application that may also be evaluated to determine a reputation score of the mobile application. As more information about an application is reported or otherwise made available to reputation engine 20, a statistical confidence level of the reputation score may be higher."* *Id.* *ld.*, [0034].

56.157. ~~Thus~~ Therefore, Alperovitch discloses, teaches, or suggests that the runtime risk (i.e., reputation score) is identified based on matching rules and probabilistic weights and scores of performed actions on the device (i.e., determined based on aggregating monitored application behaviors to increase the confidence level of the reputation score). ~~Ex. 1003, ¶157.~~ A POSITA would have understood that increasing the statistical confidence level by aggregating monitored application behaviors is equivalent to matching probabilistic weights

and scores of the application behaviors because it is taking into account the

probability of the application behaviors occurring to increase the statistical confidence level of the reputation score. ~~Id.~~

158. ~~Claim~~ Thus, Alperovitch in view of the knowledge of a POSITA would have rendered claims 10 and 22 obvious.

j. Claims 11 and 23

159. ~~Claim~~ Claims 11 depends on claim and 23 depend from claims 1 and 13, respectively, and further recites: "recite: "wherein the runtime risk is identified based on time proximity of the at least two performed actions of the action sequence and natural affinity inferred between the at least two performed actions."

57.160. Alperovitch discloses, teaches, or suggests this limitation. As Alperovitch discloses ~~that~~ "the reputation score may be calculated based on capabilities of the mobile application" that include "identify[ing] unusual combinations of permissions, or unexpected permissions (e.g., a purported game application sending unauthorized SMS messages)". Ex. 1004, [0025]. A POSITA would have understood that when, e.g., a purported game application is running, and the purported game application sends an unauthorized SMS message, the application is performing an action sequence where the time proximity of the at least two performed actions of running the game application and then sending an unauthorized SMS message as well as the natural affinity inferred between the at least two performed actions are unexpected. ~~Ex. 1003, ¶160. Thus, Alperovitch teaches~~

~~that the runtime risk (i.e., reputation score) is identified (i.e., calculated)~~ Therefore, Alperovitch
discloses,

teaches, or suggests that the runtime risk (i.e., reputation score) is identified (i.e., calculated) based on the unexpected time proximity of running the game application and then sending an unauthorized SMS message because an SMS message is not expected to be sent while running the game application and based on the unnatural affinity inferred between running the game application and then sending an unauthorized SMS message for the same reason. ~~Id.~~

161. ~~Claim~~ Thus, Alperovitch in view of the knowledge of a POSITA would have rendered claims 11 and 23 obvious.

k. Claims 12 and 24

~~p. — Limitation~~ Claims 12{a}

162. ~~Claim 12 depends on claim~~ and 24 depend from claims 1 and 13, respectively, and further ~~recites:~~ “recite the limitations below.

i. “further comprising: assessing, by the processing device, that the at least two performed actions of the action sequence describe a forensic chain of events based on a plurality of factors.”, “ / “wherein the processing device assesses that the at least two performed actions of the action sequence describe a forensic chain of events based on a plurality of factors, and”

58.163. Alperovitch discloses, teaches, or suggests this limitation. As Alperovitch discloses ~~that~~ “the reputation score may be calculated based on capabilities of the mobile application” (Ex. 1004, [0025]), including a “predefined combination of capabilities of the application (e.g., capabilities of

the application

being analyzed and other similar applications)" (*id.*, [0021]).

~~Moreover, Alperovitch discloses, teaches, or suggests that~~ unauthorized or unusual combinations of performed actions by the application ~~is~~are reflected in the calculated reputation score. For example, ~~"~~"a mobile application that automatically, and without authorization, turns on a camera and a microphone (or other recording device) of a mobile device may be deemed to be malicious~~"~~" (*id.*, [0013]), and ~~"~~"unusual combinations of permissions, or unexpected permissions (e.g., a purported game application sending unauthorized SMS messages)" of an application may cause the application to receive a lower reputation score (*id.*, [0025]). ~~Ex. 1003, ¶163.~~ A POSITA would have understood that in calculating the reputation score, the reputation engine and agent are assessing that the at least two performed actions of the action sequence are describing a forensic chain of events based on a plurality of factors because the above examples are a forensic chain of events (i.e., the above performed actions of the action sequence are investigated together as a chain of events, such as turning on a camera and a microphone (or other recording device) of a mobile device or running a purported game application and sending unauthorized SMS messages) based on a plurality of factors, ~~as explained below for Limitation 12[b].~~ *Id.* I further explain below how the forensic chain of events is based on a plurality of factors for the next limitation.

~~q.~~ **Limitation 12[b]**

164. Claim 12 continues by reciting “~~wherein~~ Therefore, Alperovitch
discloses, teaches, or suggests assessing, by the processing device, that the at least
two performed actions of the action sequence

describe a forensic chain of events based on a plurality of factors and wherein the processing device assesses that the at least two performed actions of the action sequence describe a forensic chain of events based on a plurality of factors.

ii. "[wherein] the plurality of factors includes at least one of: ordered sequences, unordered sequences, proximity analysis, outliers, probabilistic weights and scores, and probable action inferences based on an application's competency."

59.165. Alperovitch discloses, teaches, or suggests this limitation.

Alperovitch discloses, teaches, or suggests that the assessing of the at least two performed actions of the action sequence describe a forensic chain of events that is based on at least one of ordered sequences, unordered sequences, proximity analysis, outliers, probabilistic weights and scores, and probable action inferences based on an application's competency. For example, as Alperovitch discloses ~~that~~ "the reputation score may be calculated based on capabilities of the mobile application" (Ex. 1004, [0025]), including a "predefined combination of capabilities of the application (e.g., capabilities of the application being analyzed and other similar applications)" (*id.*, [0021]). A POSITA would have understood that predefined combinations of capabilities of the application is a forensic chain of events that is based on ordered sequences, as. This is because the capabilities of an application performed in a predefined combination is an ordered sequence. ~~Ex. 1003, ¶165.~~

Further

~~60.166.~~ In addition, Alperovitch discloses that “[i]n one example scenario, a mobile application that automatically, and without authorization, turns on a camera and a microphone (or other recording device) of a mobile device may be deemed to be malicious.” Ex. 1004, [0013]. A POSITA would have understood that an application turning on a camera and a microphone (or other recording device) of a mobile device without authorization is a forensic chain of events that is based on unordered sequences. This is because turning on separate recording devices without authorization is not following a proper order of sequences. ~~Ex. 1003, ¶166.~~

~~61.167.~~ Moreover, Alperovitch further discloses that “[i]n yet other example embodiments, the reputation score may be calculated based on capabilities of the mobile application. For example, an application may be assigned a lower reputation score if it asks for a large number of potentially abusable behavior permissions.” Ex. 1004, [0025]. Such an action sequence consisting of unusual combinations of permissions, or unexpected permissions may be, e.g., running a purported game application and sending unauthorized SMS messages. Id. A POSITA would have understood that running a purported game application and sending unauthorized SMS messages is a forensic chain of events that is based on unordered sequences, proximity analysis, outliers, and probable action inferences based on an application's competency. ~~Ex.~~

~~1003, ¶167.~~ Running a purported game application and sending unauthorized SMS messages is a forensic chain of events that is based on

unordered sequences because running a purported game application and sending SMS messages without authorization is not following a proper order of sequences.

~~Id.~~ Running a purported game application and sending unauthorized SMS messages is a forensic chain of events that is based on proximity analysis and probable action inferences based on an ~~application's~~application's competency for the same reasons discussed above for claim 11. *See supra* § ~~V.B.11; Ex. 1003,~~ ¶~~167.~~VII.A.2.j. This game application example is also based on outliers because it is outlier behavior (unexpected) for a purported gaming application that is running properly to send unauthorized SMS messages.~~Ex. 1003, ¶167.~~

~~Finally~~Lastly, Alperovitch discloses that “[a]n overall reputation score may be determined based upon the calculated probabilities and provided to agent 24a on mobile device 14a.”~~22.~~” Ex. 1004, [0035]. The calculated probabilities include

~~62.168.~~ “ aggregated behaviors of the application that may also be evaluated to determine a reputation score of the mobile application. As more information about an application is reported or otherwise made available to reputation engine 20, a statistical confidence level of the reputation score may be higher.” ~~Id.~~ Id., [0034]. A POSITA would have understood that increasing the statistical confidence level by aggregating monitored application behaviors is equivalent to assessing that the at least two performed actions of the action sequence describe a forensic chain of events based on probabilistic weights and scores. This is because the reputation

engine and agent are assessing the probability of the application behaviors occurring to increase the statistical confidence level of the reputation score. ~~Ex. 1003, ¶168.~~

~~4. Claim 13~~

~~a. Preamble~~

~~The preamble of claim 13 recites “[a] system for assessing runtime risk for an application program that executes on a device, comprising.” To the extent the Board considers the preamble a limitation~~Therefore~~, Alperovitch discloses, teaches, or suggests the preamble of claim 13 for the same reasons discussed above for the preamble of claim 1. See supra § V.B.1.a; Ex. 1003, ¶¶87-88.~~

~~b. Limitation 13[a]~~

~~Claim 13 continues by reciting “a rules database storing a plurality of rules, wherein each rule identifies an action sequence.” Alperovitch discloses, teaches,~~

or suggests Limitation 13[a] for the same reasons discussed above for Limitation 1[a]. *See supra* § V.B.1.b; Ex. 1003, ¶¶89–90.

c. — Limitation 13[b]

Claim 13 continues by reciting “*a policy database storing a plurality of assessment policies, wherein each assessment policy includes at least one rule of the plurality of rules.*” Alperovitch discloses, teaches, or suggests Limitation 13[b] for the same reasons discussed above for Limitation 1[b]. *See supra* § V.B.1.c; Ex. 1003, ¶¶91–92.

d. — Limitation 13[c]

Claim 13 continues by reciting “*a runtime monitor including a processing device.*” Alperovitch discloses, teaches, or suggests this limitation. In Alperovitch, the reputation engine, which has or is executed by a processor and thus is a processing device, *inter alia*, calculates reputation scores, and together with an agent on the mobile device work ~~as a runtime monitor including a processing device.~~ “[P]rocessor 36 and memory 38 may be provisioned on reputation engine 20 to facilitate calculation of mobile application reputations.” Ex. 1004, [0045]; *see id.*, [0051] (“Reputation engine 20 may calculate a reputation score for application 22 in step 62. Calculation may be performed by any suitable means.”). Ex. 1003, ¶93.

~~In addition, “[m]obile device 14 may be provisioned with agent 24 that tracks applications 22 and applicable policies 25. In an example embodiment, agent 24 may include event detection capabilities, communication interfaces, policy manager, etc. In another example embodiment, agent 24 may include software capable of communicating with reputation engine 20 and carrying out instructions from policy managers, event detection components, etc. Agent 24 may be configured to receive queries or information from reputation engine 20.”~~ Ex. 1004, [0040]; *see also id.*, [0014] (“Agents 24a-c may monitor behavior and activities of any one or more mobile applications (e.g., 22a-c) on respective mobile devices 14a-c.”). Moreover, “agent 24 on mobile device 14 may monitor the application behavior and communicate it to real-time data capture module 40 in reputation engine 20.” *Id.*, [0054]. A POSITA would have understood that an agent on the mobile device that is tracking and monitoring behavior and activities of applications on the mobile device is providing runtime monitoring because it is keeping up-to-date with runtime changes on the mobile device. Ex. 1003, ¶94.

~~e.——Limitation 13[d]~~

~~Claim 13 continues by reciting “identifying, using at least one assessment policy, a runtime risk for an application program that executes on a device, wherein the identified runtime risk indicates a risk or threat of the identified action sequence of the application.” Alperovitch discloses, teaches, or suggests~~

~~Limitation 13[d] for the same reasons discussed above for Limitation 1[c]. See supra § V.B.1.d; Ex. 1003, ¶¶96-97.~~

~~f. — Limitation 13[e]~~

~~Claim 13 continues by reciting “*identifying a behavior score for the application program that executes on the device based on the identified runtime risk.*” Alperovitch discloses, teaches, or suggests Limitation 13[e] for the same reasons discussed above for Limitation 1[d]. See supra § V.B.1.e; Ex. 1003, ¶¶78, 98.~~

~~g. — Limitation 13[f]~~

~~Claim 13 continues by reciting “*the action sequence is a sequence of at least two performed actions.*” Alperovitch discloses, teaches, or suggests Limitation 13[f] for the same reasons discussed above for Limitation 1[e]. See supra § V.B.1.f; Ex. 1003, ¶¶100-101.~~

~~h. — Limitation 13[g]~~

~~Claim 13 continues by reciting “*each performed action is at least one of: a user action, an application action, and a system action.*” Alperovitch discloses, teaches, or suggests Limitation 13[g] for the same reasons discussed above for Limitation 1[f]. See supra § V.B.1.g; Ex. 1003, ¶¶102-103.~~

~~5. — Claim 14~~

~~Claim 14 depends on claim 13 and further recites: “*wherein the user action is any form of explicit input from a user of a computing system.*” Alperovitch~~

~~discloses, teaches, or suggests claim 14 for the same reasons discussed above for claim 2. See supra § V.B.2; Ex. 1003, ¶¶105–108.~~

~~6. Claim 15~~

~~Claim 15 depends on claim 13 and further recites: “wherein the application action is any activity performed by the application initiated programmatically by a task in execution of a computing system.” Alperovitch discloses, teaches, or suggests claim 15 for the same reasons discussed above for claim 3. See supra § V.B.3; Ex. 1003, ¶¶109–111.~~

~~7. Claim 16~~

~~Claim 16 depends on claim 13 and further recites: “wherein the system action is any operation performed by a computing system on behalf of, or as a consequence of, a user action or application action that changes the state of the computing system.” Alperovitch discloses, teaches, or suggests claim 16 for the same reasons discussed above for claim 4. See supra § V.B.4; Ex. 1003, ¶¶112–114.~~

~~8. Claim 17~~

~~Claim 17 depends on claim 13 and further recites: “wherein a first action of the at least two performed actions is performed at a first time, and the second action of the at least two performed actions is performed at a second time.” Alperovitch discloses, teaches, or suggests claim 17 for the same reasons discussed above for claim 5. See supra § V.B.5; Ex. 1003, ¶¶115–117.~~

~~9.—Claim 18~~

~~a.—Limitation 18[a]~~

~~Claim 18 depends on claim 17 and further recites: “wherein the first action is a user action.” Alperovitch discloses, teaches, or suggests Limitation 18[a] for the same reasons discussed above for Limitation 6[a]. See supra § V.B.6.a; Ex. 1003, ¶¶119–120.~~

~~b.—Limitation 18[b]~~

~~Claim 18 continues by reciting “the second action is a system action.” Alperovitch discloses, teaches, or suggests Limitation 18[b] for the same reasons discussed above for Limitation 6[b]. See supra § V.B.6.b; Ex. 1003, ¶¶121–122.~~

~~c.—Limitation 18[c]~~

~~Claim 18 continues by reciting “the second time occurs after the first time.” Alperovitch discloses, teaches, or suggests Limitation 18[c] for the same reasons discussed above for Limitation 6[c]. See supra § V.B.6.c; Ex. 1003, ¶¶123–124.~~

~~10.—Claim 19~~

~~a.—Limitation 19[a]~~

~~Claim 19 depends on claim 17 and further recites: “wherein the first action is a user action.” Alperovitch discloses, teaches, or suggests Limitation 19[a] for the same reasons discussed above for Limitation 6[a]. See supra § V.B.6.a; Ex. 1003, ¶¶127–128.~~

~~b.——Limitation 19[b]~~

~~Claim 19 continues by reciting “the second action is an application action.”~~
~~Alperovitch discloses, teaches, or suggests Limitation 19[b] for the same reasons~~
~~discussed above for Limitation 7[b]. See supra § V.B.7.b; Ex. 1003, ¶¶129–130.~~

~~c.——Limitation 19[c]~~

~~Claim 19 continues by reciting “the second time occurs after the first time.”~~
~~Alperovitch discloses, teaches, or suggests Limitation 19[c] for the same reasons~~
~~discussed above for Limitation 7[c]. See supra § V.B.7.c; Ex. 1003, ¶¶131–132.~~

~~11.——Claim 20~~

~~a.——Limitation 20[a]~~

~~Claim 20 depends on claim 17 and further recites: “wherein the first action~~
~~is an application action.” Alperovitch discloses, teaches, or suggests Limitation~~
~~20[a] for the same reasons discussed above for Limitation 8[a]. See supra §~~
~~V.B.8.a; Ex. 1003, ¶¶135–136.~~

~~b.——Limitation 20[b]~~

~~Claim 20 continues by reciting “the second action is a system action.”~~
~~Alperovitch discloses, teaches, or suggests Limitation 20[b] for the same reasons~~
~~discussed above for Limitation 6[b]. See supra § V.B.6.b; Ex. 1003, ¶¶137–138.~~

~~c.——Limitation 20[c]~~

~~Claim 20 continues by reciting “the second time occurs after the first time.” Alperovitch discloses, teaches, or suggests Limitation 20[c] for the same reasons discussed above for Limitation 8[c]. See supra § V.B.8.c; Ex. 1003, ¶¶139–140.~~

~~12.——Claim 21~~

~~a.——Limitation 21[a]~~

~~Claim 21 depends on claim 13 and further recites: “wherein the action sequence includes three performed actions.” Alperovitch discloses, teaches, or suggests Limitation 21[a] for the same reasons discussed above for Limitation 9[a]. See supra § V.B.9.a; Ex. 1003, ¶¶143–144.~~

~~b.——Limitation 21[b]~~

~~Claim 21 continues by reciting “a first action of the three performed actions is a user action.” Alperovitch discloses, teaches, or suggests Limitation 21[b] for the same reasons discussed above for Limitation 9[b]. See supra § V.B.9.b; Ex. 1003, ¶¶145–146.~~

~~c.——Limitation 21[c]~~

~~Claim 21 continues by reciting “a second action of the three performed actions is an application action.” Alperovitch discloses, teaches, or suggests Limitation 21[c] for the same reasons discussed above for Limitation 9[c]. See supra § V.B.9.c; Ex. 1003, ¶¶147–148.~~

~~d.——Limitation 21[d]~~

~~Claim 21 continues by reciting “a third action of the three performed actions is a system action.” Alperovitch discloses, teaches, or suggests Limitation 21[d] for the same reasons discussed above for Limitation 9[d]. See supra § V.B.9.d; Ex. 1003, ¶¶149–150.~~

~~e.——Limitation 21[e]~~

~~Claim 21 continues by reciting “the second action is performed temporally after the first action.” Alperovitch discloses, teaches, or suggests Limitation 21[e] for the same reasons discussed above for Limitation 9[e]. See supra § V.B.9.e; Ex. 1003, ¶¶151–152.~~

~~f.——Limitation 21[f]~~

~~Claim 21 continues by reciting “the third action is performed temporally after the second action.” Alperovitch discloses, teaches, or suggests Limitation 21[f] for the same reasons discussed above for Limitation 9[f]. See supra § V.B.9.f; Ex. 1003, ¶¶153–154.~~

~~13.——Claim 22~~

~~Claim 22 depends on claim 13 and further recites: “wherein the runtime risk is identified based on matching rules and probabilistic weights and scores of performed actions on the device.” Alperovitch discloses, teaches, or suggests claim 22 for the same reasons discussed above for claim 10. See supra § V.B.10; Ex. 1003, ¶¶156–158.~~

~~14.—Claim 23~~

~~Claim 23 depends on claim 13 and further recites: “wherein the runtime risk is identified based on time proximity of the at least two performed actions of the action sequence and natural affinity inferred between the at least two performed actions.” Alperovitch discloses, teaches, or suggests claim 23 for the same reasons discussed above for claim 11. See supra § V.B.11; Ex. 1003, ¶¶159–161.~~

~~15.—Claim 24~~

~~a.—Limitation 24[a]~~

~~Claim 24 depends on claim 13 and further recites: “wherein the processing device assesses that the at least two performed actions of the action sequence describe a that the forensic chain of events is based on a plurality of factors.” Alperovitch discloses, teaches, or suggests Limitation 24[a] for the same reasons discussed above for Limitation 12[a]. See supra § V.B.12.a; Ex. 1003, ¶¶163–164.~~

~~b.—Limitation 24[b]~~

~~63.169. Claim 24 continues by reciting “the plurality of factors that includes at least one of: ordered sequences, unordered sequences, proximity analysis, outliers, probabilistic weights and scores, and probable action inferences based on an application's competency.” Alperovitch discloses, teaches, or suggests Limitation 24[b] for the same reasons discussed above for Limitation 12[b]. See supra § V.B.12.b; Ex. 1003, ¶¶165–169.~~

170. Thus, Alperovitch in view of the knowledge of a POSITA would have rendered claims 12 and 24 obvious.

B. Grounds 2-4: Claims 1-24 ~~Are Rendered~~Would Have Been Obvious ~~by~~Over Alperovitch in View of Yeh (Ground 2), Alperovitch in View of Chien (Ground 3), and Alperovitch in View of Yeh and Chien (Ground 4)

64.171. ~~Ground 1 asserts that all the limitations of claims 1-24 of the '517 patent are rendered obvious by Alperovitch in view of the knowledge of a POSITA for the reasons discussed above. Alternative Grounds 2-4 assert that if~~If it is found that Ground 1 would not have rendered the limitations discussed below obvious, then Alperovitch in view of Yeh, Alperovitch in view of Chien, and Alperovitch in view of Yeh and Chien, respectively, (Grounds 2-4), would have rendered those limitations obvious, as discussed below. Other than the limitations discussed below, all the other limitations of claims 1-24 would have been rendered obvious for the same reasons discussed in Ground 1 above. ~~Ex. 1003, ¶171.~~

1. Independent Claims 1 and 13

a. Claim 1

~~e. Limitation 1[a]~~

~~i. Limitation 1[a] recites “storing, in a rules database, a plurality of rules, wherein each rule identifies an action sequence.”~~

As explained above, ~~in Ground 1 (see supra § VII.A.1.a.ii),~~ Alperovitch discloses, teaches, or suggests this limitation. ~~See supra § V.B.1.b; Ex. 1003,~~

~~65-172. ¶172.~~ of claim 1. To the extent Alperovitch is found not to disclose, teach, or suggest this limitation, Alperovitch in view of Yeh would have rendered this limitation obvious (Grounds 2 and 4). Yeh explicitly discloses a rules database for storing a plurality of rules. “Also included within each user computer as part of the monitoring agent (or separately) is a rules database 130. Database 130 includes rules that have been downloaded from the central computer 20 and describe behaviors of the user computer that are allowed and those behaviors that are not allowed.” Ex. 1005, 6:40-45; *see also id.*, 5:47-51, 6:61-64. A POSITA would have found it obvious to store rules that describe behaviors of the user computer, ~~such~~ which would be the same as rules describing the application behaviors taught in Alperovitch, in a database, ~~whether.~~ These rules could be stored in a rules database as taught in Yeh or an application manifest database as taught in Alperovitch. ~~Ex.~~

~~1003, ¶172.~~

~~66.~~173. A POSITA would have been motivated to combine ~~Yeh's~~the rules database taught in Yeh in Alperovitch because both Alperovitch and Yeh are directed to determining whether activity on a computing device is malicious ~~(see.~~ See Ex. 1004,

[0010] (“determin[ing] one or more trustworthiness indicators, and calculating a reputation score based on the one or more trustworthiness indicators” of a mobile application); Ex. 1005, 2:4-7 (“anomaly monitoring software on the user computer detects activities that, while not malware, are suspect. These activities are compared against a rules database on the user computer.”). Both Alperovitch and Yeh accomplish this by having agents monitor whether certain behaviors on the computing device are suspicious (~~see. See~~ Ex. 1004, [0014] (“Agents 24a-c may monitor behavior and activities of any one or more mobile applications (e.g., 22a- c) on respective mobile devices 14a-c.”); Ex. 1005, 6:22-24 (“Also included on computer 14 is monitoring agent software 128 that has the ability to monitor processes, registry keys, system alerts, etc.”); ~~Ex. 1003, ¶173.~~).

~~67.174.~~ ~~Further,~~ In addition, as disclosed in Alperovitch ~~discloses,~~ an application manifest database ~~that~~ aggregates application behaviors of a mobile device for use in determining the reputation score of an application. Ex. 1004, [0055]. ~~A POSITA~~ would have ~~been~~ found it obvious ~~to a POSITA~~ to include rules stored in a rules database as disclosed in Yeh as part of the application manifest database in Alperovitch because the rules in Yeh describe whether behaviors are allowed or not, and ~~Alperovitch's~~ Alperovitch's application manifest database already has behaviors that are monitored. ~~id.~~, [0054]; *see also* Ex. 1005, 6:40-45; ~~Ex. 1003,~~ ~~¶174.~~ It would have been a known technique to have and keep rules about application behaviors that are monitored in a database

because Alperovitch already discloses that it determines whether certain behaviors are allowed or not (Ex. 1004, [0013]), and keeping information such as rules about application behaviors in a database was a known method that would have yielded predictable results, with a reasonable expectation of success. ~~Ex. 1003, ¶174.~~

~~Indeed,~~As Alperovitch discloses~~that,~~ the use of databases to store information was well-known. Ex. 1004, [0065] ~~“(“The information being tracked, sent, received, or stored in system 10 could be provided in any database.”); Ex. 1003,~~ ~~¶174.”).~~

Furthermore, to the extent that ~~Alperovitch’s~~Alperovitch’s application behaviors are found not to teach, disclose, or suggest ~~“an action sequence,”~~ Alperovitch in view of Chien would have rendered this limitation obvious (Grounds 3 and 4).

Chien explicitly discloses behavior lists that identify an action sequence—~~“,~~ which is “a sequence of at least two performed actions.” Chien discloses that ~~“a~~ behavior list is a sequence or stream of events.”” (i.e., a sequence of at least two performed actions). Ex. 1006, 3:62-65; *see also id.*, 4:8-13; ~~Ex. 1003, ¶175.~~

~~68.175.~~ As disclosed in Alperovitch~~discloses that “,~~ application behavior (e.g., requests for resources and application actions) may be monitored.”” Ex. 1004, [0054]. ~~#~~Therefore, it would have been obvious to a POSITA that a sequence of at least two performed actions (e.g., a sequence of requests for resources and application actions in Alperovitch) may be monitored ~~based on~~

~~Chien's~~ by using Chien's teaching of ~~using~~ a behavior list, which identifies a sequence or stream of events. ~~Ex. 1003, ¶175.~~

A ~~POSITA~~POSTTA would have been motivated to combine ~~Chien's~~Chien's teachings of behavior lists with the teachings of Alperovitch because both Alperovitch and Chien are directed to analyzing whether software is malicious or can be trusted. Ex. 1004, [0010] ~~("determin[ing] one or more trustworthiness indicators, and calculating a reputation score based on the one or more trustworthiness indicators"~~ of a mobile application); Ex. 1006, 1:57-59 (a ~~"behavior list is then used, together with data in a malware behavior database, to derive a policy for use in a malware prevention system."~~; ~~Ex. 1003, ¶176. They. "). Both Alperovitch and Chien~~ do so by provisioning policies to protect users from undesirable malicious software. Ex. 1004, [0046] ~~("mobile device 14 may be provisioned with a policy that applications on a network accessing pictures on mobile device 14 are not allowed to run"; "~~); Ex. 1006, 4:13-14 ~~("behavior lists are provided so that they may be used to derive or extract policy"~~ for use in a malware detection system); ~~Ex.~~

~~69.176.~~ ~~1003, ¶176. Moreover, both).~~ Both Alperovitch and Chien also perform this analysis based on collected data. Ex. 1004, [0055] ~~“(“reputation engine 20 may analyze the application behavior with other stored data (e.g., previously stored data crowdsourced from a plurality of sources) in application manifest database 32”);~~ Ex. 1006, 2:6-8 ~~“(“The computer system also has a memory that may contain a malware behavior database that stores malware samples and results from parsing the samples for analysis.”); Ex. 1003, ¶176.”).~~

~~70.177.~~ Further, ~~the combination~~ combining Alperovitch and Chien would be a simple matter.

Alperovitch already teaches a sequence of performed actions, such as "access to files and pictures stored on the mobile device" or "turning on the mobile device microphone and camera." Ex. 1004, [0054]; ~~Ex. 1003, ¶177. It].~~ Therefore, it would have, thus, been a simple and obvious modification to group the application behaviors taught in Alperovitch into a sequence of at least two performed actions by using Chien's Chien's teaching of behavior lists, which are "a sequence or stream of events." Ex. 1006, 3:63-65; Chien discloses that "[g]enerally, it is difficult to characterize malicious behavior by examining one event." Ex. 1006, 1:29-30. ~~1003,~~ Thus, it was already understood by a POSITA as of the priority date of the '517 patent that examining a sequence of multiple events is a better way of characterizing malicious behavior.

~~¶177. As Chien discloses, "[g]enerally, it is difficult to characterize malicious behavior by examining one event."~~ Ex. ~~This~~ 1006, 1:29-30. ~~Thus, examining a sequence of multiple events~~ was a known method for detecting malicious behavior that would have yielded predictable results, with a reasonable expectation of success. ~~Ex. 1003, ¶177. Indeed,~~ In fact, this known method was already disclosed in Alperovitch already discloses, where it teaches assessing mobile application risks by examining a sequence of multiple events. Ex. 1004, [0013] ("a mobile application that automatically, and without authorization, turns on a camera and a

microphone (or other recording device) of a mobile device may be deemed to be malicious.").

mobile application that automatically, and without authorization, turns on a camera and a microphone (or other recording device) of a mobile device may be deemed to be malicious.”). Ex. 1003, ¶177.

d. — Limitation 1[e]

ii. Limitation 1[e] recites “the action sequence is a sequence of at least two performed actions.” As explained above for Limitation 1[a], to

71.178. To the extent Alperovitch is found not to render this limitation obvious, Alperovitch in view of Chien would have rendered that the action sequence is a sequence of at least two performed actions obvious (Grounds 3 and 4). See supra § V.C.1.a; Ex. 1003,) for the same reasons explained above in §

VII.B.1.a.i.

¶178.

b. Claim 13

b.a. "Claim 13

e. — Limitation 13[a]

i. Limitation 13[a] recites “a rules database storing a plurality of rules, wherein each rule identifies an action sequence.”

72.179. Grounds 2-4 would have rendered Limitation this limitation of claim 13[a] obvious for the same reasons discussed above for Limitation the similar limitation of claim 1[a]. See supra § V.C.VII.B.1.a; Ex. 1003, ¶¶179-180.i.

~~f. — Limitation 13[f]~~

~~180. Limitation 13[f] recites “Thus, Grounds 2-4 would have rendered obvious a rules database storing a plurality of rules, wherein each rule identifies an action sequence.~~

~~ii. “the action sequence is a sequence of at least two performed actions.” —~~

~~73-181. Alperovitch in view of Chien would have rendered Limitation 13[f] obvious for the same reasons discussed above for Limitation 1[e] (Grounds 3 and 4) would have rendered this limitation of claim 13 obvious for the same reasons discussed above for the similar limitation of claim 1. See supra § VII.B.1.a.ii.~~

~~and 4). See supra § V.C.1.b; Ex. 1003, ¶¶ 181-182.~~

~~182. Thus, Alperovitch in view of Chien would have rendered obvious the action sequence is a sequence of at least two performed actions.~~

C. No Secondary Considerations Exist

~~Petitioner is~~ I am unaware of any secondary ~~indicia~~considerations of ~~non-obviousness~~nonobviousness, and I understand no such ~~indicia~~considerations were alleged during prosecution. ~~Petitioner reserves~~I reserve the right to ~~respond to~~rebut any ~~assertion of~~alleged secondary ~~indicia of non-obviousness advanced by~~considerations that Patent Owner.

~~V. The Parallel District Court Proceeding Does Not Warrant a Discretionary Denial~~

~~Under the Director's interim procedure for evaluating requests for discretionary denial under 35 U.S.C. § 314(a), regardless of any factors that otherwise apply, "the PTAB will not discretionarily deny institution of an IPR or PGR in view of parallel district court litigation where a petitioner stipulates not to pursue in a parallel district court proceeding the same grounds as in the petition or any grounds that could have reasonably been raised in the petition." Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation, 7 (USPTO Dir. June 21, 2022).~~

~~Petitioner stipulates that, should the Board institute review, Petitioner will not pursue in parallel district court proceedings the same grounds as in the Petition or any grounds that could have reasonably been raised in the petition. Thus, the Board should not exercise discretion to deny institution under § 314(a).~~

~~VI. Mandatory Notices~~

~~A. Real Parties in Interest~~

~~Petitioner is the real party in interest. No other party had access to or control over the present Petition, and no other party funded or participated in preparation of the present Petition.~~

~~B. Related Proceedings~~

~~No previous IPR or post-granting proceeding has been filed challenging the '517 patent. The '517 patent has been asserted by Patent Owner in the following district court litigations: *Taasera Licensing LLC v. Trend Micro Inc.*, No. 2-21-cv-00441 (E.D. Tex.); *Taasera Licensing LLC v. Palo Alto Networks, Inc.*, No. 2-22-cv-00062 (E.D. Tex.); *Trend Micro Inc. v. Taasera Licensing LLC*, No. 3-22-cv-00477 (N.D. Tex.); *Trend Micro, Inc. v. Taasera Licensing LLC*, No. 3-22-cv-00518 (N.D. Tex.); *Palo Alto Networks, Inc. v. Taasera Licensing LLC*, No. 1-22-cv-02306 (S.D.N.Y.); *In re: Taasera Licensing LLC Patent Litig.*, No. 2-22-md-03042 (E.D. Tex.); *Trend Micro Inc v. Taasera Licensing LLC*, No. 2-22-cv-00303 (E.D. Tex.); *Palo Alto Networks, Inc. v. Taasera Licensing LLC*, No. 2-22-cv-00314 (E.D. Tex.); *Taasera Licensing LLC v. Musarubra US, LLC*, No. 2-22-cv-00427 (E.D. Tex.); *Taasera Licensing LLC v. CrowdStrike, Inc.*, No. 6-22-cv-01094 (W.D. Tex.); *Taasera Licensing LLC v. CrowdStrike, Inc.*, No. 2-22-cv-00468 (E.D. Tex.).~~

~~C. Lead and Backup Counsel~~

~~Petitioner's lead and backup counsel are:~~

Lead Counsel for Petitioner	Backup Counsel for Petitioner
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~~D. — Electronic Service~~

~~Petitioner consents to electronic service at:~~

~~Winston-PAN-Taasera@winston.com.~~

~~VII. — Fees~~

~~74.183. All fees Owner's expert declarant may be charged to Deposit Account No. 50-1814 assert during any instituted *inter partes* review.~~

~~VIII. Conclusion~~

~~Petitioner respectfully requests that the Board institute IPR and enter a final written decision finding the Challenged Claims of the '517 patent unpatentable.~~

~~Dated: March 10, 2023~~

~~Respectfully submitted,~~

~~/ Juan C. Yaquian /~~

~~Juan C. Yaquian~~

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~~Counsel for Petitioner~~

CERTIFICATE OF COMPLIANCE

~~This Petition complies with the word count limits set forth in 37 C.F.R. § 42.24(a)(1)(i), because this Petition contains 13,939 words, excluding the parts of the Petition exempted by 37 C.F.R. § 42.24(a)(1), determined using the word count provided by Microsoft Word, which was used to prepare this Petition.~~

~~Dated: March 10, 2023~~ _____ Respectfully submitted,

~~/Juan C. Yaquian/
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CERTIFICATE OF SERVICE

~~Under 37 C.F.R. §§ 42.6(e) and 42.105(a), this is to certify that on March 10, 2023, I caused to be served a true and correct copy of the foregoing “**PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 8,850,517**” and Exhibits 1001-1006 by Federal Express on the Patent Owner at the correspondence address of record for U.S. Patent No. 8,850,517:~~

~~BUCHANAN, INGERSOLL & ROONEY PC
1737 KING STREET
SUITE 500
ALEXANDRIA, VA 22314-2727~~

~~A courtesy copy of this Petition and supporting material was also served on litigation counsel for Patent Owner via email:~~

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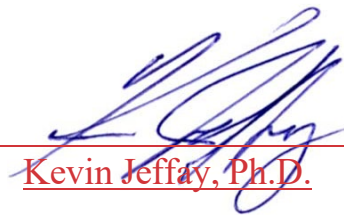
184. USPTO Reg. No. 70,755 In sum, for the reasons I have discussed above,
it is my opinion that claims 1-24 of the '517 patent are unpatentable because
they would have been obvious to a POSITA over the prior art references cited

above.

185. I understand that this Declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also understand that I may be subject to cross-examination concerning this Declaration, and I will appear for cross-examination, if required of me, during the time allotted for cross-examination.

186. I hereby declare that all of the statements made herein are true of my own knowledge and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: March 10, 2023



Kevin Jeffay, Ph.D.