IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Bechtolsheim & Cheriton
U.S. Patent No.: 7,023,853
Issue Date: Apr. 5, 2006
Appl. Serial No.: 10/087,342
Filing Date: Mar. 1, 2002
Title: ACCESS CONTROL LIST PROCESSING IN HARDWARE

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PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT
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| ARISTA-1003 | Declaration of H. Jonathan Chao, Ph.D. |
| ARISTA-1004 | Curriculum Vitae of H. Jonathan Chao, Ph.D. |
| ARISTA-1005 | [RESERVED] |
| ARISTA-1006 | [RESERVED] |
| ARISTA-1007 | U.S. Patent No. 6,081,522 ("Hendel") |
| ARISTA-1008 | U.S. Patent No. 5,938,736 ("Muller") |
| ARISTA-1009 | U.S. Patent No. 3,602,899 ("Lindquist") |
| ARISTA-1010 | Tong-Bi Pei et al., *VLSI Implementation of Routing Tables: Tries and CAMs* (IEEE 1991) ("Pei") |
| ARISTA-1013 | L. Chisvin et al., *Content-Addressable and Associative Memory: Alternatives to the Ubiquitous RAM* (IEEE 1989) ("Chisvin") |
ARISTA-1016       M. Ranum, *A Network Firewall* (Digital Equipment Corporation June 12, 1992)
ARISTA-1017       U.S. Patent No. 5,841,874 ("Kempke")
ARISTA-1019       U.S. Patent No. 5,867,495 ("Elliott")
ARISTA-1020       Cisco Claim Construction Proposals
ARISTA-1021       ITC Staff Claim Construction Proposals

I. MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1)

A. Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1)

Arista is the real party-in-interest.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)


C. Lead And Back-Up Counsel and Service Information

Petitioner designates W. Karl Renner, Reg. No. 41,265, as Lead Counsel, and Kevin E. Greene, Reg. No. 46,031, as Backup Counsel, both available at 3200 RBC Plaza, 60 South Sixth Street, Minneapolis, MN 55402 (T: 202-783-5070; F: 202-783-2331), or electronically by email at IPR40963-0004IP1@fr.com.
II. PAYMENT OF FEES — 37 C.F.R. § 42.103

Petitioner authorizes the Patent and Trademark Office to charge Deposit Account No. 06-1050 for the fee set in 37 C.F.R. § 42.15(a) for this Petition and further authorizes for any additional fees to be charged to this Deposit Account.

III. REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104

A. Grounds for Standing Under § 42.104(a)

Petitioner certifies that the ’853 Patent is available for IPR. The petition is being filed within one year of service on Petitioner of a complaint alleging infringement of the Patent. Petitioner is not barred or estopped from requesting this review on the below-identified grounds.1

B. Challenge Under § 42.104(b) and Relief Requested

Petitioner requests IPR of the Challenged Claims on the grounds set forth in the table below, and requests that the Challenged Claims be found unpatentable. An explanation of unpatentability is provided, indicating where each element is found in the prior art. Additional explanation and support for each ground is set forth in Ex. 1003, Declaration of H. Jonathan Chao, Ph.D.


Hendel (Ex. 1007), Muller (Ex. 1008), and Elliott (Ex. 1019) are prior art under 35 U.S.C. § 102(e). Hendel was filed on June 30, 1997, Muller was filed on June 30, 1997, and Elliott was filed on November 18, 1996.

IV. SUMMARY OF THE ’853 PATENT

A. Brief Description

The ’853 Patent describes techniques for enforcing access control for a computer network using a content-addressable memory (CAM). Ex. 1001, at (57). Specifically, information from an incoming packet is matched against certain access control information stored in the CAM. Id. Due to the parallel nature of searching a CAM, all access control information is searched at once. The access control information includes a priority value, either inherently based on its location in the CAM, or as a separate, discrete value. When a search is performed, matches are analyzed according to their priority, and an access control result is generated.
This access control result is then used to make a decision for routing the packet.

*Id.; see also id. 10:47–65 (claim 46); see generally Ex. 1003, ¶¶ 33–42.*

**B. Level of Ordinary Skill in the Art as of the Filing Date**

A person of ordinary skill in the art as of the Filing Date of the ’853 Patent would have had at least a master’s degree (or a substantively equivalent degree) in electrical engineering, computer engineering, or computer science (or a substantively related field), in addition to two years of post-graduate work experience, whether in industry or conducting research, in the field of networking. Additional relevant education, such as computer science, computer engineering, or electrical engineering, or industry experience may compensate for a deficit in one of the other aspects of the requirements. Ex. 1003, ¶¶ 23–25.

**V. CLAIM CONSTRUCTION**

A claim subject to IPR is given its “broadest reasonable construction in light of the specification of the patent in which it appears.” 37 C.F.R. § 42.100(b). For
this proceeding only, Petitioner submits constructions for the following terms.\(^2\) All remaining terms should be given their broadest reasonable plain meaning.\(^3\)

The ’853 Patent is a continuation of the ’577 Patent, addressed in a separate petition. The patents share essentially identical detailed descriptions. Claim 46 of

\(^2\) In several instances, the constructions set forth herein derive from positions taken by Cisco in its efforts to assert the ’853 Patent. Petitioner does not necessarily accept that such constructions are either reasonable or correct in view of the ’853 Patent, its file history, and the relevant extrinsic evidence. Petitioner expressly reserves the right to demonstrate, in an appropriate forum outside of this proceeding, that Cisco’s claim interpretations are neither reasonable nor correct.

\(^3\) Petitioner’s proposals are for the sole purpose of determining whether the prior art anticipates or renders obvious the Challenged Claims. Petitioner does not concede that any claim meets statutory standards for patent claiming. Petitioner reserves all rights to contend that Challenged Claims are invalid for reasons out of scope for IPR, including but not limited to lack of definiteness under § 112, ¶ 2 and lack of written description under § 112, ¶ 1. Definiteness and description problems in the claims are no bar to IPR, and may be set aside to permit review under §§ 102 and 103. \textit{E.g.}, \textit{Vibrant Media, Inc. v. Gen’l Elec. Co.}, IPR2013-00172, 2014 WL 3749773, at *6–7 (Patent Tr. & App. Bd. July 28, 2014).
the ’853 is identical to method claim 1 of the ’577 Patent, but is written in means-
plus-function form. Similarly, many of the ’853 Patent dependent claims track
dependent claims from the ’577 Patent. Compare, e.g., ’853 claims 47, 48, 49, 50,
and 51 with ’577 claims 10, 13, 14, 15, and 19 respectively.

A. Terms Claimed Structurally

A-1. “access control”

“Access control” appears throughout the specification and claims of the ’853
Patent. A person of skill in the art would have understood “access control” to
encompass restrictions or modifications of the transmission of a packet. According
to the patent, the restriction of the transmission of messages is one form of “access
control.” Ex. 1001, 1:14-20. The patent also identifies as “access control”
modifications of the routing decision: “The invention [which includes access
control, as it appears in each and every claim] can be used to augment or override
routing decisions otherwise made by the router, so as to implement QOS (quality
of service), and other administrative policies, using the [CAM].” Ex. 1001, 6:33–
35 (emphasis added). A person of ordinary skill would further appreciate that the
term “access control” in the field has broad applicability concerning restriction or
modification of packet transmission and its use in the ’853 Patent includes
concepts such as filtering, firewalls, security, identification of allowed ports,
denying access, and many other similar actions. See also Ex. 1003, ¶¶ 44–45.
Accordingly, one of ordinary skill at the time of the ’853 Patent would have understood “access control” to be broad enough to include “restrictions or modifications of the transmission of a packet.”

A-2. **“associative memory”**

The ’853 Patent claims recite “associative memory.” An associative memory is a memory that stores and searches on values, like a database, rather than on memory locations as in traditional memory. Ex. 1003, ¶ 34. The specification teaches a specific type of associative memory implemented in hardware known as “CAM” (content-addressable memory), configured such that a search of the CAM’s entries will search every entry at once. *Id.* In the Abstract, the ’853 Patent states:

> A sequence of access control specifiers from an ACL are **recorded in a CAM**, and information from the packet header is used to attempt to match selected source and destination IP addresses or subnets, ports, and protocols, against all the ACL specifiers at once.

Ex. 1001, at (57) (emphasis added); *see also id.* 4:54–56 (defining “CAM” to mean “content-addressable memory”). Further, the summary of invention teaches storing access control information in a content-addressable memory. *Id.* 2:30–31, 2:46–49, 4:54–64. In short, the ’853 Patent makes clear that the “associative memory” is a content-addressable memory; every disclosure is consistent with that, and there is no contrary disclosure.
Further, a person of skill in the art would have understood that the patent phrase “associative memory” meant a content-addressable memory. Ex. 1003, ¶¶ 46–47. For purposes of this proceeding, the term “associative memory” should be construed broadly enough to include a “content-addressable memory (CAM).”

A-3. “packet label”

The ’853 Patent describes the “packet label” as a “collection” of “a set of selected elements of a packet header 133 for each packet.” Ex. 1001, 4:19–21. Alternatively, the patent otherwise describes a packet label as “any collection of information derived from the packet (preferably from the packet header) used for access control.” Id. 4:28–31. The patent is replete with references to the “packet header,” and these references are consistent. E.g., id. at (57), 5:21–55, 6:56–62, fig.2 (depicting “packet header 133”), fig.3 (depicting step 322, “identify header,” and 323, “select label”), and accompanying text. In light of this disclosure, a person of ordinary skill in the art would conclude that the broadest reasonable interpretation of “packet label” includes “information related to the packet, such as the packet header.” Ex. 1003, ¶¶ 48–49. Arista thus submits that, for purposes of this proceeding, the term “packet label” should be construed broadly enough to include “information related to the packet, such as the packet header.”
A-4. “responsive”

It is appropriate for the PTAB to interpret this term consistent with the interpretation implicit in Cisco’s assertion of the ’853 patent. In pending litigation before the International Trade Commission (ITC), Cisco has refused to positively define this term, but has made infringement allegations from which one can deduce Cisco’s claim interpretation. See Ex. 1003, ¶¶ 50–53; see also Ex. 1018 (setting forth Cisco’s ITC infringement allegations); Ex. 1020, at 8. Consistent with Cisco’s infringement allegations, the staff attorney from the ITC’s Office of Unfair Import Investigations has proposed that “responsive” be construed to mean “based on” or “derived from.” Ex. 1021, at 2-2. A proper application of the broadest reasonable interpretation standard should subsume the ITC staff attorney’s proposal, and thus, account for patentee Cisco’s infringement allegations. Arista thus submits that, for purposes of this proceeding only, “responsive” should be construed broadly enough to include “based on” and “derived from.”

B. Terms Claimed According to § 112, ¶ 6

Several terms of the claims for which IPR is sought recite claim terms in means-plus-function format, and § 112, ¶ 6 of the pre-AIA Patent Act applies.4

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4 The ’853 Patent’s filing date is before the effective date set for the AIA’s changes to § 112. America Invents Act, sec. 4(e), 125 Stat. 284, 297 (2011).
Net MoneyIN, Inc. v. VeriSign, Inc., 545 F.3d 1359, 1366 (Fed. Cir. 2008). For each means, the specific corresponding portions of the specification that describe the structure, material, or acts are identified below, consistent with 37 CFR 42.104(3).

A-5. “means for maintaining a set of access control patterns in at least one associative memory”

The term recites the function of “maintaining a set of access control patterns in at least one associative memory.” The ’853 Patent does not disclose sufficient structure for performing this function. Ex. 1003, ¶ 55.

Recognizing that issues of sufficiency in claiming under Section 112 are out of scope for IPR, it is appropriate for the PTAB to analyze the prior art for the presence of structures corresponding to the best available disclosure of the ’853 Patent, notwithstanding that such disclosure may be insufficient to support the claims. To enable such analysis, this petition treats the ’853 Patent’s disclosure of access control memory 210 in access control element 120 as corresponding structure for the sole purpose of evaluating anticipation and obviousness over the prior art.5 Ex. 1001, fig.1, fig.2, 4:54–56 (“The access control memory 210

5 The phrase “access control pattern” is not used in the description. It appears in only the claims. Petitioner recognizes that IPR is not an appropriate forum to
includes a CAM (content-addressable memory) having a sequence of access control specifiers 211.”); see also Ex. 1003, ¶ 55.

In related litigation asserting the ’853 Patent, Cisco has proposed as structure for this term’s elements that do not correspond to the required function:

A general-purpose processor program and data memory, and mass storage (’853 Patent, Fig. 1 “CPU”; 5:21–25), executing operating system software (’853 Patent, 5:21–25; 1:33–37) performing the steps of preparing and recording a set of access control patterns in at least one associative memory, including translating, optimizing, and/or storing such access control patterns in the memory (’853 Patent, Fig. 2; 4:54–63; 5:33–46; 5:55–6:20).

Ex. 1020, at 26–29.

Cisco’s proposal does not correctly identify structure corresponding to the recited function, and the PTAB should decline to apply it for purposes of IPR. The general purpose processor identified by Cisco does not, in the ’853 Patent, perform the function of “maintaining a set of access control patterns.” Rather, in the ’853 Patent, the CPU is a higher-level processor element that performs secondary software access control processing, ancillary to the access control of the invention, as directed by the access control result. Ex. 1001, 5:17–18, 5:21–30. The ’853 Patent does not clearly link the high-level processor in any way to the function of

address failure to comply with 35 U.S.C. § 112 and, therefore, reserves all rights to pursue indefiniteness and other infirmities under § 112 in an appropriate forum.
maintaining patterns in the content-addressable memory. As such, Cisco’s proposed corresponding structure for the given claim term is improper. Ex. 1003, ¶¶ 55–56.

A-6. “means for receiving a packet label responsible to a packet, said packet label being sufficient to perform access control processing for said packet”

The term recites the function of “receiving a packet label responsible to a packet.”6 To the extent the ’853 Patent discloses corresponding structure, that structure is packet input interface 201 in Figure 2. Ex. 1001, 4:43–44 (“The access control element 120 includes an input port 201 coupled to the packet label 200[.]”); see also Ex. 1003, ¶ 57. In related litigation asserting the ’853 Patent, Cisco has proposed the same corresponding structure for this limitation. Ex. 1020, at 29–30.

A-7. “means for matching matchable information, said matchable information being responsive to said packet label, with said set of access control patterns in parallel”7

The term recites the function of “matching matchable information, said

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6 The term “responsible” is nonsensical. Petitioner assumes that patentee meant to use the word “responsive,” given that it changed one instance of “responsible” to “responsive” in an amendment. See also Ex. 1003, ¶¶ 50–53.

7 “Matchable information” is not used in the ’853 Patent’s written description. It appears in only the claims. Petitioner recognizes that IPR is not an appropriate
matchable information being responsive to said packet label, with said set of access control patterns in parallel.” The ’853 Patent does not disclose sufficient structure for performing this function. Ex. 1003, ¶ 58. However, in related litigation asserting the ’853 Patent, Cisco has proposed that access control memory 210 provides the necessary structure. Ex. 1020, at 30–31. Recognizing that issues of sufficiency in claiming are out of scope for IPR, it is appropriate for the PTAB to apply Cisco’s proposal for purposes of evaluating anticipation and obviousness.

A-8. “means for generating a set of matches in response thereto, each said match having priority information associated therewith”

The term recites the function of “generating a set of matches in response to the matching of matchable information that is responsive to the packet label with said set of access control patterns, each said match having priority information associated therewith.” To the extent the ’853 Patent discloses corresponding structure, that structure is access control memory 210, which is the structure Cisco identified when construing this term in the related litigation involving the ’853 Patent. Ex. 1020, at 31–32.

In the specification, access control memory 210 “includes a CAM (content-addressable memory) having a sequence of access control specifiers.” Ex. 1001,
4:54–67. The specification describes comparing the packet label to the access control specifiers stored in the access control memory 210 and generating multiple matches with associated priority information. See id., 5:1–9, fig. 2. See also Ex. 1003, ¶¶ 59–60.

"means for selecting at least one of said matches in response to said priority information"

The term recites the function of “selecting at least one of said matches in response to said priority information.” To the extent the ’853 Patent discloses corresponding structure, that structure is priority encoder 220 (which is the structure Cisco identified when construing this term in the related litigation involving the ’853 Patent):

The priority encoder 220 selects the single access control specifier 211 with the highest priority (in a preferred embodiment, the one with the lowest address in the access control memory 210) and provides an indicator of that single access control specifier 211 to the output port 202. Ex. 1001, 5:4–10; Ex. 1020, at 32; see also Ex. 1003, ¶¶ 61–62.

"means for . . . generating an access result in response to said at least one selected match"

The term recites the function of “generating an access result in response to said at least one selected match.” The ’853 Patent does not disclose sufficient structure for performing this function. Ex. 1003, ¶ 63. However, in related litigation asserting the ’853 Patent, Cisco has proposed that priority encoder 220 of
the ’853 Patent provides the necessary structure. Ex. 1020, at 32. Recognizing that issues of sufficiency in claiming under Section 112 are out of scope for IPR, it is appropriate for the PTAB to apply Cisco’s proposal for purposes of evaluating anticipation and obviousness.

A-11. “means for making a routing decision in response to said access result”

The term recites the function of “making a routing decision in response to said access result.” The ’853 Patent does not disclose sufficient structure for performing this function. Although the specification teaches that output port 202 receives the “indicator” instructing whether the packet has permission to be forwarded to its destination, the output port is not a structure that makes a routing decision. Ex. 1001, 5:10–13. The output port is not described as making a routing decision, nor is there any structure described or shown between the output of the memory element and the port that could make such a decision. A person of ordinary skill, reviewing the ’853 Patent, would have understood that additional structure was required to make a routing decision in accordance with that indicator. Ex. 1003, ¶¶ 64–68. Nevertheless, the Petition identifies the identical function and related structure in the prior art.

In related litigation asserting the ’853 Patent, for this term, Cisco has proposed a structure that does not correspond to the required function. Cisco’s defective proposal of structure is:
(1) Output port (202) and/or (2) a general-purpose processor program and data memory, and mass storage ('853 Patent, Fig. 1 “CPU”; 5:21–25), executing operating system software ('853 Patent, 5:21–25; 1:33–38) performing at least the step of making a decision on whether and how to route a packet in response to said access result ('853 Patent, 5:25–30).

Ex. 1020, at 32–34.

Cisco’s proposal is not a reasonable identification of structure for the claimed means, and the PTAB should decline to apply it for purposes of IPR. As explained supra, output port 202 is not a structure that is able to make a routing decision. Further, the ’853 Patent’s limited disclosure concerning a general purpose processor does not describe that the processor performs the function of “making a routing decision in response to said access result.” In the ’853 Patent, the CPU is part of the higher-level processor element that performs software access control processing as directed by the access control result. Ex. 1001, 5:17–18 (“The packet 130 is forwarded to a ‘higher-level’ processor for further treatment.”), 5:21–30. Importantly, the higher-level processor does not implement routing in response to an access control result, but rather specifies whether the packet is to be dropped or forwarded to a selected output interface. Id. 5:27–30. Finally, the higher-level processor cannot be the core corresponding structure of the invention because it performs a software-based access control processing that the ’853 Patent describes as too slow and teaches away from. Id. (57) (teaching
access control processing “without need for software processing” in order to achieve wirespeed), 1:39–45 (noting that software access control processing is “slow”), 2:11–15. As such, Cisco’s identified corresponding structure is improper. Ex. 1003, ¶ 67.

A-12. “means for choosing a first one of said matches” (*claim 47*)

The term recites the function of “choosing a first one of said matches.” Corresponding structure for this term, to the extent any can be identified, is priority encoder 220, discussed *supra*, e.g., at A-9; *see also* Ex. 1003, ¶ 68. In related litigation asserting the ’853 Patent, Cisco has proposed the same corresponding structure for this limitation. Ex. 1020, at 34–35.

A-13. “means for determining an output interface for said packet” (*claim 48*) and “means for determining at least one output interface for said packet” (*claim 52*)

These terms recite the functions of “determining an output interface for said packet” and “determining at least one output interface for said packet,” respectively. To the extent the ’853 Patent discloses corresponding structure, that structure is routing element 110 in Figure 1. Ex. 1001, 6:32–41; 6:66-67. The written description describes “the output interface” as “selected by the routing element 110.” *Id.* at 6:32–41; *see also* Ex. 1003, ¶ 69. In related litigation asserting the ’853 Patent, Cisco has proposed the same corresponding structure for those limitations. Ex. 1020, at 35, 37.
A-14. “means for implementing a quality of service policy” (claim 49)

The term recites the function of “implementing a quality of service policy.” The ’853 Patent does not disclose sufficient structure for performing this function. According to the specification, access control element 120 can “augment or override routing decisions otherwise made by the router,” and can do so by “alter[ing] the output interface, which was selected by the routing element 110, to another selected output interface.” Ex. 1001, 6:33–40. However, no structure for implementing the output of the access control element 120, or altering the output interface, after the access control element, is shown or disclosed in the patent.

A person of ordinary skill, reviewing the ’853 Patent, would have understood that additional structure was required to implement a quality of service policy, and he would recognize the absence of disclosure within the ’853 Patent of structure for performing this QoS function. Ex. 1003, ¶¶ 70–72. Nevertheless, the Petition identifies the identical function and related structure in the prior art.

In related litigation asserting the ’853 Patent, Cisco has proposed as structure for this term an element, access control element 120, that does not correspond to the required function. Ex. 1020, at 35–36.

Cisco’s proposal is not a reasonable identification of structure, and the PTAB should decline to apply it for purposes of IPR. Although the specification states that the access control element 120 may alter a preliminarily selected output
interface according to a QoS policy, \((id. \ 6:34–39)\), this access result is then implemented by structures associated with the “routing decision,” discussed \textit{supra}. \textit{See id.} 7:13–26, 10:64–65. Thus, access control element 120 does not perform the function of “implementing a quality of service policy.” As such, Cisco’s proposed corresponding structure is improper, as it fails to perform the function associated with the recited means. Ex. 1003, ¶ 72.

\begin{quote}
A-15. “means for permitting or denying access for said packet” (claim 50)
\end{quote}

The term recites the function of “permitting or denying access for said packet.” The specification describes the access result provided to a port.

The indicator provided to the output port 202 specifies whether or not the packet 130 has permission to be forwarded from its specified source device 131 to its specified destination device 132. In a preferred embodiment, the indicator specifies one of three possibilities: (a) the packet 130 is forwarded to its calculated output interface and on to its specified destination device 132; (b) the packet 130 is dropped; or (c) the packet 130 is forwarded to a “higher-level” processor for further treatment. When a packet 130 is dropped it is effectively denied access from its specified source device 131 to its specified destination device 132


However, this disclosure simply describes what information the indicator holds. There is no structure that acts on the information. The only structure disclosed is an “output port,” which is insufficient structure for performing the
function of permitting or denying access for said packet. A person of ordinary
skill, reviewing the ’853 Patent, would have understood that additional structure
was required for permitting or denying access to the packet. Ex. 1003, ¶¶ 73–77.
Nevertheless, the Petition identifies the identical function and related structure in
the prior art.

In related litigation asserting the ’853 Patent, Cisco has improperly
identified the output port 202 as a corresponding structure for this term. Ex. 1020,
at 36. As just explained, output port 202 cannot be a corresponding structure for
this limitation, as it fails to perform the function associated with the recited means.
Ex. 1003, ¶¶ 73–77.

A-16. “means for making a preliminary routing decision for said
packet” (claim 51)

The term recites the function of “making a preliminary routing decision for
said packet.” To the extent the ’853 Patent discloses corresponding structure, that
structure is routing element 110 in Figure 1. Ex. 1001, 6:32–41; see also Ex. 1003,
¶ 78. In related litigation asserting the ’853 Patent, Cisco has proposed the same
corresponding structure for this limitation. Ex. 1020, at 36–37.

A-17. “means for preprocessing said packet label” (claim 54)

The term recites the function of “preprocessing said packet label.” To the
extent the ’853 Patent discloses corresponding structure, that structure is
In a preferred embodiment, a comparison circuit 230 compares the source port number and the destination port number with these known ranges and provides a set of comparison bits 231 indicating whether or not the source port number and the destination port number are within each specified range. The comparison circuit 230 includes a finite state machine 232 (or other element) for storing lower and upper bounds for each specified range. The comparison bits 231 are coupled to the input port 201 of the access control element 120 for treatment as matchable input bits supplemental to the header of the packet 130.

Ex. 1001, 6:21–32; see also Ex. 1003, ¶ 79–80.

In related litigation asserting the ‘853 Patent, Cisco has proposed as structure for this term an element, routing element 110, that does not perform the required function. Ex. 1020, at 37–38. To this point, the ‘853 Patent indicates that the routing element 110 only creates the packet label; there is no indication of it performing preprocessing functions. See Ex. 1001, 6:54–57. Because there is no indication that the routing element 110 preprocesses the packet label, Cisco’s proposed corresponding structure is improper. Ex. 1003, ¶ 80.

A-18. “means for generating said matchable information” (claim 54)

The term recites the function of “generating said matchable information.” The ‘853 Patent teaches structure corresponding to this function in the form of comparison circuit 230 and CAM 232. Ex. 1001, 6:21-31; see A-17, supra; see also Ex. 1003, ¶¶ 81–82.
In related litigation asserting the ’853 Patent, Cisco has proposed as structure for this term an element, routing element 110, that does not correspond to the required function. Ex. 1020, at 38–39. For the reasons already discussed, Cisco’s proposal is improper, as it fails to perform the function associated with the recited means. *See* A-17, *supra*. Ex. 1003, ¶ 82.

A-19. “means for comparing a source IP port value or destination IP port value with a selected port value” (*claim 56*)

The term recites the function of “comparing a source IP port value or destination IP port value with a selected port value.” To the extent the ’853 Patent discloses corresponding structure, that structure is comparison circuit 230 and CAM 232. Ex. 1001, 6:21–32; *see* A-17, *supra*; *see also* Ex. 1003, ¶¶ 83–84.

In related litigation asserting the ’853 Patent, Cisco has proposed as structure for this term an element, access control memory 210, that does not correspond to the required function. Ex. 1020, at 39–40.

Cisco’s proposal is not a reasonable identification of structure, and the PTAB should decline to apply it for purposes of IPR. The ’853 Patent does not locate the function of “comparing a source IP port value or destination IP port value with a selected port value.” The “IP port” verbiage is inaccurate. Ports in a TCP/IP network are created by the Transport Control Protocol (“TCP”). *See* Ex. 1003, ¶¶ 83, 151 (describing TCP ports in Ex. 1019).
value with a selected port value” in access control memory 210. The ’853 Patent teaches an optimization technique with a port range preprocessing logic that compares port values from the packet label to certain predefined port values to generate the matchable input for the access control memory 210. *Id.* 6:12–31, fig. 2. *See also id.* at (57) (describing preprocessing circuit doing port range comparisons), 4:32-41 (disclosing comparing packet header data against port ranges). It is this matchable input that then gets matched in the access control memory 210, not the port values from the packet label. *Id.* As such, Cisco’s proposed corresponding structure is improper, as it fails to perform the function associated with the recited means. *Ex. 1003, ¶ 83–84.*

A-20. “means for declaring whether to permit or deny access to a set of packets” *(claim 59)*

The term recites the function of “declaring whether to permit or deny access to a set of packets.” The ’853 Patent does not disclose sufficient structure for performing this function. *Ex. 1003, ¶ 85.* However, in related litigation asserting the ’853 Patent, Cisco has proposed that priority encoder 220 of the ’853 Patent provides the necessary structure. *Ex. 1020, at 40–41.* Recognizing that issues of sufficiency in claiming under Section 112 are out of scope for IPR, it is appropriate for the PTAB to apply Cisco’s proposal for purposes of evaluating anticipation and obviousness.
A-21. “means for receiving a sequence of access control specifiers” and “means for translating said sequence of access control specifiers into a sequence of access control patterns” (claim 60)

These terms recite the functions of “receiving a sequence of access control specifiers” and “translating said sequence of access control specifiers into a sequence of access control patterns.” The ’853 Patent does not disclose structure sufficient to perform these functions. Ex. 1003, ¶¶ 86–87.

Recognizing that issues of sufficiency in claiming under Section 112 are out of scope for IPR, it is appropriate for the PTAB to analyze the prior art for the presence of structures corresponding to the best available disclosure of the ’853 Patent, notwithstanding that such disclosure may be insufficient to support the claims. To enable such analysis, this petition treats the ’853 Patent’s disclosure of ACL command language, along with operating software for the router that interprets such language, as corresponding structure for the sole purpose of evaluating anticipation and obviousness over the prior art. Ex. 1001, 1:33–38 (“In known routers such as those manufactured by Cisco Systems, Inc., of San Jose, Calif., the router is provided with an ACL using an ACL command language, interpreted by operating system software for the router, such as the IOS operating system.”). Ex. 1003, ¶ 86–87.

In related litigation asserting the ’853 Patent, Cisco has proposed as structure for this term elements, namely “a general-purpose processor program and
data memory, and mass storage, executing operating system software,” that do not correspond to and are not clearly linked with the required function, and as such is improper. Ex. 1020, at 41–44. As noted supra at A-5, A-11, the general-purpose processor with associated program and memory is a part of a high-level processor serving a very specific ancillary function of conducting further access control processing. Nothing in the ’853 Patent links this processor to the functions in these claim terms in the manner proposed by Cisco. Thus, Cisco’s proposal that this reference to a CPU provides corresponding structure is misplaced, as it fails to perform the function associated with the recited means. Ex. 1003, ¶ 87.

A-22. “means for storing said sequence of access control patterns in said associative memory” (claim 60)

The term recites the function of “storing said sequence of access control patterns in said associative memory.” The ’853 Patent does not disclose structure sufficient to perform this function. Ex. 1003, ¶¶ 88–89.

Recognizing that issues of sufficiency in claiming are out of scope for IPR, it is appropriate for the PTAB to analyze the prior art for the presence of structures corresponding to the best available disclosure of the ’853 Patent, notwithstanding that such disclosure may be insufficient to support the claims. To enable such analysis, this petition treats the ’853 Patent’s disclosure of access control memory 210 as corresponding structure for the sole purpose of evaluating anticipation and obviousness over the prior art. Ex. 1001, 4:54–67; Ex. 1003, ¶¶ 88–89. Notably,
the staff attorney for the ITC Office of Unfair Import Investigations has proposed the same structure. Ex. 1021, at 1-13.

In related litigation asserting the ’853 Patent, Cisco has proposed as structure for this term elements that do not correspond to the required function. Cisco’s primary proposed structure associated with this function was: “A general-purpose processor program and data memory, and mass storage, executing operating system software.” Ex. 1020, at 44–45. As noted supra at A-21, Cisco’s proposal that this reference to a CPU provides corresponding structure is misplaced. In the ’853 Patent, the general-purpose processor (and its associated memory, storage, and program) serve a specific ancillary function related to further access control processing following a CAM lookup. Nothing in the ’853 Patent links this processor to the functions in this claim term in the manner proposed by Cisco. Ex. 1003, ¶ 89.

A-23. “means for generating a single one of said access control patterns in response to a plurality of said access control specifiers” (claim 61) and “means for generating a single one of said access control patterns in response to a plurality of said access control specifiers” (claim 62)

These terms recite the function of “generating a single one of said access control patterns in response to a plurality of said access control specifiers.” The ’853 Patent does not disclose structure sufficient to perform these functions. Ex. 1003, ¶¶ 90–91.
Recognizing that issues of sufficiency in claiming are out of scope for IPR, it is appropriate for the PTAB to analyze the prior art for structure corresponding to the best available disclosure of the ’853 Patent, notwithstanding that such disclosure may be insufficient to support the claims. To enable such analysis, this petition treats the ’853 Patent’s ACL command language, along with operating software for the router that interprets such language, as corresponding structure for the sole purpose of evaluating anticipation and obviousness over the prior art. See also Ex. 1003, ¶ 90–91.

In related litigation asserting the ’853 Patent, Cisco has proposed as structure for this term elements that do not correspond to the required function. Cisco’s primary structure proposal was improper, and read: “[a] general-purpose processor program and data memory, and mass storage, executing operating system software.” As noted, e.g., supra at A-21, Cisco’s proposal is misplaced. See Ex. 1003, ¶ 91.

VI. MANNER OF APPLYING CITED PRIOR ART TO EVERY CLAIM FOR WHICH IPR IS REQUESTED, THUS ESTABLISHING A REASONABLE LIKELIHOOD THAT AT LEAST ONE CLAIM OF THE ’853 PATENT IS UNPATENTABLE

The ’853 Patent is directed to the straightforward concept of using previously-known memory technologies called content addressable memories (“CAMs”) in the already-mature field of network access control. See Ex. 1001, at (57). The ’853 Patent does not claim to have invented either of these technologies,
nor is there any evidence that Mr. Bechtolsheim and Dr. Cheriton (the named inventors) actually invented either CAMs or the field of network access control. As the ’853 Patent’s written description itself acknowledges, access control technology was already a well-developed field at the time. *E.g.*, *id.* 1:20–2:16 (describing previously-available technologies for access control, including the use of “ACLs (access control lists)"). The use of CAMs, and even TCAMs, with access control functionality was known in the industry almost two years prior to the filing date. Ex. 1017 (U.S. Patent No. 5,841,874 (filed Aug. 13, 1996), 1:58–63 (disclosing use of “ternary CAMs . . . for such things as address resolution [and] filtering”); Ex. 1003, ¶ 39 (discussing same). The ’853 Patent’s sole basis for alleging patentability was an apparent understanding—albeit an incorrect one—that using CAMs for network access control was neither previously known in the field nor obvious to those of ordinary skill. Petitioner respectfully submits that the enclosed references readily reveal that, to the contrary, others had previously developed such technology. As such, none of the ’853 Patent’s challenged claims was either new or nonobvious in the field as of the Filing Date.

**Hendel** describes a network routing and access control system in which forwarding logic in a network device compares multiple aspects of an incoming packet’s header data simultaneously to data stored in a CAM so as to make appropriate determinations for how and whether to forward an incoming packet.
Specifically, Hendel teaches using “forwarding logic” to compare different aspects of packet information to different layer 2 and 3 (and layer 4) data stored in a CAM, and then using “merge logic” to merge the results of those comparisons into a final routing decision.

Hendel describes its approach using the OSI layer model for network communications. Ex. 1007, 2:5–39. It performs packet header analysis in both “L2 Logic 62” (concerning link layer packet information) and “L3 Logic 64” (concerning network layer packet information). Id. 10:12–33. Each of these compares L2 and L3 information for the packet, respectively, to information stored in forwarding memory 40, which is a CAM. Id. 8:57–61. Hendel performs additional packet analysis in Class Logic 60. Id. 11:49–60. Merge logic 66 receives information relating to both layers, as well as information from class logic 60, and determines what to do with the patent. Id. 10:47–52. See also Ex. 1003, ¶¶ 109–10.

Hendel discusses using its techniques for packet filtering (Ex. 1007, 9:21-25, 9:43-44), as well as network firewall applications. Id. 14:8–12. It teaches that
merge logic 66 may, in some circumstances, instruct that packets be discarded where their proposed destination is inappropriate. *Id.* 10:51–52. Hendel also teaches techniques for promoting prioritization decisions among the various entries stored in the CAM. *Id.* 8:37–42.

**Muller** describes a network switch capable of examining packets and comparing to a search database, particularly a CAM. Ex. 1008, 2:40–64. Like the Hendel device, Muller’s device examines packets at multiple layers of the OSI model, thus enabling features including, but not limited to, filtering packets for access control purposes. *Id.* 5:2–5. Muller teaches separate flows for analyzing a packet’s layer 2 (i.e., data link layer) header information, and analyzing layer 3 (i.e., network layer) transport information. *See* Ex. 1003, ¶¶ 137–39.

![Figure 2. Ex. 1008 fig.5 (highlighting added)](highlight.png)

Muller teaches that the address accumulation block 510 can process a packet’s layer 2 header, and the L3 blocks, header class matching block 530 and address dependent block 540 can process a packet’s layer 3 header address information, including ports. *Id.* 9:61–10:8. These processes use search engine 370, which provides access to the CAM. *Id.* 8:1–12 (describing access to
forwarding database 140), 11:7–13 (stating that database 140 includes two CAMs). Searching the forwarding database gives instruction on what should be done with the packet. *Id.* 12:47–13:24; *see also* Ex. 1003, ¶¶ 136–38.

Ariel Hendel, lead inventor on the Hendel patent, appears as a co-inventor on the Muller patent. *Id.* at (75). The Muller and Hendel patents were filed on the same day—June 30, 1997—and have the same assignee. *Id.* at (73), (22).

Each proposed Ground is appropriate for institution, as detailed below.


**Claim 46 - [46.1]: “A system comprising: means for maintaining a set of access control patterns in at least one associative memory”**

Hendel teaches the use of a forwarding memory 40, which is preferably “a content-addressable memory.” Ex. 1007, 8:57–61. This memory is used “to define the actions that the switching element 36 must do to forward the packet to the appropriate destinations.” *Id.* 8:61–65; *see also* fig.2 (depicting switching element 36 and forwarding memory 40). In addition, Hendel teaches that the forwarding and the associated memories can be used to restrict or modify transmission of certain packets through a network, and thus perform access control. *Id.* 9:21-25 (discussing packet filtering), 9:43–44 (noting that some packets will be routed to “no output port”), 14:8–12 (noting the utility of the technology for “firewall technology”). Hendel further teaches storing binary strings in a CAM
that represent rules describing access to network resources. *Id.* 8:57–65 (describing use of a CAM to store information about layer 2 and layer 3 switching, and that such information will lead to decisions about “the actions that the switching element 36 must do to forward the packet to the appropriate destination(s)”). The information stored by Hendel in the CAM thus includes access control patterns. *See generally* Ex. 1003, ¶¶ 111.

By storing packet forwarding information in a CAM, and using it to identify packets to relay or discard, Hendel discloses equivalent functions and structure (e.g., forwarding memory 40, corresponding to the ’853 Patent’s access control memory 210) practicing the limitation “a system comprising: means for maintaining a set of access control patterns in at least one associative memory.”

9 To the extent Cisco may contend that the corresponding structure for this term is as set forth in Cisco’s litigation proposals, discussed *supra* at V.B.A-5, Hendel discloses structure equivalent to Cisco’s proposed elements. Hendel describes a processor 32 and processor memory 34 (e.g., Ex. 1007, 7:57–60); a person of skill in the art would have appreciated that some operating system and some mass storage must necessarily be present, as the ’853 Patent itself contemplates. Ex. 1001, 5:21–30; *see also* Ex. 1003, ¶ 111. The processor and processor memory in Hendel, and the inherently-present operating system and mass storage, perform the
“means for receiving a packet label responsible to a packet, said packet label being sufficient to perform access control processing for said packet;”

Hendel teaches receiving information, i.e. the “packet label,” that is based on or derived from a packet. See Ex. 1003, ¶¶ 112–14; Ex. 1001, 7:1–12; see also Ex. 1001, fig.3, 8:37–44, 10:55–58 (“During operation, the input port 50i receives a packet from the multi-layer network element port 38i and sends the header plus the input port 50i identifier to the forwarding logic 52.” (emphasis added)).

Hendel teaches that the header is received by forwarding logic 52, which uses it for searching forwarding memory 40. Ex. 1001, fig.4, 10:21–30, 10:42–44.

Hendel teaches “access control” using the packet header. Ex. 1001, 4:25–28. Hendel’s L3/4 lookups to the forwarding memory provide access control required function in a manner equivalent to the structures identified by Cisco, under Cisco’s proposed interpretation.

Arista assumes that “responsible” will be construed to have the same meaning as “responsive,” discussed supra. To the extent Cisco may contend that either “responsive” or “responsible” should be interpreted according to their plain and ordinary meaning, Hendel’s disclosure is consistent with Cisco’s apparent interpretation of such meaning. The packet header in Hendel is equivalent to the packet header recited by Cisco in its infringement allegations. See Ex. 1018, at 3–4; Ex. 1003, ¶ 112.
capability such as filtering and firewall functionality (id. at 9:23–25 and 13:4-6 (filtering), 14:8–12 (firewall)), quality of service functionality (id. 7:5–6; 14:50–54), and administration decisions (id. 4:23-27). See also Ex. 1003, ¶¶ 112–14.

As such, the packet header information along with the input port identifier, i.e. “packet label,” is received by the router and is sufficient to performing packet access control within the forwarding logic 52. Hence, Hendel discloses equivalent functions and structure (e.g., forwarding logic 52, corresponding to the ’853 Patent’s packet input interface 201) practicing the limitation “means for receiving a packet label responsive to a packet, said packet label being sufficient to perform access control processing for said packet[,]” as required by claim 46.

[46.3] “means for matching matchable information, said matchable information being responsive to said packet label, with said set of access control patterns in parallel;”

Hendel teaches searching the CAM for entries that match information from the layer 3 lookup key with layer 3 and layer 4 entries:

The forwarding logic 52 also searches the forwarding memory 40 for matches at layer 2 and/or layer 3. The search may also include some information at layer 4. In the preferred embodiment, the forwarding memory 40 is a content-addressable memory (CAM) storing information about both layer 2 and layer 3, and may contain some layer 4 information. If a match is found, data stored in associated memory 42 and pointed to by the matching entry in the forwarding memory 40 serves to define the actions that the switching element 36 must do to forward the packet to the appropriate destination(s).
Ex. 1007, 8:55–65 (emphasis added); see also 11:39–43; Ex. 1003, ¶¶ 115–17. As previously noted, Hendel teaches using a CAM, and in such a memory all entries are searched in parallel. *Supra* [46.1] (describing CAM); Ex. 1003, ¶ 34 (describing how CAMs search their entire contents in parallel).

Thus, Hendel teaches matching incoming packet headers to such entries. Ex. 1003, ¶¶ 115–17. In such matching, the matchable information is based on or derived from the packet header.\(^\text{11}\) Thus, Hendel discloses equivalent functions and structure (e.g., forwarding memory 40, corresponding to the ‘853 Patent’s access control memory 210) practicing the limitation “means for matching matchable information, said matchable information being responsive to said packet label, with said set of access control patterns in parallel.”

\[^{46.4}\] “means for generating a set of matches in response thereto, each said match having priority information associated therewith”

Hendel teaches searching the CAM for entries that match information from the packet header. Ex. 1007, 8:55–65 (emphasis added); see also 11:39–43; Ex. 1003, ¶ 115.

\(^{11}\) To the extent Cisco may contend that “responsive” should be interpreted according to its plain and ordinary meaning, Hendel’s disclosure is consistent with Cisco’s apparent interpretation of such meaning. The information used for matching in Hendel is equivalent to the packet fields or packet contents recited by Cisco in its infringement allegations. *See* Ex. 1018, at 4–5; Ex. 1003, ¶ 115.
1003, ¶ 118. Hendel also discloses matching the lookup keys, and specifically the layer 3 lookup key, with entries of the forwarding memory 40.

The forwarding logic 52 searches the forwarding memory 40 for a matching entry to a layer 3 search key created by the L3 logic 64. If a match exists, the information in the associated memory 42 is used by the merge logic 66 to instruct the input port 50i what to do with the packet.

Id. 11:39–43. The ’853 Patent discloses that the “priority information” is, among other things, the relative position of a CAM entry. Ex. 1001, 5:1-9. Similarly, Hendel teaches that, in some circumstances, the information in the forwarding memory 40 may be stored in a particular order, such that the order in the CAM signifies the priority associated with the information being stored. Hendel teaches that such manipulation of the order of entries is a technique for prioritizing among multiple matches:

In those instances where additional information has been placed by the processor 32 into the forwarding memory 40, there may be more than one entry for a particular class in the forwarding memory 40. The processor 32 ensures that of the entries matched, the one used is the most appropriate one.

In the preferred embodiment, the processor 32 reorders the Layer 3 entries when it places any new layer 3 so that the best match for a particular search criteria occurs earliest in the memory. Those skilled in the art will recognize many different implementations to achieve the same result.
Id. 12:37–55 (emphasis added); see also 11:27–31, 11:37–38 (describing instances of multiple matches); Ex. 1003, ¶ 118.

Because Hendel teaches the use of priority information to select a match from multiple matches, Hendel includes equivalent functions and structure (e.g., forwarding memory 40, corresponding to ’853 Patent’s access control memory 210) practicing the limitation “means for generating an access result in response thereto, each said match having priority information associated therewith.”

[46.5a] “means for selecting at least one of said matches in response to said priority information”

Hendel teaches selecting a single match in the forwarding memory 40 based on the priority information associated with the matched CAM entries. See Ex. 1007, 12:41–42 (“The processor 32 ensures that of the entries matched, the one used is the most appropriate one.”); Ex. 1003, ¶ 119. A person skilled in the art would have appreciated that, as such, the forwarding memory 40 comprised a priority encoder performing this function. Id.

Because Hendel discloses selecting the highest priority match in the forwarding memory 40, Hendel discloses equivalent functions and structure (e.g., forwarding memory 40 with a priority encoder, corresponding to the ’853 Patent’s priority encoder 220) practicing the limitation “means for selecting at least one of said matches in response to said priority information” as required by claim 46.
[46.5b] “means for . . . generating an access result in response to said at least one selected match; and”

Hendel further teaches generating a forwarding decision, i.e. the “access result,” in the associated memory 42, based on the selected match in the forwarding memory 40. Ex. 1007, fig.4, 8:61–65 (“[D]ata stored in associated memory 42 and pointed to by the matching entry in the forwarding memory 40 serves to define the actions that the switching element must do to forward the packet to the appropriate destination(s).”); see also Ex. 1003, ¶ 119 (describing in detail the access result generation process used in Hendel’s multi-layer processing). A person ordinary skilled in the art would have appreciated that the associated memory 42 is accessed based on the address generated by an address encoder, which in turn operates on the output of the priority encoder. Ex. 1003, ¶ 119.

Because Hendel discloses generating the associated memory 42 results, i.e. “access control result,” based on the selected highest priority match in the forwarding memory 40, Hendel discloses equivalent functions and structure (e.g., associated memory 42 with an address encoder and a priority encoder, corresponding to the ’853 Patent’s priority encoder 220) practicing the limitation “means for . . . generating an access result in response to said at least one selected match[,]” as required by claim 46.
“means for making a routing decision in response to said access result.”

As discussed, e.g., supra at [1.3], Hendel teaches that the switching element will forward the packet to the appropriate destination(s) according to the information stored in forwarding memory 40 and associated memory 42. Ex. 1007, 8:55–65. In particular, Hendel teaches that merge logic 66 (in figure 4) will combine the results of the searches on the forwarding memory and associated memory to determine access:

In a preferred embodiment, the merge logic 66 directs the input port 50i to take one of the following actions on a packet: filter the packet; forward the packet at layer 2; forward the packet as a layer 3 flow; process the packet as a layer 3 route; and forward the packet as a multicast route.

Id. 13:4–8 (emphasis added); see also id. 9:43–44 (discarding a packet by forwarding to “no output port”); see Ex. 1003, ¶ 120 (further describing Hendel’s operation and its routing decisions). The input port 50i then directs the appropriate output port to implement the decision of the merge logic 66 on a given packet. See Ex. 1007, 9:39-42.

Because Hendel teaches that forwarding decisions are made according to information stored in memory, retrieved via a match to a packet header, Hendel discloses functions and structure (e.g., merge logic 66, with input port 50i and the
appropriate output port)\textsuperscript{12} practicing the limitation “means for making a routing
decision in response to said access result.”

Claim 47 – [47.0] “The system of claim 46 further comprising: means for
choosing a first one of said matches.”

As described \textit{supra}, Hendel teaches ordering entries in a forwarding memory
40 CAM according to priority, and arranging things so that the highest-priority
match “occurs earliest in the memory.” Ex. 1007, 12:51–54. Hendel thus teaches
selecting the first (earliest) match as the best. Ex. 1003, ¶ 121.

As discussed \textit{supra}, Hendel teaches all limitations of claim 46. In view of
that, and because Hendel teaches selecting the first match in a CAM as the best

\textsuperscript{12} To the extent Cisco may propose that the corresponding structure for this term is
as set forth in Cisco’s litigation proposals, discussed \textit{supra} at, e.g., V.B.A-11,
Hendel discloses structure equivalent to Cisco’s proposed elements. Hendel
describes output ports 56\textsubscript{a–n}, as well as a processor 32 and processor memory 34
(e.g., Ex. 1007, 7:57–60 (discussing processor and memory), 8:30–35 (discussing
output ports)); a person of ordinary skill in the art would have appreciated that
some operating system and some mass storage must necessarily be present, as the
’853 Patent itself contemplates. Ex. 1001, 1:20–2:16, 5:32–60; \textit{see also} Ex. 1003,
¶ 121. Such elements perform the required function in a manner equivalent to the
structures identified by Cisco.
match, Hendel discloses equivalent functions and structure (e.g., forwarding memory 40 with a priority encoder, corresponding to the ’853 Patent’s priority encoder 220) practicing the limitation “the system of claim 46 further comprising: means for choosing a first one of said matches.”

**Claim 48** – [48.0] “The system of claim 46, further comprising: means for determining an output interface for said packet.” and **Claim 52** – [52.0] “The method of claim 46, further comprising: means for determining at least one output interface for said packet.”

Hendel teaches that forwarding decisions involve determining appropriate output ports, i.e. “output interfaces,” for the given packet. Specifically, Hendel teaches that the “multi-layer network element for forwarding received packets from an input port to one or more output ports . . . . The results from the two searches are combined to forward the packet to the appropriate one or more output ports.” *Id.* at (57) (emphasis added), 17:9–24 (describing the forwarding decision made by the merge logic as indicating appropriate output ports); see also Ex. 1003, ¶ 122.

As discussed *supra*, Hendel teaches all limitations of claim 46. In view of that, and because Hendel teaches determining an output port or ports, Hendel discloses equivalent functions and structure (e.g., merge logic 66, corresponding to the ’853 Patent’s routing element 110) practicing the limitations “the system of claim 46, further comprising: means for determining an output interface for said
packet” and “the method of claim 46, further comprising: means for determining at least one output interface for said packet.”

Claim 49 - [49.0] “The system of claim 46, further comprising: means for implementing a quality of service policy.”

Hendel teaches the use of its technology to achieve quality-of-service objectives. Ex. 1007, 5:45–50, 7:4–10, 12:66–13:3, 14:24–28, 15:29–36; see also Ex. 1003, ¶ 123. As discussed supra, Hendel teaches all limitations of claim 46. In view of that, and because Hendel teaches implementing quality of service policies, Hendel discloses functions and structure (e.g., merge logic 66, with input port 50 and the appropriate output port) practicing the limitation “the system of claim 46, further comprising: means for implementing a quality of service policy.”

13 To the extent Cisco may propose that the corresponding structure for this term is as set forth in Cisco’s litigation proposals, discussed supra at, e.g., V.B.A-14, Hendel discloses structure equivalent to Cisco’s proposed elements. Hendel describes enforcing QoS via layer 3/layer 4 access control processing in the forwarding memory 40 and associated memory 42. See id. 12:66–13:3, 14:24–28, 15:29–36; see also Ex. 1003, ¶ 123. Such elements perform the required function in a manner equivalent to the structures identified by Cisco. Ex. 1003, ¶ 123.
Claim 50 - [50.0] “The system of claim 46, further comprising: means for permitting or denying access for said packet.”

Hendel teaches that permitting and/or denying access for a packet are two possible outcomes of packet handling. See, e.g., Ex. 1007, 9:21–25 (describing how an input port may either “filter the packet” or forward it on depending on the results of a CAM lookup); see also id. 14:8–12 (discussing firewall functionality, which would deny packet access), 13:67–14:3 (discussing various options for packet forwarding for permitted packets), 13:4–8 (“In a preferred embodiment, the merge logic 66 directs the input port 50i to take one of the following actions on a packet: filter the packet; forward the packet at layer 2; forward the packet at layer 2; forward the packet as a layer 3 flow; process the packet as a layer 3 route; and forward the packet as multicast router.”). A person of ordinary skill in the art would therefore understand that Hendel teaches a routing decision that includes permitting or denying access for a packet. Ex. 1003, ¶ 124.

As discussed supra, Hendel teaches all limitations of claim 46. In view of that, and because Hendel teaches permitting or denying access for a received packet, Hendel discloses functions and structure (e.g., merge logic 66 with input port 50i and an appropriate output port) practicing the limitation “the system of
claim 46, further comprising: means for permitting or denying access for said packet.”

**Claim 51** – [51.0] “The system of claim 46, further comprising: means for making a preliminary routing decision for said packet.”

Hendel teaches making a preliminary routing decision generated at the associated memory 42 for an incoming packet by making a routing decision of a packet based on packet headers containing layer 2 routing information, and then using merge logic to determine the appropriate final routing determination. Ex. 1007, fig.7 (depicting separate paths for routing lookups at “L2” (layer 2) and “L3” (layer 3), then applying a step of “merge results”), 8:57–65, 16:15–24. In such a configuration, the layer 2 routing determinations, when made, are “preliminary.”

The final routing decision, made as part of the “merge results” step, includes those preliminary decisions. *See also id.* 16:63–17:7 (describing figure 7); *see also* Ex. 1003, ¶ 125.

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14 To the extent Cisco may propose that the corresponding structure for this term is as set forth in Cisco’s litigation proposals, discussed *supra* at, e.g., V.B.A-15, Hendel discloses structure equivalent to Cisco’s proposed element. Hendel describes output port 50i, which performs the required function in a manner equivalent to the structure identified by Cisco. Ex. 1003, ¶ 124.
As discussed supra, Hendel teaches all limitations of claim 46. In view of that, and because Hendel teaches making preliminary routing decisions and using those preliminary decisions to create packet routing information, Hendel discloses equivalent functions and structure (e.g., associated memory 42 used for layer 2, corresponding to the ’853 Patent’s routing element 110) practicing the limitation “the system of claim 46, further comprising: means for making a preliminary routing decision for said packet.”

**Claim 54 – [54.0]** “The system of claim 46, further comprising: means for preprocessing said packet label; and means for generating said matchable information.”

Hendel describes a variety of preprocessing steps used to generate the information used to match entries in the CAM. Specifically, Hendel teaches that class logic 60 examines the packet header information, and uses the results in generating a lookup key, i.e., “matchable information.” Ex. 1007, 11:49–67; see also id. fig.4, 10:21–33, 10:55–58; see also Ex. 1003, ¶ 126.

As discussed supra, Hendel teaches all limitations of claim 46. In view of that, and because Hendel teaches class logic 60 and L3 logic 64 preprocessing the information received from the input port, i.e. “packet label,” to generate matchable information, Hendel discloses equivalent functions and structure (e.g., class logic 60 and L3 logic 64, corresponding to the ’853 Patent’s compare circuit 230 and CAM 232) practicing the limitation “the system of claim 46, further comprising:
means for preprocessing said packet label; and means for generating said
matchable information.”

**Claim 56 – [56.0]** “The system of claim 46, further comprising: means for
comparing a source IP port value or a destination IP port value with a
selected port value.”

Hendel teaches a process of class identification that includes identifying “at
least the flow, priority, traffic classification, and hardware routing” of a packet.
Ex. 1007, 11:66–67; see also Ex. 1003, ¶ 127. A person of ordinary skill,
reviewing Hendel, would have appreciated that identifying a flow requires at least
a comparison of TCP port numbers. Ex. 1003, ¶ 127. For example, to identify an

15 To the extent Cisco may contend that the corresponding structure for this term is
as set forth in Cisco’s litigation proposals (routing element 110), discussed *supra*
at, e.g., V.B.A-17 and V.B.A-18, the structures described above (class logic 60 and
L3 logic 64) are equivalent to Cisco’s proposed elements under Cisco’s apparent
interpretation. These structures perform the functions of packet preprocessing and
generating matchable information in the same way as Cisco apparently believes
routing element 110 does, i.e., it reviews an incoming packet prior to any CAM
search and uses the outcome of that review to prepare the lookup key. *See* Ex.
1003, ¶ 126. As noted *supra*, Cisco’s apparent interpretation does not accurately
reflect the teachings of the ’853 Patent.
HTTP flow, the class logic 60 would compare the TCP port of an incoming packet to the TCP port number that is conventionally assigned to HTTP, i.e., port 80. Having determined that an incoming packet is associated with a known flow type (i.e., HTTP), class logic 60 will be able to associate any necessary priority information with the packet. Class logic 60 will then relay that information to L3 logic, where it can be used to form a search key. Ex. 1007, 10:42–44 (describing how L3 logic uses information from the class logic to form the search key); see also Ex. 1003, ¶ 127 (describing same). A person of ordinary skill would thus conclude that Hendel teaches comparing TCP port values to a selected value.

As discussed supra, Hendel teaches all limitations of claim 46. In view of that, and in light of the foregoing, Hendel teaches equivalent functions and structure (e.g., class logic 60, corresponding to the ’853 Patent’s compare circuit 230 and CAM 232) practicing the limitation “the system of claim 46, further comprising: means for comparing a source IP port value or a destination IP port value with a selected port value.”16

16 To the extent Cisco may contend that the corresponding structure for this term is as set forth in Cisco’s litigation proposals (access control memory 210), discussed supra at, e.g., V.B.A-19, the structure described above (class logic 60) is equivalent to Cisco’s proposed element under Cisco’s apparent interpretation. This
Claim 59 – [59.0] “The system of claim 46, further comprising: means for declaring whether to permit or deny access of a set of packets.”

Hendel teaches that the “data stored in associated memory 42 and pointed to by the matching entry in the forwarding memory 40 serves to define” the layer 3/layer 4 result, i.e., the determination of whether to permit or deny access. See id. 8:61–65. A person ordinary skilled in the art would have appreciated that the associated memory 42 is accessed based on the address generated by an address encoder, which in turn operates on the output of the priority encoder of the forwarding memory 40, as discussed supra at [46.5b]. See also Ex. 1003, ¶ 128. This access result further indicates to the merge logic whether to permit or deny access to a set of packets. See, e.g., Ex. 1007, 9:21–25 (describing how an input port may either “filter the packet” or forward it on depending on the results of a CAM lookup); see also id. 14:8–12 (discussing firewall functionality, which would deny packet access), 13:67–14:3 (discussing various options for packet forwarding structure performs the port comparison function in the same way as Cisco apparently believes access control memory 210 does, i.e., it reviews the port information on an incoming packet and compares it to known information about ports, using such information to prepare the matchable information. See Ex. 1003, ¶ 127. As noted supra, Cisco’s apparent interpretation does not accurately reflect the teachings of the ’853 Patent.
for permitted packets), 13:4-8 ("In a preferred embodiment, the merge logic 66 directs the input port 50i to take one of the following actions on a packet: filter the packet; forward the packet at layer 2; forward the packet as a layer 3 flow; process the packet as a layer 3 route; and forward the packet as multicast router."); Ex. 1003, ¶ 128.

As previously discussed, Hendel teaches all limitations of claim 46. In view of that, and because Hendel teaches declaring whether to permit or deny access for a received packet, Hendel discloses equivalent functions and structure (e.g., associated memory 42 with an address encoder and a priority encoder) practicing the limitation “the system of claim 46, further comprising: means for declaring whether to permit or deny access of a set of packets.”

Claim 63 – [63.0] “A method of processing a packet comprising:”

Hendel teaches methods for packet processing. E.g., Ex. 1001, 8:61–65. As a result, it teaches “a method of processing a packet.” See also Ex. 1003, ¶ 129.

[63.1] “selecting an output interface to which to forward the packet;”

As discussed supra at, e.g., [48.0], Hendel teaches determining an output interface for a packet, and so teaches “selecting an output interface to which to forward the patent.” Ex. 1003, ¶ 130.

[63.2] “determining forwarding permission for the packet, wherein the determining comprises matching one or more characteristics of said packet
with one or more access control specifiers in at least one access control element;”

As discussed supra at, e.g., [46.3], Hendel teaches searching the CAM for information extracted from the packet header, and doing so in a CAM structure with the same relevant features as the ’853 Patent’s access control memory. According to the ’853 Patent’s written description, the “access control memory” is part of the “access control element,” and so this discussion teaches performing the search in an access control element. As discussed supra at, e.g., [46.5], Hendel teaches that a packet may be directed to its destination or filtered; such results comprise “forwarding permission” for those packets permitted to be passed to their destinations. See Ex. 1001, 13:4–8. For these reasons, Hendel teaches “determining forwarding permission for the packet, wherein the determining comprises matching one or more characteristics of said packet with one or more access control specifiers in at least one access control element.” See also Ex. 1003, ¶¶ 131–34.

[63.3] “processing said packet based on said forwarding permission;”

As discussed supra at, e.g., [46.6], Hendel teaches that a packet will either be discarded or routed to its destination according to the information received following the CAM lookup. See also Ex. 1001, 13:4–8; Ex. 1003, ¶ 135. Thus, Hendel teaches “processing said packet based on said forwarding permission.”
[63.4] “wherein, the selecting step is performed in parallel with the determining step.”

Hendel teaches performing multiple CAM lookups for a single packet in parallel with one another. Figure 7 illustrates such parallel processing. As the diagram shows, Hendel teaches performing an “L2 source search” (i.e., a lookup for routing and access control information at the data link layer) and a “Layer 3 search” (i.e., such a lookup at the network layer) simultaneously. See also id. 16:64–17:7 (describing such parallelism). In such a system, for example, the step of “selecting” along one path can proceed in parallel with the step of “determining” in the other. As noted above, Hendel specifically teaches that “everything but the actual memory search” (i.e., the “matching” step) can be performed in parallel. Id. 16:64–66. Hendel further teaches that the actual memory searches themselves could be performed in parallel, if the layer 2 and layer 3 CAM searches are using different CAMs. Id. 8–10; see also Ex. 1003, ¶ 136. Accordingly, Hendel teaches a system “wherein, the selecting step is performed in parallel with the determining step.”

As set forth supra, Hendel teaches all limitations of claims 54, 56, and 60–62. To the extent the Board may determine it is not reasonably likely that a person of ordinary skill would understand Hendel to disclose every additional limitation of these claims, such limitations would be obvious for the reasons set forth below.

Claim 54 — [54.0] “The system of claim 46, further comprising: means for preprocessing said packet label; and means for generating said matchable information.”

As discussed supra, Hendel teaches all limitations of claim 46. Muller further teaches preprocessing a packet header to generate a search key, which is then used as the matchable information in searching the CAM. Ex. 1008, 7:44–66 (describing the operation of header preprocessing logic 305). Specifically, Muller teaches preprocessing that analyzes the packet header for both layer 2 and layer 3 information, and using such information to generate the “search key” that will be used to search the CAM. Id. fig.5; see also id. 9:56–11:5 (describing the generation of “search keys” by the blocks in figure 5); 1:63–67, 11:22–35. The “search keys” are matchable information, used to search the CAM. Id.12:25–26 (“[T]he associative date [i.e., the CAM] is the data with which the
search key is matched.”). Thus, Hendel in view of Muller renders obvious equivalent functions and structure (e.g., Muller’s L3 header class matching block 530, L3 address dependent block 540, and search engine 370, corresponding to the ’853 Patent’s compare circuit 230 and CAM 232) practicing the limitations of claim 54.

One of ordinary skill in the art would have viewed it as obvious to combine the teachings of Hendel and Muller so as to arrive at claim 54. Hendel and Muller disclose aspects an apparently-common design. Ariel Hendel is a named inventor on both. Hendel and Muller disclose overlapping subject matter: both incorporate very similar multi-layer packet analysis for the purpose of packet handling, both disclose the same class logic, both use a CAM as a forwarding memory, and both disclose an associated memory in the form of an SRAM that contains fields representing actions based on matches in the forwarding memory. See supra; see also Ex. 1003, ¶¶ 137–40. Muller focuses on the preprocessing, whereas Hendel focuses on the Forwarding Engine. Incorporating Muller’s teachings for packet preprocessing into Hendel (which, as discussed, also engages in packet preprocessing) would enhance Hendel’s operation and provide useful functionality, such as capable handling of packets based on layer 2 information, encapsulation information, and layer 3 information. Ex. 1003, ¶¶ 139.
Claim 56 – [56.0] “The system of claim 46, further comprising: means for comparing a source IP port value or a destination IP port value with a selected port value.”

As discussed supra, Hendel teaches all limitations of claim 46. Further, Hendel in combination with Muller renders obvious the requirements of claim 56. Muller further teaches that packet header preprocessing includes comparisons of port numbers. Muller teaches that L3 header class matching block 530 (in figure 5) will “determine the class of the L3 header by comparing the packet header to a plurality of programmable registers that may contain predetermined values known to facilitate identification of the L3 header class.” Ex. 1008, 10:42–45 (emphasis added). Muller teaches that the packet header includes “a TCP source port and a TCP destination port.”17 Id. 9:50–51. Such values would be compared to the registers to identify L3 class. Ex. 1003, ¶¶ 142–44. Therefore, Hendel in view of Muller renders obvious equivalent functions and structure (e.g., Hendel’s

17 The claim’s reference to “IP port” is imprecise. Though ports are commonly associated with IP addresses, a port is not itself a feature of the Internet Protocol. Ports are provided by the Transport Control Protocol (“TCP”). A person of ordinary skill would have appreciated this distinction in evaluating Muller and Hendel. Ex. 1003, ¶¶ 76, 141, 150.
class logic 66 and Muller’s L3 header class matching block 530, corresponding to
the ’853 Patent’s compare circuit 230 and CAM 232) practicing the claim.

One of ordinary skill would have viewed it as obvious to combine Hendel
and Muller so as to practice all limitations of claim 56. Hendel and Muller are
highly compatible designs, with both incorporating multi-layer packet analysis for
the purpose of packet handling, and both using a CAM to do so. See supra; see
also Ex. 1003, ¶¶ 136–38. Incorporating Muller’s teachings for packet
preprocessing into Hendel would enhance Hendel’s operation and provide useful
functionality, such as capable handling of packets based on layer 2 information,
encapsulation information, and layer 3 information. Ex. 1003, ¶¶ 141–44.

Claim 60 - [60.0] “The system of claim 46, further comprising: means for
receiving a sequence of access control specifiers; means for translating said
sequence of access control specifiers into a sequence of access control
patterns; and means for storing said sequence of access control patterns in
said associative memory.”

Hendel teaches all limitations of claim 46. Muller teaches storing access
control patterns in a CAM, and confirms that such patterns (i.e., “access control
patterns”) are derived from rules (i.e., “access control specifiers”) that govern
access to network resources. Ex. 1008, 12:48–13:24 (stating that the data in the
CAM lists ports “to which the packet may be forwarded,” as well as “priority fields
for priority tagging and priority queuing,” and “a best effort mask indicating which
ports should queue the packet as a best effort”). To properly store the access
control patterns, it would be necessary to receive the rules to be enforced, then translate the rules (i.e., “access control specifiers”) into bit strings for storage in the CAM (i.e., the “access control patterns”), and finally to store them. A person of ordinary skill would have readily understood this from Muller. Ex. 1003, ¶¶ 145–46. As the ’853 description acknowledges, ACLs (“access control specifiers”) and techniques for translating, were already known, and a person of ordinary skill would have appreciated that such would inherently be present in and otherwise obvious from access control devices such as Hendel and Muller. 18 E.g., Ex. 1001, 1:20–2:16 (describing previously-available technologies for access control, including the use of “ACLs (access control lists)”), 5:32–60 (describing prior art ACLs in “IOS” software); Ex. 1003, ¶¶ 145–46. Hendel in view of Muller renders obvious equivalent functions and structure (e.g., Muller’s forwarding and filtering database 140 with structures for receiving and translating, corresponding to the ’853 Patent’s ACL command language and operating software for the router for

18 In showing that structures are inherent in the art, Petitioner is mindful that many of those same structures, if they can be found in the ’853 Patent, are found by implication. While section 112 issues are not in scope for IPR, in evaluating the disclosure of the prior art concerning means-plus-function terms it is appropriate for the PTAB to be mindful of deficiencies in the ’853 Patent’s own disclosure.
the “means for receiving” and “means for translating,” and Muller’s forwarding and filtering database 140 corresponding to the ’853 Patent’s access control memory 210, for “means for storing”) practicing claim 60. A person of skill would also have incentive and ability to combine, as set forth supra.

Claims 61 & 62 - [61.0, 62.0] “The system of claim 46, further comprising: means for generating a single one of said access control patterns in response to a plurality of said access control specifiers.”

As discussed supra, Hendel teaches all limitations of claim 46. Muller further teaches storing a single pattern in the CAM for a multiple network access

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19 To the extent Cisco may propose that the corresponding structure for any of the claimed functions is as set forth in Cisco’s litigation proposals, discussed supra at V.B.A-21–A-22, Hendel discloses structure equivalent to Cisco’s proposed elements under Cisco’s proposed interpretation. Hendel describes a processor 32 and processor memory 34 (e.g., Ex. 1007, 7:57–60 (discussing processor and memory), 8:30–35 (discussing output ports)); a person of ordinary skill in the art would have appreciated that some operating system and some mass storage must necessarily be present, as the ’853 Patent itself contemplates. Ex. 1001, 1:20–2:16, 5:32–60; see also Ex. 1003, ¶¶ 145–46. Such elements perform the required function in a manner equivalent to the structures identified by Cisco under Cisco’s proposed interpretation.
rules. Muller teaches that some CAMs can use to use variable (i.e., wildcard) bits in the CAM. Id. 12:45 (noting that the CAM may be a mask per bit CAM supporting such bits). For such a CAM, a single bit string (i.e., “access control patterns”) could enforce multiple rules (i.e., “access control specifiers”). Ex. 1003, ¶¶ 147–48. As the ’853 Patent’s written description itself acknowledges, access control technology, including the use of ACLs (“access control specifiers”) and techniques for translating them, was already a well-developed field at the time, and a person of ordinary skill would have appreciated that such would inherently be present in and otherwise obvious from access control devices such as those described in Hendel and Muller. E.g., Ex. 1001, 1:20–2:16 (describing previously-available technologies for access control, including the use of “ACLs (access control lists)”, 5:32–60 (describing prior art ACLs in “IOS” software)); Ex. 1003, ¶¶ 147–48. Thus, Hendel in view of Muller renders obvious equivalent functions and structure (e.g., Muller’s forwarding and filtering database 140, corresponding to the ’853 Patent’s ACL command language and operating software for the router) practicing the limitations of claims 61 and 62.20 A person of skill would also had ample incentive and ability to combine Muller with Hendel, as set forth supra.

20 To the extent Cisco may propose that the corresponding structure for any of the claimed functions is as set forth in Cisco’s litigation proposals, discussed supra at

As set forth supra, Hendel teaches all limitations of claim 56. To the extent the Board may determine it is not reasonably likely that a person of ordinary skill would understand Hendel to disclose every additional limitation, such limitations would be obvious for the reasons set forth below.

Claim 56 – [56.0] “The system of claim 46, further comprising: means for comparing a source IP port value or a destination IP port value with a selected port value.”

As discussed supra, Hendel discloses all limitations of claim 46. Elliott further teaches a packet classifier that involves comparing TCP port values to stored values, Ex. 1019, 18:46–64 (describing packet classifier 285, corresponding, V.B.A-23, Hendel discloses structure equivalent to Cisco’s proposed elements under Cisco’s proposed interpretation. Hendel describes a processor 32 and processor memory 34 (e.g., Ex. 1007, 7:57–60 (discussing processor and memory), 8:30–35 (discussing output ports)); a person of ordinary skill in the art would have appreciated that some operating system and some mass storage must necessarily be present, as the ’853 Patent itself contemplates. Ex. 1001, 1:20–2:16; see also Ex. 1003, ¶ 147–48. Such elements perform the required function in a manner equivalent to the structures identified by Cisco under Cisco’s proposed interpretation.
in combination with Hendel, to ’853 Patent comparison circuit 230 and CAM 232). One of ordinary skill in the art would have found it obvious to incorporate Elliott’s port comparison techniques into Hendel, as both references are highly similar in subject matter and the combination would bring substantial benefits in packet classification and prioritizing. See also Ex. 1003, ¶¶ 149–52. Thus, Hendel in view of Elliott renders obvious equivalent functions and structure (e.g., Hendel’s class logic and Elliott’s packet classifier, corresponding to the ’853 Patent’s compare circuit 230 and CAM 232) practicing the limitations of claim 56.

VII. THIS PETITION DOES NOT PRESENT REDUNDANT GROUNDS FOR INSTITUTION

The presented § 103 grounds are not redundant of each other or of the § 102 grounds. Muller and Elliott each disclose specific implementation details that add new approaches and features to those described in Hendel.

VIII. CONCLUSION

The references identified in this Petition indicate a reasonable likelihood of success as to Petitioner’s assertion that the Challenged Claims are not patentable pursuant to the grounds presented. Accordingly, Petitioner respectfully requests institution of IPR for the Challenged Claims for each of the grounds presented.
Respectfully submitted,

Dated: April 10, 2015

/s/ W. Karl Renner
W. Karl Renner, Reg. No. 41,265
Kevin E. Greene, Reg. No. 46,031

Fish & Richardson P.C.
P.O. Box 1022
Minneapolis, MN 55440-1022
T: 202-783-5070
F: 202-783-2331

Attorneys for Petitioner
CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) et seq. and 42.105(b), the undersigned certifies that on April 10, 2015, a complete and entire copy of this Petition for Inter Partes Review and all supporting exhibits were provided via FedEx to the Patent Owner by serving the correspondence address of record as follows:

Campbell Stephenson LLP
11404 Century Oaks Terrace
Bldg. H, Suite 250
Austin, TX 78758

/Edward G. Faeth/
Edward G. Faeth
Fish & Richardson P.C.
3200 RBC Plaza
60 South Sixth Street
Minneapolis, MN 55402
(202) 626-6420