

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

IARNACH TECHNOLOGIES LTD.,

Plaintiff,

v.

CHARTER COMMUNICATIONS, INC.,
CHARTER COMMUNICATIONS HOLDING
COMPANY, LLC, CHARTER
COMMUNICATIONS OPERATING, LLC,
SPECTRUM MANAGEMENT HOLDING
COMPANY, LLC, and SPECTRUM GULF
COAST, LLC,

Defendants.

Civil Action No. 2:24-cv-00230

JURY TRIAL DEMAND

**DECLARATION OF DR. KERRY LITVIN
REGARDING CLAIM CONSTRUCTION ISSUES**

I declare under penalty of perjury that the statements in this declaration are true and correct to the best of my knowledge and belief.

Signed: 

Kerry Litvin, Ph.D.

May 30, 2025

Exhibit 1018
Charter Comm. v. Iarnach Tech.
IPR2024 - 01287

I. Introduction

1. I have been retained as an expert on behalf of Plaintiff Iarnach Technologies Ltd. (“Iarnach”) in the above captioned case to provide my professional opinions and conclusions relating to certain claim construction issues involving U.S. Patent No. 9,674,035 (“the ’035 Patent”).¹

II. Summary of Opinions

2. None of these terms from the ’035 Patent are written in means-plus-function format or covered by 35 U.S.C. §112, ¶6: “generator;” “notifier;” “file provider;” “monitor;” “receiver;” “obtainer;” “validator;” “determiner;” and “applier.” None of these terms use the word “means,” so there is a presumption that §112, ¶6 does not apply. Charter has not met its burden to overcome that presumption by demonstrating that any of these terms fail to recite sufficiently definite structure or recite function without reciting sufficient structure for performing that function. Instead, persons of ordinary skill understand that these terms have a sufficiently definite meaning as the name for structure.

III. Professional Background and Qualifications

3. I have attached my resume as Appendix A to this declaration. The resume includes a list of my qualifications and publications. Nonetheless, I now summarize my background related to the field of PON technology, including DPoE.

4. I am currently the President and Founder of H-Bar Omega, LLC, a high technology consultancy with expertise in fiber optic telecommunications technologies, which serves the needs

¹ I understand there are two other patents asserted in the litigation, but I have not been asked to opine about the constructions of any terms in those patents.

of clients in the legal and investment professions who have interests in this field of technology. I founded H-Bar Omega in the spring of 2014.

5. Prior to this, from June 2011 through December 2013, I was a Principal Research and Development Engineer at Futurewei Technologies (also known as Huawei Technologies). I served directly under the company's Vice President for Access Optical Network Research and Development. My focus was the development of new technologies for passive optical (unrepeated) access networks.

6. Prior to joining Futurewei, I was a Principal Staff Engineer at the Motorola Broadband Communications Sector (now part of CommScope, Inc.) from February 2000 through October 2010 and worked in the Advanced Optical Communications Technology Applied Research and Development Group. My focus there was the development of state-of-the-art fiber optic communications technologies for applications in both hybrid-fiber-coaxial access network infrastructure and passive optical networks.

7. I previously served as a Staff Engineer working for the Lockheed Martin Missiles and Space Company from 1995 through 2000, developing cutting-edge microwave and millimeter-wave communications components and systems and also fiber optic signal distribution technologies all for applications onboard space-based platforms. This included acting as a principal engineer conducting the development of the first 60 GHz space-qualified power amplifier utilizing monolithic millimeter-wave integrated circuits.

8. I received my Ph.D. in Electrical Engineering (minor in Applied Physics) from Cornell University, Ithaca, NY in 1994. I was awarded an Arco Company Fellowship to support my first year of studies at Cornell. During my second year at Cornell University, I was named a Howard Hughes Doctoral Fellow, and the Hughes Aircraft Company then supported me during all

subsequent years of study and research through to my graduation. My dissertation was entitled “Metal-Semiconductor-Metal Photodiodes with applications in Monolithic Optical Receiver Circuits Capable of Detecting and Amplifying a Millimeter-Wave Modulation Signal Being Transmitted Via an Optical Carrier.”

9. I received my M.S. degree in Electrical Engineering from the California Institute of Technology (Caltech), Pasadena, CA in 1986. While at Caltech, I was an Institute Fellow. My research was supervised by Professor David Rutledge and focused on microwave power combining in a quasi-optical free-space cavity.

10. In 1985, I received a B.S. degree in Electrical Engineering from Drexel University, Philadelphia, PA and graduated with high honors, in the top 2% of my class. My senior research project at Drexel concerned the optical control of a microwave oscillator.

11. Through education and work, I have gained extensive experience in all aspects of the design and implementation of fiber optic communications networks, subsystems, and components. This includes advanced research and development efforts in systems, components, and physical phenomena occurring within the fiber insofar as they impact the quality of the communications signals being transmitted. I have extensive hands-on laboratory experiment construction and test and measurement experience and have also developed various theoretical mathematical models to accurately predict the performance of optical communication systems using computer simulations. I have dealt directly with some of the largest telecommunications service providers in designing optical networks and troubleshooting optical communications issues occurring in field-deployed in-service systems.

12. I have presented my research findings over the years at professional conferences such as the Optical Fiber Communications Conference (“OFC”) and the International Microwave

Symposium (“IMS”), as well as in refereed professional journals. In total, I have presented or published 13 such articles. Additionally, I have written many technically-extensive white papers on several topics directly related to fiber optic communications for the internal consumption of my colleagues on behalf of my former employers.

13. I am a member of both Tau Beta Pi (National Engineering Honor Society) and Eta Kappa Nu (National Electrical Engineering Honor Society).

14. I am listed as an inventor/co-inventor on many patents and patent applications, including the following issued patents related to the field of fiber optic communications technology:

Number	Title	Issued
EP 2,837,114	Raman Crosstalk Mitigation in a Multi-Wavelength System Utilizing an Optical Equalizing Signal Modulated with Composite Bandwidth-Limited Data Sources	July 27, 2016
9,118,388	Raman Crosstalk Mitigation in a Multi-Wavelength System Utilizing an Optical Equalizing Signal Modulated with Composite Bandwidth-Limited Data Sources	Aug. 25, 2015
8,666,260	Burst Mode Laser Transmitter having an Extremely Fast Response Time when Triggered from a Totally Off State	Mar. 4, 2014
8,391,723	Raman Back-Pumped Near Zero Dispersion CWDM System and Method	Mar. 5, 2013
CA 258,9851	Method and Apparatus for Reducing Crosstalk and Nonlinear Distortions Induced By Raman Interactions in a Wavelength Division Multiplexed (WDM) Optical Communication System	June 6, 2012
8,155,524	Method and Apparatus for Transmitting Multiple Channels in a Wavelength Division Multiplexed (WDM) Optical Communication System with Reduced Raman Crosstalk and Nonlinear Distortions	Apr. 10, 2012
7,920,795	Method and Apparatus for Transmitting Multiple Channels in a Wavelength Division Multiplexed (WDM) Optical Communication System with Reduced Raman Crosstalk and Nonlinear Distortions	Apr. 5, 2011
7,783,197	Method and Apparatus for Reducing Crosstalk in a DWDM Transmission System	Aug. 24, 2010

7,693,366	Aligned Narrowband Optical Filters having Flat Passbands and Comprising of Offset Cascaded Broadband Optical Filters	Apr. 6, 2010
7,418,205	Method and Apparatus for Controlling a Frequency Hopping Laser	Aug. 26, 2008
7,271,948	Method and Apparatus for Reducing Crosstalk and Nonlinear Distortions Induced By Raman Interactions in a Wavelength Division Multiplexed (WDM) Optical Communication System	Sept. 18, 2007
6,788,839	Time Slot Tunable All-Optical Packet Data Routing Switch	Sept. 7, 2004
6,671,426	Monolithic Integrated Terahertz Optical Asymmetric Demultiplexer	Dec. 30, 2003
6,650,800	Time Slot Tunable All-Optical Packet Data Demultiplexer	Nov. 18, 2003

IV. Compensation

15. I am being compensated for my time at my current standard rate of \$350 per hour for the services that I provide in connection with this case. That compensation is not dependent on the conclusions I reach, the outcome of the case, or any issues involved in or related to this matter.

V. Legal Standards

16. I am not an attorney. For the purposes of this report, I have been informed about certain aspects of the law that are relevant to my analysis and opinions.

17. I have been informed that, as a general rule, a claim term should be construed according to its plain and ordinary meaning, which is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.

18. I have been informed that determining the plain and ordinary meaning of a claim term involves considering the usage of the term in the context of the intrinsic evidence, including the claim language, patent specification and prosecution history.

19. I have been informed that extrinsic evidence—such as technical dictionaries, treatises, and expert testimony—may be considered to understand the underlying technology and

the manner in which one skilled in the art might use the claim terms within that context, but extrinsic evidence may not be used for the purpose of altering the terms of the claim from their plain meaning nor to create contradictions in the terms of the claims.

20. I have been informed that 35 U.S.C. §112, ¶6 (pre-AIA)² states: “An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.”

21. I have been informed that, when a claim term does not use the word “means,” there is a rebuttable presumption that the claim term is not written in means-plus-function format and §112, ¶6 does not apply. However, that presumption can be overcome and §112, ¶6 will apply if the challenger demonstrates that the claim term fails to recite sufficiently definite structure or else recites function without reciting sufficient structure for performing that function. Conversely, §112, ¶6 will not apply if the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure.

VI. Materials Considered

22. Among the materials I have reviewed in forming my opinions are the '035 Patent, its prosecution history, the provisional application to which it claims priority, the agreed

² I understand the America Invents Act became effective on March 16, 2013 and applies to patents filed after that date. Under the America Invents Act, 35 U.S.C. §112, ¶6 (pre-AIA) effectively became 35 U.S.C. §112(f) (post-AIA); the text of both statutes is identical. Because the '035 Patent was filed on March 28, 2012—before the AIA was effective, I understand that the pre-AIA version of the statute, 35 U.S.C. §112, ¶6, applies. However, because the text of the statutes is identical, my analysis and opinions do not change even if the post-AIA version of the statute, 35 U.S.C. §112(f) applies instead. I note that Charter’s preliminary constructions erroneously cite to the post-AIA version of the statute.

constructions in these proceedings, as well as the patents, references, and other materials cited in this expert report.

23. I have also reviewed Iarnach's Local Patent Rule 4-2 Statement (Dated April 28, 2025) and Charter's Preliminary Claim Constructions and Identification of Extrinsic Evidence (dated April 28, 2025).

24. I understand that Charter will be submitting a declaration from its claim construction expert, Dr. George Rouskas. I have not seen Dr. Rouskas's declaration and reserve the right to supplement my declaration to address any issues presented in Dr. Rouskas's declaration.

VII. Person of Ordinary Skill in the Art

25. Based on the materials and information I have reviewed and on my experience in the technical areas relevant to the '035 Patent, a person of ordinary skill in the art ("POSITA") at the time of the invention would have had at least a bachelor's degree in electrical engineering, computer science, or a similar degree plus at least two years of experience in optical networks. This description is approximate, and a higher level of experience would compensate for a lower level of education, and vice versa. I was a person of at least ordinary skill in the art at the time of the '035 Patent's invention (*i.e.*, March 2011).

VIII. Agreed Constructions

26. I understand that the parties have agreed to constructions for the following terms, which includes terms for patents that are asserted in the litigation but are not the '035 Patent.

- "service auto-configuration method of a DOCSIS Provisioning of EPON (DPoE) System" '982 claims 1, 6: the preamble is limiting.
- "virtual cable modem (vCM)" '035 claims 1, 3-5, 7-9, 11-13: "software in a DPoE system that emulates the function of a physical cable modem"

- “optical line terminal (OLT)” ’378 claims 1, 3-6, 8; ’982 claims 1-6, 8-11; ’035 claims 19, 25, 31: plain and ordinary meaning; no construction necessary.
- “optical network unit (ONU)” ’378 claims 1-6, 8-9, 11-13; ’982 claims 1-6, 8-11; ’035 claims 1-2, 5-6, 9-10, 13-14, 20, 26, 32: plain and ordinary meaning; no construction necessary.
- “DPOE system” ’982 claims 1, 4, 6-7; ’035 claims 19, 25, 31: plain and ordinary meaning; no construction necessary.
- “back office management system” ’982 claims 1, 4, 6-7: plain and ordinary meaning; no construction necessary.
- “means for generating an updated configuration file for the ONU” ’035 claim 13: Function: “generating an updated configuration file for the ONU”; Corresponding Structure: “DOCSIS back-office systems (described, *e.g.*, in 3:7-12, Fig. 1, and Fig. 2), including module 602 (described, *e.g.*, in 7:35-36 and Fig. 6), that permit an operator to edit a CM config file as and/or associated service definitions (described, *e.g.*, in 5:37-45 and Fig. 3) and are implemented in digital electronic circuitry, computer software, firmware, or hardware (described, *e.g.*, in 8:25-26), and equivalents thereof.”
- “means for notifying a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU” ’035 claim 13: Function: “notifying a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU”; Corresponding Structure: “DOCSIS back-office systems (described, *e.g.*, in 3:7-12, Fig. 1, and Fig. 2), including a DHCP server (described, *e.g.*, in 5:55-58 and Fig. 4) and module 604 (described, *e.g.*, in 7:36-38 and Fig. 6), that set the dpoeVcmDynCfgNowMIB object to ‘set’ (described, *e.g.*, in 5:44-45 and Fig. 3) and/or inform the vCM about the target config file name as well as the list of TFTP address servers holding its config file (described, *e.g.*, in 3:27-37 and 5:58-60), that are implemented in digital electronic circuitry, computer software, firmware, or hardware (described, *e.g.*, in 8:25-26), and equivalents thereof.”
- “means for providing, when requested by the vCM, to the vCM, the updated configuration file” ’035 claim 13: Function: “providing, when requested by the vCM, to the vCM, the updated configuration file”; Corresponding Structure: “DOCSIS back-office systems (described, *e.g.*, in 3:7-12, Fig. 1, and Fig. 2), including TFTP server (described, *e.g.*, in 5:55-60 and Fig. 4) and module 606 (described, *e.g.*, in 7:38-40 and Fig. 6), that transmit the updated configuration file to the vCM and that are implemented in digital electronic circuitry, computer software, firmware, or hardware (described, *e.g.*, in 8:25-26), and equivalents thereof.”
- “means for monitoring the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file” ’035 claim 13: Function: “monitoring the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file”; Corresponding Structure: “DOCSIS back-office systems (described, *e.g.*, in 3:7-12, Fig. 1, and Fig. 2), including module 608 (described, *e.g.*, in 7:40-42 and Fig. 6), that determine whether the vCM’s dpoeVcmDynCfgState MIB object is set to ‘updateComplete’ (described, *e.g.*, in 5:45-51, 7:12-19, Fig. 3, and Fig. 4) and that are implemented in digital electronic circuitry,

computer software, firmware, or hardware (described, *e.g.*, in 8:25-26), and equivalents thereof.”

- “means for receiving a notification that an updated configuration file is available for the ONU” ‘035 claim 32: Function: “receiving a notification that an updated configuration file is available for the ONU”; Corresponding Structure: “A DPoE System (described, *e.g.*, in 3:7-17 and Fig. 2), including a DHCP server (described, *e.g.*, in 5:55-58, 7:45-47, and Fig. 4) and module 802 (described, *e.g.*, in 7:61-62), that receives a dpoeVcmDynCfgNow MIB object configured to ‘set’ (described, *e.g.*, in 5:44-45 and Fig. 4) and/or receives the target config file name as well as the list of TFTP address servers holding the config file (described, *e.g.*, in 4:59-61 and Fig. 4), and that is implemented in digital electronic circuitry, computer software, firmware, or hardware (described, *e.g.*, in 8:25-26), and equivalents thereof.”
- “means for obtaining the updated configuration file” ‘035 claim 32: Function: “obtaining the updated configuration file”; Corresponding Structure: “A DPoE System (described, *e.g.*, in 3:7-17 and Fig. 2), including module 804 (described, *e.g.*, in 7:62-63 and Fig. 8), polls a TFTP server based on information from a DHCP request and receives the updated configuration file (described, *e.g.*, in 4:61-63, 5:55-58, 7:47-48, and Fig. 4), and that is implemented in digital electronic circuitry, computer software, firmware, or hardware (described, *e.g.*, in 8:25-26), and equivalents thereof.”
- “means for performing a first validation of the updated configuration file for structural errors” ‘035 claim 32: Function: “performing a first validation of the updated configuration file for structural errors”; Corresponding Structure: “A DPoE System (described, *e.g.*, in 3:7-17 and Fig. 2), including module 806 (described, *e.g.*, in 7:64-65 and Fig. 8), that changes the status of the dpoeVcmDynCfgState MIB object to ‘validationInProgress’ and then verifies the updated configuration file for configuration errors (structural errors) (described, *e.g.*, in 6:1-9 and Fig. 4) and, if errors are detected, changes the status of the dpoeVcmDynCfgState MIB object to ‘validationFailed’ (described, *e.g.*, in 6:10-15 and Fig. 4), and that is implemented in digital electronic circuitry, computer software, firmware, or hardware (described, *e.g.*, in 8:25-26), and equivalents thereof.”
- “means for determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes” ‘035 claim 32: Function: “determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes”; Corresponding Structure: “A DPoE System (described, *e.g.*, in 3:7-17 and Fig. 2), including module 808 (described, *e.g.*, in 7:65-8:1 and Fig. 8), that assesses the differences between a current active CM configuration file and an updated configuration file (described, *e.g.*, in 6:52-53, 7:49-52, and 7:65-8:1), and that is implemented in digital electronic circuitry, computer software, firmware, or hardware (described, *e.g.*, in 8:25-26), and equivalents thereof.”
- “means for performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU” ‘035 claim 32: Function: “performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU”; Corresponding Structure: “A DPoE System (described, *e.g.*, in 3:7-17 and Fig. 2), including module 810 (described, *e.g.*, in 8:1-4 and Fig. 8), that sets the dpoeVcmDynCfgState

MIB object to ‘resourceValidationInProgress’ and confirms the availability of hardware and software resources on the target DPoE ONU to make sure that the new configuration can be executed successfully (described, *e.g.*, in 6:6-9, 6:44-48, and Fig. 4) and, if not, change the status of the dpoeVcmDynCfgState MIB object to ‘resourceValidationFailed,’ (described, *e.g.*, in 6:10-15, 6:53-57, and Fig. 4) and that is implemented in digital electronic circuitry, computer software, firmware, or hardware (described, *e.g.*, in 8:25-26), and equivalents thereof.”

- “means for applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU” ‘035 claim 32: Function: “applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU”; Corresponding Structure: “A DPoE System (described, *e.g.*, in 3:7-17 and Fig. 2), including module 812 (described, *e.g.*, in 8:4-7 and Fig. 8), that changes the status of the dpoeVcmDynCfgState MIB object to ‘updateInProgress’ (described, *e.g.*, in 6:58-64 and Fig. 4), converts the configuration delta into a set of eOAM configuration parameters addressed to the target ONU, and sends the eOAM configuration parameters to the target ONU so that they can be used to add/modify/delete specific service instances (described, *e.g.*, in 3:43-45, 6:65-7:2, and Fig. 4), and changes the status of the dpoeVcmDynCfgState MIB object to ‘updateComplete’ to reflect the successful completion of the committing process (described, *e.g.*, in 7:16-19 and Fig. 4), and that is implemented in digital electronic circuitry, computer software, firmware, or hardware (described, *e.g.*, in 8:25-26), and equivalents thereof.”

IX. Disputed Constructions

27. As an initial matter, I note that Charter’s position that 35 U.S.C. §112, ¶6 applies for each of the disputed terms is inconsistent with its statements in its IPR Petition. In its Petition for IPR of the ’035 Patent, Charter only argued that the “means for” terms of claims 13 and 32 were subject to 35 U.S.C. §112, ¶6. ’035 IPR Pet. at 10-11. In other words, Charter did not state in its IPR Petition that “generator,” “notifier,” “file provider,” “monitor,” “receiver,” “obtainer,” “validator,” “determiner,” or “applier” were subject to 35 U.S.C. §112, ¶6. *Id.*

A. “a generator that generates an updated configuration file for the ONU” (’035 claim 5)

Iarnach’s Construction	Charter’s Construction
Plain and ordinary meaning. Not governed by 35 U.S.C. §112, ¶6	Governed by 35 U.S.C. §112(f) <u>Function</u> : generates an updated configuration file for the ONU <u>Structure</u> : instruction steps disclosed at 035 patent, 1:38-41, 2:47-55, 3:7-12, 3:34-39, 4:52-

	63, 5:28-51, 7:24-42, 8:10-15, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, and equivalents thereof.
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28. Charter contends that the term “a generator that generates an updated configuration file for the ONU” is governed by 35 U.S.C. §112(f) (post-AIA) / 35 U.S.C. §112, ¶6 (pre-AIA). I disagree. Unlike ‘035 claim 13, which uses “means for generating...” to make clear that 35 U.S.C. §112, ¶6 applies, the patentee deliberately chose a different format when drafting ‘035 claim 5 to make equally clear that 35 U.S.C. §112, ¶6 does not apply; claim 5 does not use the term “means for generating,” but rather recites “a generator.” Persons of ordinary skill understand that the term “generator” connotes particular structure in the art; it is not a nonce word. As such, 35 U.S.C. §112, ¶6 is inapplicable, and this term should be construed as per its plain and ordinary meaning.

29. The disputed term appears in Claim 5 of the ‘035 Patent, which I reproduce below:

5. An apparatus for facilitating an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising:

a generator that generates an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file;

a notifier that notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and

a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file; and

a monitor that monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.

’035 Patent at 10:24-38 (emphasis added).

30. Claim 5 is very similar to claim 13—with one important difference. As shown below, claim 5 is not drafted in means-plus-function format (*i.e.*, “means for...”), whereas claim 13 is drafted in means-plus-function format. A person of ordinary skill would understand from this that 35 U.S.C. §112, ¶6 does not apply to claim 5, but does apply to claim 13. If 35 U.S.C.

§112, ¶6 did apply to claim 5, then claim 5 would be substantively identical to claim 13. Persons of ordinary skill understand that, per the doctrine of claim differentiation, different words mean different things, and different claims are presumed to be different. A person of ordinary skill would not understand claims 5 and 13 to be exactly the same—which is what would happen if 35 U.S.C. §112, ¶6 were to apply to claim 5 (like it does to claim 13).

‘035 Claim 5	‘035 Claim 13
5. An apparatus for facilitating an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising: <u>a generator that generates an updated configuration file for the ONU</u>, wherein the ONU is configured with an existing configuration file; a notifier that notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file; and a monitor that monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.	13. An apparatus for causing an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising: <u>means for generating an updated configuration file for the ONU</u>, wherein the ONU is configured with an existing configuration file; means for notifying a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and means for providing, when requested by the vCM, to the vCM, the updated configuration file; and means for monitoring the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.

31. I have also analyzed the dependent claims of the ‘035 Patent, and that analysis confirms that “generator” is a particular structural module. For example, dependent claim 6 recites that “the generator includes: a detector that detects a configuration change need for the ONU; and a modifier that modifies at least one service listed in the configuration file to generate the updated configuration file.” This additional structure of the claimed generator, and the absence of a similar

dependent claim for claim 13, serves to further confirm that the generator of claim 5 is intended to be a structural module of the claimed apparatus.

32. The specification also confirms my understanding that “generator” is a particular structural module. For example, Figure 6 is described as “a block diagram representation of a portion of an apparatus 600.” *See* 035 Patent at 7:34-35. The specification refers to module 602, stating that “[t]he module 602 is for generating an updated configuration file for the ONU.” *Id.* at 7:35-36. In my opinion, module 602 is an example embodiment of the claimed generator. *See id.*; *see also id.* at 8:20-22.

33. Generator has a well understood meaning. In the context of file generation, the term generator has been used in professional literature since at least 1988 and would have been understood by persons of ordinary skill at the time of the priority date as having a sufficiently definite meaning as a name for particular structure or class of structures.

34. For example, a 1998 paper discusses three different types of generators. D. Liu, “*The HICLASS software system: a manufacturing expert system shell*,” [1988] Proceedings. The Fourth Conference on Artificial Intelligence Applications, San Diego, CA, USA, 1988, pp. 256-261, doi: 10.1109/CAIA.1988.196112. (<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=196112&isnumber=5031>)

(Abstract: Several expert system applications are being used at the Hughes Aircraft Company's Electro-Optical and Data Systems Group to aid in the engineering-to-manufacturing cycle of circuit board design and production. The author focuses on the evolution of the Hughes Integrated Classification Software System and its applications. He describes the various versions of the system and the auxiliary support modules; these are a rule-driven graphics generator, a rule-driven file generator, and a route sheet generator.)

35. The paper explains on page 261 that three auxiliary support generator modules were developed to support the Hughes Integrated Classification Software System which is/was a “white collar” decision making system. The rule-driven graphics generator is invoked to generate integrated text and graphics instructions. The rule-driven file generator generates formatted text files. The route sheet generator generates parts number, serial numbers, assembly instructions, and bar code information for component parts. These three generator modules take advantage of UNIX software tools. This confirms my contention that the term “generator” connotes a particular structural module.

36. This next paper from 2011 exemplifies the persistent use of the term generator as it concerns the generation of files for use on/with computer systems. D. von Rohr, M. Felser and M. Rentschler, "*Simplifying the engineering of modular PROFINET IO devices*," ETFA2011, Toulouse, France, 2011, pp. 1-4, doi: 10.1109/ETFA.2011.6059156. (<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6059156&isnumber=6058966>) (Abstract: PROFINET IO is designed with a modular structure of the IO devices. “Certified modular PROFINET IO devices are usually shipped with a General Station Description (GSD) file that does not contain the actual module configuration of the IO device. With common appliances the modules must subsequently be configured manually in the engineering tool. This can become an elaborate task in large PROFINET IO installations and it would therefore be useful to have some tool support to automatically detect and import the actually installed modules in an IO device. As a solution we propose a GSD file generator that creates the GSD file with the actual module configuration by retrieving the real data from the device via SNMP. This paper presents the implemented mechanism and gives some attention to certification issues.”.)

37. This paper is concerned with modular industrial Ethernet networks and the generation of “General Station Description” files which is a device type specific description file (2.1). The authors propose utilizing SNMP protocols to identify installed modules and using the MIB (management information base) of the device to build (generate) a GSD file automatically (3). The authors explain that the GSD generator can be implemented in JAVA and integrated into a web interface (4.1). JAVA is a very well-known computer programming language used to produce software applications. This again, confirms my contention that the term “generator” clearly implies a particular structural module.

38. The Oxford Dictionary of Computer Science seventh edition, Oxford University Press 2016 (pages 234-235) provides a definition of a “generator” consistent with it meaning a particular structural module: “Generator: a program that accepts the definition of an operation that is to be accomplished, and automatically constructs a program for the purpose.”

39. Dating back as far as 1977 the IEEE Standard Dictionary of Electrical and Electronics Terms, Second Edition contained a definition of a generator as it relates to computing systems: “Generator: a controlling routine that performs a generate function, for example, report generator, input output generator.” This industry standard dictionary defines a “generator” as having a specific structure, “a controlling routine,” that performs a “generate function” resulting in the production of other entities such as reports, input, or output. A routine is typically an element of a larger software program. Thus, a routine can be understood to be a module.

40. Nonetheless, if it is determined by the Court that “generator” is governed by 35 U.S.C. § 112(f), it is my opinion that the agreed construction for the “means for generating” term of claim 13 would apply.

41. In summary, it is my opinion that persons of ordinary skill understand that the term “generator” connotes particular structure in the art and that it is not a nonce word. This is supported by the specification and claims. As such, 35 U.S.C. §112, ¶6 is inapplicable to “generator” and this term should be construed as per its plain and ordinary meaning.

B. “a notifier that notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU” (‘035 claim 5)

Iarnach’s Construction	Charter’s Construction
Plain and ordinary meaning. Not governed by 35 U.S.C. §112, ¶6	Governed by 35 U.S.C. §112(f) <u>Function</u>: notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU <u>Structure</u>: instruction steps disclosed at 035 patent, 1:38-41, 2:47-55, 3:7-12, 3:34-39, 4:52-63, 5:28-51, 7:24-42, 8:10-15, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, and equivalents thereof.

42. Charter contends that the term “a notifier that notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU” is governed by 35 U.S.C. §112(f) (post-AIA) / 35 U.S.C. §112, ¶6 (pre-AIA). I disagree. Unlike ‘035 claim 13, which uses “means for notifying...” to make clear that 35 U.S.C. §112, ¶6 applies, the patentee deliberately chose a different format when drafting ‘035 claim 5 to make equally clear that 35 U.S.C. §112, ¶6 does not apply; claim 5 does not use the term “means for notifying,” but rather recites a “notifier.” Persons of skill understand that the term “notifier” connotes particular structure in the art; it is not a nonce word. As such, 35 U.S.C. §112, ¶6 is inapplicable and this term should be construed as per its plain and ordinary meaning.

43. The disputed term appears in Claim 5 of the ‘035 Patent, which I reproduce below:

5. An apparatus for facilitating an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising:

a generator that generates an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file;

a notifier that notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and

a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file; and

a monitor that monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.

'035 Patent at 10:24-38 (emphasis added).

44. Claim 5 is very similar to claim 13—with one important difference. As shown below, claim 5 is not drafted in means-plus-function format (*i.e.*, “means for...”), whereas claim 13 is drafted in means-plus-function format. A person of ordinary skill would understand from this that 35 U.S.C. §112, ¶6 does not apply to claim 5, but does apply to claim 13. If 35 U.S.C. §112, ¶6 did apply to claim 5, then claim 5 would be substantively identical to claim 13. Persons of ordinary skill understand that, per the doctrine of claim differentiation, different words mean different things, and different claims are presumed to be different. A person of ordinary skill would not understand claims 5 and 13 to be exactly the same—which is what would happen if 35 U.S.C. §112, ¶6 were to apply to claim 5 (like it does to claim 13).

'035 Claim 5	'035 Claim 13
5. An apparatus for facilitating an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising: a generator that generates an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file;	13. An apparatus for causing an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising: means for generating an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file;

<u>a notifier that notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU;</u> and a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file; and a monitor that monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.	<u>means for notifying a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU;</u> and means for providing, when requested by the vCM, to the vCM, the updated configuration file; and means for monitoring the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.
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45. I have also analyzed the dependent claims of the ‘035 Patent, and that analysis confirms that “notifier” is a particular structural module. For example, dependent claim 7 recites that “the notifier includes: a changer that changes a variable in a management information base (MIB) of the vCM.” This additional structure of the claimed notifier, and the absence of a similar dependent claim for claim 13, serves to further confirm that the notifier of claim 5 is intended to be a structural module of the claimed apparatus.

46. The specification also confirms my understanding that “notifier” is a particular structural module. For example, Figure 6 is described as “a block diagram representation of a portion of an apparatus 600.” *See* 035 Patent at 7:34-35. The specification refers to module 604, stating that “[t]he module 604 is for notifying a virtual cable modem (vCM) that a configuration file update is available for the ONU.” *Id.* at 7:36-38. In my opinion, module 604 is an example embodiment of the claimed notifier. *See id.*; *see also id.* at 8:20-22.

47. Notifier has a well understood meaning. In the context of computer networking and data communications, the term “notifier” has been used in professional literature since at least 1996 and would have been understood by persons of ordinary skill in the art at the time of the

priority date as having a sufficiently definite meaning as a name for particular structure or class of structures.

48. For example, in this 1996 paper a “notifier” is used to provide information concerning the congestion state of a Broadband Integrated Services Digital Network (B-ISDN): Soong Hee Lee, *"A reactive access control scheme at UNI for congestion control in ATM-based B-ISDN,"* Proceedings of LCN - 21st Annual Conference on Local Computer Networks, Minneapolis, MN, USA, 1996, pp. 366-373, doi: 10.1109/LCN.1996.558165. (<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=558165&isnumber=12125>)

(“Abstract: A reactive access control scheme, which controls effectively B-ISDN congestion, is proposed. The increasing number of active traffic sources results in increasing amount of feedback traffic in the current congestion control schemes. The proposed scheme resolves the problem using the generic flow control (GFC) field as a feedback notifier which informs the congestion state from a network node to a broadband network termination (B-NT) system, and includes a decision method on the actual network congestion state. We evaluate the performance of the proposed scheme through computer simulation. We compare the performance of the proposed scheme with that of the scheme using leaky bucket. As a result, the proposed scheme has the lower probability of overflow at the node output buffer with the longer cell delay at the B-NT system.”.)

49. This paper addresses traffic congestion monitoring and control thereof with reactive access control (page 366). The generic flow field of B-ISDN is used as a notifier to provide the necessary feedback information to the Broadband Network Termination (B-NT) so that access decisions can be determined within the confines of QoS requirements (pages 366, 367). According to this paper, the GFC field notifier must contain information on the network state (normal, pre-congestion, and congestion). The authors propose using four bits of the GFC field to convey such

notification information (page 368). Hence the “notifier” in this example is of definite structure and consists of four bits in the GFC field.

50. This next paper from 2007 defines a software based “notifier” that sends information concerning appropriate actions to take upon the detection of network intrusion. F. Baiardi and D. Sgandurra, "*Building Trustworthy Intrusion Detection through VM Introspection*," Third International Symposium on Information Assurance and Security, Manchester, UK, 2007, pp. 209-214, doi: 10.1109/IAS.2007.36.

(<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4299776&isnumber=4299732>)

(“Abstract: Psycho-Virt is a high assurance intrusion detection tool that merges host and network intrusion detection technologies with virtual machine introspection. Psycho-Virt architecture includes a cluster of virtual machines, the monitored VMs, which run the OS and applications of interest, and a further VM, the introspection one. Several agents distributed across the monitored VMs execute network and host IDS tools to discover attempted intrusions/attacks on the monitored VMs. The introspection VM makes the detection tools trustworthy by running an introspector and a director to discover any attempt to maliciously modify the kernel, the agents and the IDSes hosted on a monitored VM. On each monitored VM a collector gathers the alerts generated by the agents and forwards them to the director through a control network dedicated to data exchange among the agents and the introspection VM. The director on the introspection VM filters all the alerts and delegates the execution of a proper action to a notifier whenever an intrusion or an attempt to modify the IDSes is detected. In such cases, a monitored VM can either be stopped or frozen and its current state saved in a file for a later, deeper inspection. After describing Psycho-Virt, we discuss some examples of agents and functions using introspection and present preliminary results and performance figures of a first prototype.”.)

51. The paper centers around intrusion detection. An introspection virtual machines (IVM) monitors intrusion data from a network of virtual machines (VMs). Intrusion alerts are sent to the IVM. Each VM uses virtual machine introspection to monitor for intrusion attacks (209). When an agent (a software component) detects an intrusion it sends an alert to the IVM. According to the paper “the notifier runs on the IVM too and has to take proper action when an agent detects an intrusion or the introspector discovers that the IDses or the kernel have been alerted by an attacker.” Hence the notifier is a software-based component that is a particular structural module.

52. Next, this 2008 paper uses a “global notifier” algorithm for congestion control in communication networks. A. Tsioliaridou and V. Tsaoussidis, "*On the Properties of System-Wide Responsive Behavior*," Fifth International Conference on Information Technology: New Generations (itng 2008), Las Vegas, NV, USA, 2008, pp. 863-868, doi: 10.1109/ITNG.2008.181.

(<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4492592&isnumber=4492438>)

(“Abstract: High contention of flows is associated with unstable network behavior and unmanageable resource administration, i.e., convergence to equilibrium becomes a difficult task. In this paper, we propose a new approach to control congestion. In this context, we present an algorithm for active queue management, to notify simultaneously all competing flows about incipient congestion. Typically, AQM schemes notify only a small portion of participating flows about congestion events. Our notification scheme, called global notifier (GN), allows for an immediate and less aggressive adjustment of transmission windows with three consequent properties: (i) fairness is improved, (ii) smoothness of responsive flows is improved and (iii) system utilization is better regulated between the knee and the cliff. We detail our algorithm and the corresponding responsive behavior of participating flows, and we highlight significant performance results gathered by simulations.”).

53. Global Notifier is an algorithm for congestion control in communication networks that utilizes active queue management (AQM) and also a transmission strategy at the transport layer (page 864). The algorithm resides at the router (864). The notifier algorithm notifies a larger number of packets than other algorithms such as RED (page 865) and takes advantage of the ECN bit used for network congestion feedback in an IP header. This algorithmic nature demonstrates that “notifier” it is of a particular structural module.

54. Cable Television Laboratories specification PKT-SP-RSTF-I08-110127 *PacketCable Residential SIP Telephony Feature Specification* (01/27/2011) refers to a “notifier user agent” (pages 152 and 172) in the context of meeting PacketCable requirements for SIP (session initiation protocol). “Upon receiving this SUBSCRIBE, the notifier sends a 200 OK response and a NOTIFY with a Subscription-State header value of ‘terminated.’” A notifier user agent is a piece of software designed to act autonomously on behalf of the user or a supervisory system. The notifier user agent is responsible for informing other entities about changes or occurrences within the PacketCable network. As such, this type of “notifier” lends further credence to my contention that the term “notifier” is well understood and connotes a particular structural module .

55. Nonetheless, if it is determined by the Court that “notifier” is governed by 35 U.S.C. § 112(f), it is my opinion that the agreed construction for the “means for notifying” term of claim 13 would apply.

56. In summary, it is my opinion that persons of skill understand that the term “notifier” connotes particular structure in the art and that it is not a nonce word. This is supported by the specification and claims. As such, 35 U.S.C. §112, ¶6 is inapplicable to “notifier” and this term should be construed as per its plain and ordinary meaning.

C. “a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file” (‘035 claim 5)

Iarnach’s Construction	Charter’s Construction
Plain and ordinary meaning. Not governed by 35 U.S.C. §112, ¶6	Governed by 35 U.S.C. §112(f) <u>Function</u> : provides, when requested by the vCM, to the vCM, an updated configuration file <u>Structure</u> : instruction steps disclosed at 035 patent, 1:38-41, 2:47-55, 3:7-12, 3:34-39, 4:52-63, 5:28-51, 7:24-42, 8:10-15, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, and equivalents thereof.

57. Charter contends that the term “a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file” is governed by 35 U.S.C. §112(f) (post-AIA) / 35 U.S.C. §112, ¶6 (pre-AIA). I disagree. Unlike ‘035 claim 13, which uses “means for providing...” to make clear that 35 U.S.C. §112, ¶6 applies, the patentee deliberately chose a different format when drafting ‘035 claim 5 to make equally clear that 35 U.S.C. §112, ¶6 does not apply; claim 5 does not use the term “means for providing,” but rather recites a “file provider.” Persons of skill understand that the term “file provider” connotes particular structure in the art; it is not a nonce word. As such, 35 U.S.C. §112, ¶6 is inapplicable and this term should be construed as per its plain and ordinary meaning.

58. The disputed term appears in Claim 5 of the ‘035 Patent, which I reproduce below:

5. An apparatus for facilitating an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising:

a generator that generates an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file;

a notifier that notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and

a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file; and

a monitor that monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.

'035 Patent at 10:24-38 (emphasis added).

59. Claim 5 is very similar to claim 13—with one important difference. As shown below, claim 5 is not drafted in means-plus-function format (*i.e.*, “means for...”), whereas claim 13 is drafted in means-plus-function format. A person of ordinary skill would understand from this that 35 U.S.C. §112, ¶6 does not apply to claim 5, but does apply to claim 13. If 35 U.S.C. §112, ¶6 did apply to claim 5, then claim 5 would be substantively identical to claim 13. Persons of ordinary skill understand that, per the doctrine of claim differentiation, different words mean different things, and different claims are presumed to be different. A person of ordinary skill would not understand claims 5 and 13 to be exactly the same—which is what would happen if 35 U.S.C. §112, ¶6 were to apply to claim 5 (like it does to claim 13).

'035 Claim 5	'035 Claim 13
5. An apparatus for facilitating an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising: a generator that generates an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file; a notifier that notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and <u>a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file;</u> and a monitor that monitors the vCM for an indication of successful update of the	13. An apparatus for causing an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising: means for generating an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file; means for notifying a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and <u>means for providing, when requested by the vCM, to the vCM, the updated configuration file;</u> and means for monitoring the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.

ONU by the vCM using the updated configuration file.	
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60. I have also analyzed the dependent claims of the ‘035 Patent, and that analysis confirms that “file provider” is a particular structural module. For example, dependent claim 8 recites that “the file provider includes: a receiver receiving a dynamic host control protocol (DHCP) request from the vCM; a location provider that provides the vCM information about a location of the updated configuration file; and a file transferor that permits the vCM to download the updated configuration file using a file transfer protocol (FTP).” This additional structure of the claimed file provider, and the absence of a similar dependent claim for claim 13, serves to further confirm that the file provider of claim 5 is intended to be a structural module of the claimed apparatus.

61. The specification also confirms my understanding that “file provider” is a particular structural module. For example, Figure 6 is described as “a block diagram representation of a portion of an apparatus 600.” *See* 035 Patent at 7:34-35. The specification refers to module 606, stating that “[t]he module 606 is for providing, when requested by the vCM, the vCM the updated configuration file.” *Id.* at 7:38-40. In my opinion, module 606 is an example embodiment of the claimed file provider. *See id.*; *see also id.* at 8:20-22.

62. “File provider” has a well understood meaning. In the context of computer networking and data communications, the term “file provider” has been used in professional literature since at least 2007 and would have been understood by persons of ordinary skill in the art at the time of the priority date as having a sufficiently definite meaning as a name for particular structure or class of structures.

63. In 2007 this paper addressing peer-to-peer network traffic explained that peer-to-peer file sharing would be more efficient if file downloading would utilize the nearest “file

provider.” G. Zhang and G. Zhang, "*Agent Selection And P2P Overlay Construction Using Global Locality Knowledge*," 2007 IEEE International Conference on Networking, Sensing and Control, London, UK, 2007, pp. 519-524, doi: 10.1109/ICNSC.2007.372832. (<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4239045&isnumber=4238950>)

(“Abstract: It is estimated that Peer-to-Peer(P2P) traffic has already accounted for 50-70 percent of the total traffic on the Internet. This work aims to improve the performance of P2P file-sharing applications by constructing locality-aware P2P networks and enabling locality-aware downloading. A P2P agent's locality information, e.g., the prefix and autonomous system (AS) number in which it sits, can be abstracted from its IP address. This information can then be used to identify whether P2P agents belong to different ASes, the hop-distance between the ASes can be inferred using the global locality knowledge obtained from measurements of the AS-level Internet topology. It is expected that the file-sharing process should be more efficient when choosing to download from the nearest file provider, and the total amount of P2P traffic generated onto the Internet should be reduced as well. Preliminary simulation suggests that by using the global locality knowledge, the P2P enquiry process can be modified to return more file providers that are close to the enquirer without comprising the success rate of file searching.”).

64. Within the context of this paper the authors, when referring to a “file provider”, discuss its physical location with respect to the entities downloading files from it stating that (page 519) “ the file sharing process should be more efficient when choosing to downloading from the nearest file provider, and the P2P (peer-to-peer) traffic generated onto the Internet should be reduced as well.” The authors explain, figure 2, that requested resources (files) may be located in different domains (page 520). From this a person of ordinary skill at the time of the priority date would conclude that the authors are referring to devices such as file server computers (file transfer

protocol FTP servers, as a common example, that have been in existence since the 1980s) that are accessible via the Internet. Therefore, the term “file provider” has a definite meaning as a name for particular structure or class of structures.

65. The paper from 2011 discusses file-provider relation in the context of complex network structures. O. Allali, C. Magnien and M. Latapy, "*Link prediction in bipartite graphs using internal links and weighted projection*," 2011 IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS), Shanghai, China, 2011, pp. 936-941, doi: 10.1109/INFCOMW.2011.5928947.

(<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5928947&isnumber=5928760>)

(“Abstract: Many real-world complex networks, like client-product or file-provider relations, have a bipartite nature and evolve during time. Predicting links that will appear in them is one of the main approaches to understand their dynamics. Only few works address the bipartite case, though, despite its high practical interest and the specific challenges it raises. We define in this paper the notion of internal links in bipartite graphs and propose a link prediction method based on them. We describe the method and experimentally compare it to a basic collaborative filtering approach. We present results obtained for two typical practical cases. We reach the conclusion that our method performs very well, and that internal links play an important role in bipartite graphs and their dynamics.”).

66. This paper discusses bipartite networks. These are networks where the network's nodes can be divided into two distinct groups whereby connections only exist between nodes in different groups, not within the same group. That is two sets of nodes with links only between nodes in different sets (page 936). In this context, a file-provider graph is where peers are linked to the files they provided (page 936). As such, a person of ordinary skill at the time of the priority

date would have understood that in this peer-to-peer file sharing model that a file provider would realistically mean a networked computer or server storing a file that is also available to be provided upon request to a networked peer device. Therefore, the term “file provider” has a definite meaning as a name for a particular structure or class of structures.

67. Nonetheless, if it is determined by the Court that “file provider” is governed by 35 U.S.C. § 112(f), it is my opinion that the agreed construction for the “means for providing” term of claim 13 would apply.

68. In summary, it is my opinion that persons of skill understand that the term “file provider” connotes particular structure in the art and that it is not a nonce word. This is supported by the specification and claims. As such, 35 U.S.C. § 112, ¶6 is inapplicable to “file provider” and this term should be construed as per its plain and ordinary meaning.

D. “a monitor that monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file” (‘035 claim 5)

Iarnach’s Construction	Charter’s Construction
Plain and ordinary meaning. Not governed by 35 U.S.C. §112, ¶6	Governed by 35 U.S.C. §112(f) <u>Function</u>: monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file <u>Structure</u>: instruction steps disclosed at 035 patent, 1:38-41, 2:47-55, 3:7-12, 3:34-39, 4:52-63, 5:28-51, 7:24-42, 8:10-15, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, and equivalents thereof.

69. Charter contends that the term “a monitor that monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file” is governed by 35 U.S.C. §112(f) (post-AIA) / 35 U.S.C. §112, ¶6 (pre-AIA). I disagree. Unlike ‘035 claim 13, which uses “means for monitoring...” to make clear that 35 U.S.C. §112, ¶6 applies, the patentee deliberately chose a different format when drafting ‘035 claim 5 to make equally clear that 35

U.S.C. §112, ¶6 does not apply; claim 5 does not use the term “means for monitoring,” but rather recites a “monitor.” Persons of skill understand that the term “monitor” connotes particular structure in the art; it is not a nonce word. As such, 35 U.S.C. §112, ¶6 is inapplicable and this term should be construed as per its plain and ordinary meaning.

70. The disputed term appears in Claim 5 of the ‘035 Patent, which I reproduce below:

5. An apparatus for facilitating an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising:

a generator that generates an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file;

a notifier that notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and

a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file; and

a monitor that monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.

’035 Patent at 10:24-38 (emphasis added).

71. Claim 5 is very similar to claim 13—with one important difference. As shown below, claim 5 is not drafted in means-plus-function format (*i.e.*, “means for...”), whereas claim 13 is drafted in means-plus-function format. A person of ordinary skill would understand from this that 35 U.S.C. §112, ¶6 does not apply to claim 5, but does apply to claim 13. If 35 U.S.C. §112, ¶6 did apply to claim 5, then claim 5 would be substantively identical to claim 13. Persons of ordinary skill understand that, per the doctrine of claim differentiation, different words mean different things, and different claims are presumed to be different. A person of ordinary skill would not understand claims 5 and 13 to be exactly the same—which is what would happen if 35 U.S.C. §112, ¶6 were to apply to claim 5 (like it does to claim 13).

'035 Claim 5	'035 Claim 13
5. An apparatus for facilitating an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising: a generator that generates an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file; a notifier that notifies a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file; and <u>a monitor that monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.</u>	13. An apparatus for causing an update to a configuration file used for operation of an Optical Network Unit (ONU) operable in an Ethernet Passive Optical Network (EPON), the apparatus comprising: means for generating an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file; means for notifying a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and means for providing, when requested by the vCM, to the vCM, the updated configuration file; and <u>means for monitoring the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.</u>

72. The '035 specification confirms my understanding that the term “monitor” has sufficient definite meaning as the name for structure. For example, the specification describes a flow chart 600 of an apparatus for causing an update to a configuration file. *See* '035 Patent at 7:24-25, 7:34-35. This flow chart includes a structure 608 that “monitor[s] the vCM for an indication of successful update of the ONU by the vCM.” '035 Patent at 7:40-42; *see also id.* at 7:32-33.

73. The '035 specification explains that this “indication of successful update” comes in the form of a MIB object that is advertised by the vCM to the OSS backend system: “the virtual cable mode[m], which connects the ONU with the OSS, manages the process while advertising the progress and the state of the configuration file update via certain entries in a management information base (MIB).” '035 Patent at 8:10-14.

74. The '035 Patent provides examples of the different MIBs that the vCM uses to advertise the progress and state of the configuration file update. *See, e.g.*, Fig. 4 (annotated):

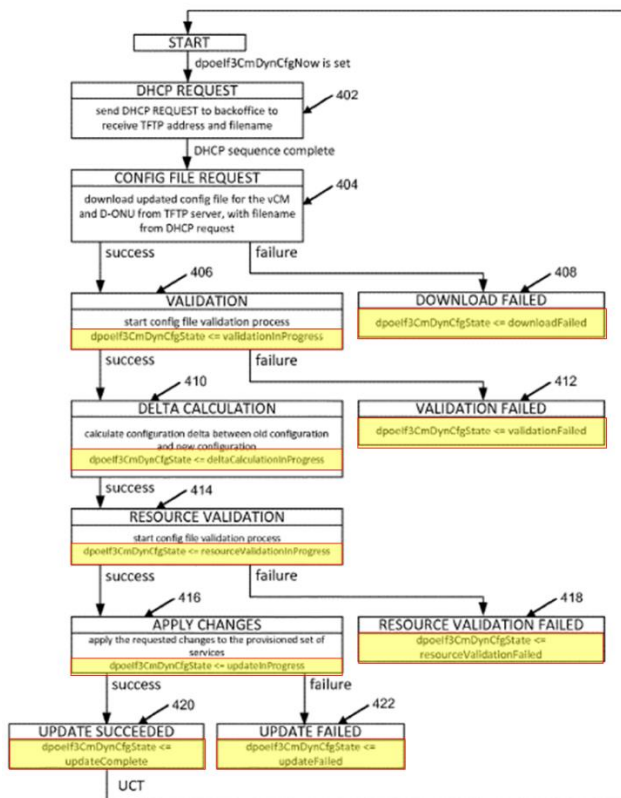


FIG. 4

75. In view of these teachings, a person of ordinary skill in the art would understand that the term “monitor” has a definite structure. Dating back as far as 1977 the IEEE Standard Dictionary of Electrical and Electronics Terms, Second Edition contains a definition of “monitor” as it relates to computing systems: “monitor: software or hardware that observes, supervises, controls, or verifies the operation of a system.”

76. The Oxford Dictionary of Computer Science seventh edition, Oxford University Press 2016 (page 351) provides a definition of “monitor” consistent with it meaning a particular structural module: “monitor: a device that is used for checking the progress and operation of a system.”

77. A person of ordinary skill in the art would understand that the structure could be depicted by the SNMP protocol—a well-known application layer protocol used to monitor networks. See U.S. Patent App. No. 2013/0159504 at [0011] (“SNMP is used mostly in network management systems to monitor network-attached devices for conditions that warrant administrative attention. SNMP is a component of the Internet Protocol Suite as defined by the Internet Engineering Task Force (IETF).”) Specifically, the SNMP protocol includes detailed procedures for the use of “traps,” which are notifications triggered by a specific event in the network. See, e.g., *id.* at [0016]-[0018]. Therefore, when a specific MIB is set by the vCM, the SNMP trap would notify the SNMP manager of such event.

78. In this paper from 2011, that has been cited by 207 patents, the authors discuss a monitoring module for quality of service. F. Doelitzscher, M. Held, C. Reich and A. Sulistio, “*Viteraas: Virtual Cluster as a Service*,” 2011 IEEE Third International Conference on Cloud Computing Technology and Science, Athens, Greece, 2011, pp. 652-657, doi: 10.1109/CloudCom.2011.101.

(<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6133210&isnumber=6133119>)

(“Abstract: The idea behind cloud computing is to deliver Infrastructure-, Platform- and Software-as-a-Service (IaaS, PaaS and SaaS) over the network on an easy pay-per-use business model. In this paper, we present our work, Virtual Cluster as a Service (Viteraas), that provides on-demand high performance computing for research projects, and e-Learning and teaching purposes in a private cloud. Moreover, Viteraas can be extended to use Amazon's public cloud infrastructure as needed. Viteraas can be categorized as PaaS that leverages Open Nebula, a virtual infrastructure manager, to dynamically create a cluster of virtual machines (VMs) on idle resources or dedicated servers. In addition, Viteraas is integrated within the university's existing IT infrastructure like

Single Sign-On for seamless authentication and authorization. Finally, a Quality of Service monitoring module is used by ViteraaS to monitor the performance and status of these VMs.”).

79. The authors explain (page 622) that a “monitoring module is used by ViteraaS to monitor the Quality of Service (QoS) attributes of these VMs, such as CPU load and network traffic, through a web browser.” The authors further explain (page 654) that SNMP is used to implement the monitoring module. “A Simple Network Management Protocol (SNMP) is used to monitor the VMs with regards to CPU and memory usages, and network bandwidth. SNMP uses an UDP-based network protocol, and therefore requires an agent to be installed in each VM. The *QoS Monitoring* module acts as an SNMP master that periodically collects real-time information from agents and stores the data into a database.” These agents are software residing on monitored devices. This confirms my contention that the term “monitor” connotes a particular structural module, and a person of ordinary skill in the art at the time of the priority date would have understood this to be the case as well.

80. Nonetheless, if it is determined by the Court that “monitor” is governed by 35 U.S.C. § 112(f), it is my opinion that the agreed construction for the “means for monitoring” term of claim 13 would apply.

81. In summary, it is my opinion that persons of ordinary skill understand that the term “monitor” connotes particular structure in the art and that it is not a nonce word. This is supported by the specification and claims. As such, 35 U.S.C. §112, ¶6 is inapplicable to “monitor” and this term should be construed as per its plain and ordinary meaning.

E. “a receiver that receives a notification that an updated configuration file is available for the ONU” (‘035 claim 20)

Iarnach’s Construction	Charter’s Construction
Plain and ordinary meaning. Not governed by 35 U.S.C. §112, ¶6	Governed by 35 U.S.C. §112(f)

	<u>Function</u>: receives a notification that an updated configuration file is available for the ONU <u>Structure</u>: instruction steps disclosed at 035 patent, 5:24-51, 7:43-8:7, 8:10-15, Figure 2, Figure 3, Figure 4, Figure 7, Figure 8, and equivalents thereof.
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82. Charter contends that the term “a receiver that receives a notification that an updated configuration file is available for the ONU” is governed by 35 U.S.C. §112(f) (post-AIA) / 35 U.S.C. §112, ¶6 (pre-AIA). I disagree. Unlike ‘035 claim 32, which uses “means for receiving...” to make clear that 35 U.S.C. §112, ¶6 applies, the patentee deliberately chose a different format when drafting ‘035 claim 20 to make equally clear that 35 U.S.C. §112, ¶6 does not apply; claim 20 does not use the term “means for receiving,” but rather recites a “receiver.” Persons of skill understand that the term “receiver” connotes particular structure in the art; it is not a nonce word. As such, 35 U.S.C. §112, ¶6 is inapplicable and this term should be construed as per its plain and ordinary meaning.

83. The disputed term appears in Claim 20 of the ‘035 Patent, which I reproduce below:

20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising:

a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;

an obtainer that obtains the updated configuration file;

a first validator that performs a first validation of the updated configuration file for structural errors;

a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;

a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and

an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.

'035 Patent at 12:22-40 (emphasis added).

84. Claim 20 is very similar to claim 32—with one important difference. As shown below, claim 20 is not drafted in means-plus-function format (*i.e.*, “means for...”), whereas claim 32 is drafted in means-plus-function format. A person of ordinary skill would understand from this that 35 U.S.C. §112, ¶6 does not apply to claim 20, but does apply to claim 32. If 35 U.S.C. §112, ¶6 did apply to claim 20, then claim 20 would be substantively identical to claim 32. Persons of ordinary skill understand that, per the doctrine of claim differentiation, different words mean different things, and different claims are presumed to be different. A person of ordinary skill would not understand claims 20 and 32 to be exactly the same—which is what would happen if 35 U.S.C. §112, ¶6 were to apply to claim 20 (like it does to claim 32).

'035 Claim 20	'035 Claim 32
20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: <u>a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;</u> an obtainer that obtains the updated configuration file; a first validator that performs a first validation of the updated configuration file for structural errors; a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes; a second validator that performs a second validation about whether the ONU	32. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: <u>means for receiving a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;</u> means for obtaining the updated configuration file; means for performing a first validation of the updated configuration file for structural errors; means for determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes; means for performing a second validation about whether the ONU resources to

resources to implement the changes are available or not at the ONU; and an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.	implement the changes are available or not at the ONU; and means for applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.
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85. I have also analyzed the dependent claims of the '035 Patent, and that analysis confirms that “receiver” is a particular structural module. For example, dependent claim 21 recites that “the receiver includes: a detector that detects a change to a management information base (MIB) entry.” This additional structure of the claimed receiver, and the absence of a similar dependent claim for claim 32, serves to further confirm that the receiver of claim 20 is intended to be a structural module of the claimed apparatus.

86. The '035 specification confirms my understanding that the term “receiver” has sufficient definite meaning as the name for structure. For example, the specification describes a flow chart 800 of an apparatus for updating configuration of an ONU. *See* '035 Patent at 7:58-60. This flow chart includes a structure 802 that “receive[s] a notification that an updated configuration file is available for the ONU.” '035 Patent at 7:61-62; *see also id.* at 7:45-47.

87. In addition to claim 21, the '035 specification explains that the structure receives the notification in the form of a change in the MIB object: “Next, using the existing OSS mechanisms, the operator may trigger the vCM to download the updated CM config file (304). This can be achieved by setting the dpoeVcmDynCfgNow MIB object to set.” '035 Patent at 5:41-45.

88. In view of these teachings, a person of ordinary skill in the art would understand that the term “receiver” has a definite structure. For example, the Modern Dictionary of Electronics defines “receiver” as “[a] device for the reception and, if necessary, demodulation of electronic signals.” Modern Dictionary of Electronics, Seventh Ed. (1999) at 628.. The Modern Dictionary

of Electronics also defines “receiving equipment” as “equipment (amplifiers, filters, oscillator, demodulator, etc.) associated with incoming signals.” *Id.*

89. “Receiver” has a well understood meaning. In fact, the term “receiver” has been used in the professional literature for well over 100 years and would have been understood by persons of ordinary skill at the time of the priority date as having a sufficiently definite meaning as a name for particular structure or class of structures. *See, e.g.*, C.F. Meyer, J.B. Whitehead “*The Vibrations of telephone diaphragms*,” June 1912, in Proceedings of the American Institute of Electrical Engineers which discusses early telephone receivers. [The vibrations of telephone diaphragms | IEEE Journals & Magazine | IEEE Xplore](#) .

90. This 1987 paper, cited by 110 other scholarly articles, discusses coherent optical receivers, a specific class of receiver structures. A. Davis, M. Pettitt, J. King and S. Wright, “*Phase diversity techniques for coherent optical receivers*,” in Journal of Lightwave Technology, vol. 5, no. 4, pp. 561-572, April 1987, doi: 10.1109/JLT.1987.1075539. (<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1075539&isnumber=23177>)

(“Abstract: In the present state of the art, coherent optical receivers most often operate in the heterodyne mode. Here a photodiode-amplifier combination having bandwidth greater than twice the bit rate (B) is needed: indeed bandwidths considerably greater than $2B$ are preferably employed to ease design of the bandpass filter needed for noise limitation, and to avoid demodulator penalties in some modulation schemes. For the high bit rate systems now coming into service (560 Mbit/s-2.4 Gbit/s), the optical receiver design requirements become more stringent for coherent heterodyne operation. The various modes of “zero IF” operation, however, require only baseband receiver module bandwidth. The options available are either homodyne (phase locked) operation, or phase diversity (multiport) techniques. In this paper, we compare these options, and show that

phase diversity techniques are capable of good performance for high bit rate coherent receivers. In phase diversity operation, not only is phase locking avoided, but also the necessary frequency locking does not have high stability requirements. Furthermore, there are advantages in operating with a small frequency offset from zero (of the order of 1 percent of the bit rate). An experimental receiver has been operated at 320 and 680 Mbit/s, demodulating both amplitude shift keying (ASK) and differential phase shift keying (DPSK). Operation with FSK is also possible. Sensitivities so far achieved of -47.5 dBm (320-Mbit/s ASK) and -42 dBm (680- Mbit/s ASK) with limited local oscillator power are capable of substantial improvement when higher power local oscillators and lower noise receive modules become available. Demodulation of DPSK at 320 Mbit/s has also been achieved and shows a measured receiver sensitivity improvement of over 4 dB over ASK at the same bit rate and local oscillator power. These practical results show clearly that phase diversity is a very realistic option for high bit rate systems.”).

91. The authors explain (page 561) that “the majority of coherent optical receivers so far reported have operated in the heterodyne mode.” “Majority of coherent optical receivers” indicates a class of receiver structures while “so far reported have operated in the heterodyne mode” indicates a particular receiver structure. A person of ordinary skill in the art at the time of the priority date would have understood and recognized that the type of receiver refers to a class of structures (class of structure: coherent optical receivers) and the operating mode refers to a particular structure within this class of receivers (particular structure: operated in the heterodyne mode). This confirms my contention that the term “receiver” connotes a particular structure or class of structures.

92. Another example of a “receiver” can be seen in chapter 4 of Coulouris’ Distributed Systems, which describes “requirements for communication and synchronization between co-

operating processes in distributed systems and the implementation of protocols to support them.” Coulouris, *Distributed Systems*, Second Ed. (1994) at 99. On page 101, it discusses the “Building blocks” of communications between two computers and provides an example of *Send* and *Receive* operations using ports. *Id.* at 103-04. It explains that “[i]n order for one process to communicate with another, one process sends a message (a sequence of data items) to a destination and another process at the destination receives the message.” *Id.* at 104. Figure 4.2, shown below, shows a snippet of Modula-2 programming code that depicts the *Send* and *Receive* operations using ports:

Figure 4.2 Definition of message-passing operations

```

DEFINITION MODULE Message;
EXPORT QUALIFIED Message, ErrorReport, PortId, Send, Receive;
TYPE
  PortId = (* global port identifier, represented for example by 128 bits *)
  Message = RECORD
    dataItems: (* sequence of bytes *);
  END;
  ErrorType = (NONE, TIMEOUT);
VAR ErrorReport: ErrorType; (* used when Receive times out *)
PROCEDURE Send(p:PortId; m:Message);
  (* Basic send - does not guarantee to deliver the message -
  it therefore does not produce any error reports *)
PROCEDURE Receive( p:PortId; VAR m:Message);
  (* Basic receive produces an error report when it times out *)
END Message.

```

Id. at 104.

93. A person of ordinary skill in the art would find additional examples of “receiver” structures within the OLT and ONU both of which contain optical transceiver components. An optical transceiver consists of an optical transmitter and an optical receiver. See, e.g., US 7,796,893 B2. The OLT optical transceiver contains an optical receiver (a burst mode optical receiver) designed for the reception bursts of upstream information sent via a modulated optical carrier from an ONU’s optical transmitter. Likewise, the ONU optical transceiver contains an optical receiver designed for the reception of downstream information sent via a modulated optical carrier from the OLT’s optical transmitter. Furthermore, both the OLT and ONU contain additional receiver

components. In the case of the OLT, additional receiver structures are needed for communicating with the OSS back-office management system and also the edge router connecting it to the broader internet. In the case of the ONU, additional receiver structures are required for communicating with customer premises equipment (CPE). Such additional receiver structures could be optical, electrical, or radio/microwave in structural design. *See, e.g.*, DPoE-SP-ARCHv1.0-C01-160830 and US 8,897,644 B2.

94. Nonetheless, if it is determined by the Court that “receiver” is governed by 35 U.S.C. § 112(f), it is my opinion that the agreed construction for the “means for receiving” term of claim 32 would apply.

95. In summary, it is my opinion that persons of ordinary skill understand that the term “receiver” connotes particular structure in the art and that it is not a nonce word. This is supported by the specification and claims. As such, 35 U.S.C. §112, ¶6 is inapplicable to “receiver” and this term should be construed as per its plain and ordinary meaning.

F. “an obtainer that obtains the updated configuration file” (‘035 claim 20)

Iarnach’s Construction	Charter’s Construction
Plain and ordinary meaning. Not governed by 35 U.S.C. §112, ¶6	Governed by 35 U.S.C. §112(f) <u>Function</u> : obtains the updated configuration file <u>Structure</u> : instruction steps disclosed at 035 patent, 5:24-51, 7:43-8:7, 8:10-15, Figure 2, Figure 3, Figure 4, Figure 7, Figure 8, and equivalents thereof.

96. Charter contends that the term “an obtainer that obtains the updated configuration file” is governed by 35 U.S.C. §112(f) (post-AIA) / 35 U.S.C. §112, ¶6 (pre-AIA). I disagree. Unlike ‘035 claim 32, which uses “means for obtaining...” to make clear that 35 U.S.C. §112, ¶6 applies, the patentee deliberately chose a different format when drafting ‘035 claim 20 to make equally clear that 35 U.S.C. §112, ¶6 does not apply; claim 20 does not use the term “means for

obtaining,” but rather recites an “obtainer.” Persons of skill understand that the term “obtainer” connotes particular structure in the art; it is not a nonce word. As such, 35 U.S.C. §112, ¶6 is inapplicable and this term should be construed as per its plain and ordinary meaning.

97. The disputed term appears in Claim 20 of the ‘035 Patent, which I reproduce below:

20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising:

a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;

an obtainer that obtains the updated configuration file;

a first validator that performs a first validation of the updated configuration file for structural errors;

a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;

a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and

an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.

’035 Patent at 12:22-40 (emphasis added).

98. Claim 20 is very similar to claim 32—with one important difference. As shown below, claim 20 is not drafted in means-plus-function format (*i.e.*, “means for...”), whereas claim 32 is drafted in means-plus-function format. A person of ordinary skill would understand from this that 35 U.S.C. §112, ¶6 does not apply to claim 20, but does apply to claim 32. If 35 U.S.C. §112, ¶6 did apply to claim 20, then claim 20 would be substantively identical to claim 32. Persons of ordinary skill understand that, per the doctrine of claim differentiation, different words mean different things, and different claims are presumed to be different. A person of ordinary skill would not understand claims 20 and 32 to be exactly the same—which is what would happen if 35 U.S.C. §112, ¶6 were to apply to claim 20 (like it does to claim 32).

'035 Claim 20	'035 Claim 32
20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file; <u>an obtainer that obtains the updated configuration file;</u> a first validator that performs a first validation of the updated configuration file for structural errors; a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes; a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.	32. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: means for receiving a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file; <u>means for obtaining the updated configuration file;</u> means for performing a first validation of the updated configuration file for structural errors; means for determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes; means for performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and means for applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.

99. The '035 specification confirms my understanding that the term “obtainer” has sufficient definite meaning as the name for structure. For example, the specification describes a flow chart 800 of an apparatus for updating configuration of an ONU. *See* '035 Patent at 7:58-60. This flow chart includes a structure 804 that “obtain[s] the updated configuration file.” '035 Patent at 7:62-63; *see also id.* at 7:47-48.

100. Furthermore, the '035 specification teaches that “[t]he vCM uses the **standard mechanism defined in DPoE I01 specifications to obtain** the said CM config file, starting with

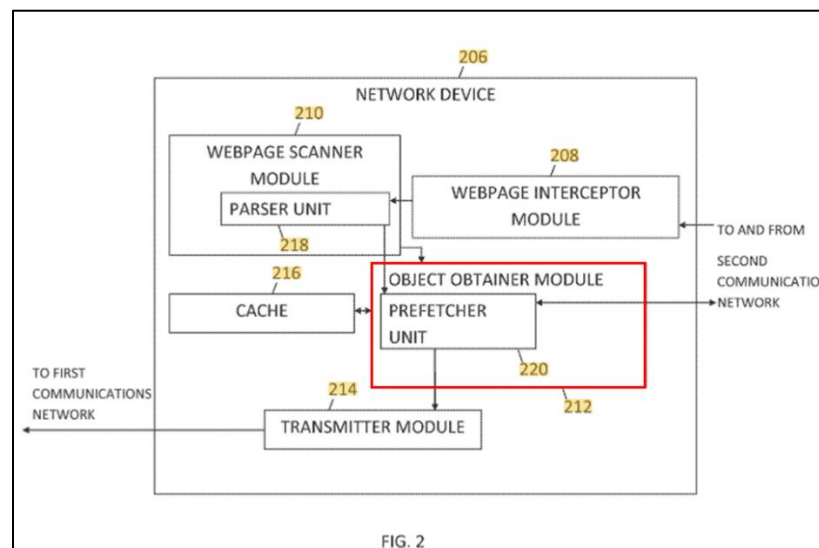
DHCP request message (402) and then following with (T)FTP download (404) of the new CM config file into the DPoE System for further processing.” ’035 Patent at 5:55-60 (emphasis added). To a person of ordinary skill, this means that the “obtainer” is a standard structure that involves communicating with servers via (T)FTP.

101. This standard structure is well-understood in the world of networking. For example, a person of ordinary skill in the art would understand that structural terms like “getter” or “retriever” would be synonymous with “obtainer.” See Webster’s New World Roget’s A-Z Thesaurus (1999) at 541 (showing synonyms of obtain that include “get” and “retrieve”). Microsoft Press’s Computer Dictionary (1997) defines “get” as an “FTP command that instructs the server to transfer a specified file to the client.” Microsoft Press, Computer Dictionary (1997) at 217 (defining “get”). Similarly, a person of ordinary skill in the art would understand that “Computers can retrieve information from any source of storage.” *Id.* at 410.

102. An example of such structure is depicted by “FTP commands,” which are well-understood and definite structures. FTP stands for File Transfer Protocol. Microsoft Press, Computer Dictionary (1997) at 210). This protocol is used for copying files to and from remote computer systems on a network. *Id.* The FTP protocol uses commands to carry out their function. *Id.* As recognized by the ’035 specification, this is standard knowledge within the world of networking. See ’035 Patent at 5:55-60.

103. In addition, in the context of data communications, the term “obtainer” can be found in patents and would have been understood by persons of ordinary skill at the time of the priority date as having a sufficiently definite meaning as a name for particular structure or class of structures.

104. For example, US,9,021,047 B2 “Method and System for Delivering Embedded Objects in a Webpage to a User Agent Using a Network Device” filed July 29, 2011 uses the term “obtainer” twenty-one times. In particular, the inventors describe an “object obtainer module” that is configured to obtain an object that is identified by one of the links.” [1:63-64] By object, the inventors are referring to images, scripts, audios, and videos [1:15]. This patent addresses communicating these objects within a webpage over a limited bandwidth link [1:16-18]. The “object obtainer module” may be included as part of a network device [1:57-66]. Figure 2 depicts the particular structure of the “object obtainer module” (outlined in red) embedded within the network device. As this obtainer is intended to interact with embedded objects of a webpage the realization of this module would be in the form of software or firmware designed to carry out the specified functionality. This confirms my contention that the term “obtainer” connotes a particular structural module that a person of ordinary skill in the art at the time of the priority date would have understood.



105. Nonetheless, if it is determined by the Court that “obtainer” is governed by 35 U.S.C. § 112(f), it is my opinion that the agreed construction for the “means for obtaining” term of claim 32 would apply.

106. In summary, it is my opinion that persons of ordinary skill understand that the term “obtainer” connotes particular structure in the art and that it is not a nonce word. This is supported by the specification and claims. As such, 35 U.S.C. §112, ¶6 is inapplicable to “obtainer” and this term should be construed as per its plain and ordinary meaning.

G. “a first validator that performs a first validation of the updated configuration file for structural errors” (‘035 claim 20)

Iarnach’s Construction	Charter’s Construction
Plain and ordinary meaning. Not governed by 35 U.S.C. §112, ¶6	Governed by 35 U.S.C. §112(f) <u>Function</u> : performs a first validation of the updated configuration file for structural errors <u>Structure</u> : instruction steps disclosed at 035 patent, 5:24-51, 7:43-8:7, 8:10-15, Figure 2, Figure 3, Figure 4, Figure 7, Figure 8, and equivalents thereof.

107. Charter contends that the term “a first validator that performs a first validation of the updated configuration file for structural errors” is governed by 35 U.S.C. §112(f) (post-AIA) / 35 U.S.C. §112, ¶6 (pre-AIA). I disagree. Unlike ‘035 claim 32, which uses “means for performing a first validation...” to make clear that 35 U.S.C. §112, ¶6 applies, the patentee deliberately chose a different format when drafting ‘035 claim 20 to make equally clear that 35 U.S.C. §112, ¶6 does not apply; claim 20 does not use the term “means for performing a first validation obtaining,” but rather recites a “first validator.” Persons of skill understand that the term “validator” connotes particular structure in the art; it is not a nonce word. As such, 35 U.S.C. §112, ¶6 is inapplicable and this term should be construed as per its plain and ordinary meaning.

108. The disputed term appears in Claim 20 of the ‘035 Patent, which I reproduce below:

20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising:

a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;

an obtainer that obtains the updated configuration file;

a first validator that performs a first validation of the updated configuration file for structural errors;

a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;

a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and

an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.

'035 Patent at 12:22-40 (emphasis added).

109. Claim 20 is very similar to claim 32—with one important difference. As shown below, claim 20 is not drafted in means-plus-function format (*i.e.*, “means for...”), whereas claim 32 is drafted in means-plus-function format. A person of ordinary skill would understand from this that 35 U.S.C. §112, ¶6 does not apply to claim 20, but does apply to claim 32. If 35 U.S.C. §112, ¶6 did apply to claim 20, then claim 20 would be substantively identical to claim 32. Persons of ordinary skill understand that, per the doctrine of claim differentiation, different words mean different things, and different claims are presumed to be different. A person of ordinary skill would not understand claims 20 and 32 to be exactly the same—which is what would happen if 35 U.S.C. §112, ¶6 were to apply to claim 20 (like it does to claim 32).

'035 Claim 20	'035 Claim 32
20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is	32. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: means for receiving a notification that an updated configuration file is available for

configured with a current configuration file; an obtainer that obtains the updated configuration file; <u>a first validator that performs a first validation of the updated configuration file for structural errors;</u> a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes; a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.	the ONU, wherein the ONU is configured with a current configuration file; means for obtaining the updated configuration file; <u>means for performing a first validation of the updated configuration file for structural errors;</u> means for determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes; means for performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and means for applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.
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110. The specification also confirms my understanding that a “first validator” is a particular structural module. For example, Figure 8 is described as “a block diagram representation of an apparatus 800 for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON).” *See* ’035 Patent at 7:58-60. The specification refers to module 806, stating that “[t]he module 806 is for performing a first validation of the updated configuration file for structural errors.” *Id.* at 7:64-65. In my opinion, module 806 is an example embodiment of the claimed first validator. *See id.*; *see also id.* at 8:20-22.

111. “First validator” has a well understood meaning. In the context of software and computer engineering, the term “first validator” has been used in professional literature since at least 2008 and would have been understood by persons of ordinary skill at the time of the priority

date as having a sufficiently definite meaning as a name for particular structure or class of structures.

112. This 2008 paper concerning software development for facial tracking employs a “first validator.” S. Shen and Y. Liu, *"An Efficient Multiple Faces Tracking System,"* 2008 Congress on Image and Signal Processing, Sanya, China, 2008, pp. 161-165, doi: 10.1109/CISP.2008.113.

(<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4566636&isnumber=4566597>)

(“Abstract: A multiple faces tracking system was presented based on Relevance Vector Machine (RVM) and Boosting learning. In this system, a face detector based on Boosting learning is used to detect faces at the first frame, and the face motion model and color model are created. In the tracking process different tracking methods are used according to different states of faces, and the states are changed according to the tracking results. When the full image search condition is satisfied, a full image search is started in order to find new coming faces and former occluded faces. In the full image search and local search, the similarity matrix is introduced to help matching faces efficiently. Experimental results demonstrate the capability and efficiency of the proposed system.”).

113. The authors explain that a “first validator uses the face detector based on AdaBoost to find a face in the result, and gives a positive response if a face is found” (page 163). The paper is based upon machine learning which is software centric technology. AdaBoost short for Adaptive Boosting, is a powerful ensemble learning algorithm that combines multiple weak learners (like decision trees) to create a strong classifier (Google AI search result for “AdaBoost”). This paper confirms my contention that a “first validator” is of a particular structural module, a software

module in this case, and would have been well understood at the priority date by a person of ordinary skill in the art.

114. Nonetheless, if it is determined by the Court that “first validator” is governed by 35 U.S.C. § 112(f), it is my opinion that the agreed construction for the “means for performing a first validation” term of claim 32 would apply.

115. In summary, it is my opinion that persons of skill understand that the term “first validator” connotes particular structure in the art and that it is not a nonce word. This is supported by the specification and claims. As such, 35 U.S.C. §112, ¶6 is inapplicable to “first validator” and this term should be construed as per its plain and ordinary meaning.

H. “a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes” (‘035 claim 20)

Iarnach’s Construction	Charter’s Construction
Plain and ordinary meaning. Not governed by 35 U.S.C. §112, ¶6	Governed by 35 U.S.C. §112(f) <u>Function</u> : determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes <u>Structure</u> : instruction steps disclosed at 035 patent, 6:35-48, 7:49-8:7, Figure 2, Figure 3, Figure 4, Figure 7, Figure 8, and equivalents thereof

116. Charter contends that the term “a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes” is governed by 35 U.S.C. §112(f) (post-AIA) / 35 U.S.C. §112, ¶6 (pre-AIA). I disagree. Unlike ‘035 claim 32, which uses “means for determining changes...” to make clear that 35 U.S.C. §112, ¶6 applies, the patentee deliberately chose a different format when drafting ‘035 claim 20 to make equally clear that 35 U.S.C. §112, ¶6 does not apply; claim 20 does

not use the term “means for determining changes,” but rather recites a “determiner.” Persons of skill understand that the term “determiner” connotes particular structure in the art; it is not a nonce word. As such, 35 U.S.C. §112, ¶6 is inapplicable and this term should be construed as per its plain and ordinary meaning.

117. The disputed term appears in Claim 20 of the ‘035 Patent, which I reproduce below:

20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising:

a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;

an obtainer that obtains the updated configuration file;

a first validator that performs a first validation of the updated configuration file for structural errors;

a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;

a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and

an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.

’035 Patent at 12:22-40 (emphasis added).

118. Claim 20 is very similar to claim 32—with one important difference. As shown below, claim 20 is not drafted in means-plus-function format (*i.e.*, “means for...”), whereas claim 32 is drafted in means-plus-function format. A person of ordinary skill would understand from this that 35 U.S.C. §112, ¶6 does not apply to claim 20, but does apply to claim 32. If 35 U.S.C. §112, ¶6 did apply to claim 20, then claim 20 would be substantively identical to claim 32. Persons of ordinary skill understand that, per the doctrine of claim differentiation, different words mean different things, and different claims are presumed to be different. A person of ordinary skill would not understand claims 20 and 32 to be exactly the same—which is what would happen if 35 U.S.C. §112, ¶6 were to apply to claim 20 (like it does to claim 32).

'035 Claim 20	'035 Claim 32
20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file; an obtainer that obtains the updated configuration file; a first validator that performs a first validation of the updated configuration file for structural errors; <u>a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;</u> a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.	32. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: means for receiving a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file; means for obtaining the updated configuration file; means for performing a first validation of the updated configuration file for structural errors; <u>means for determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;</u> means for performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and means for applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.

119. The specification also confirms my understanding that a “determiner” is a particular structural module. For example, Figure 8 is described as “a block diagram representation of an apparatus 800 for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON).” See ’035 Patent at 7:58-60. The specification refers to module 808, stating that “[t]he module 808 is for determining changes between a current configuration of the ONU and the updated configuration file to identify ONU resources to implement to the changes.”

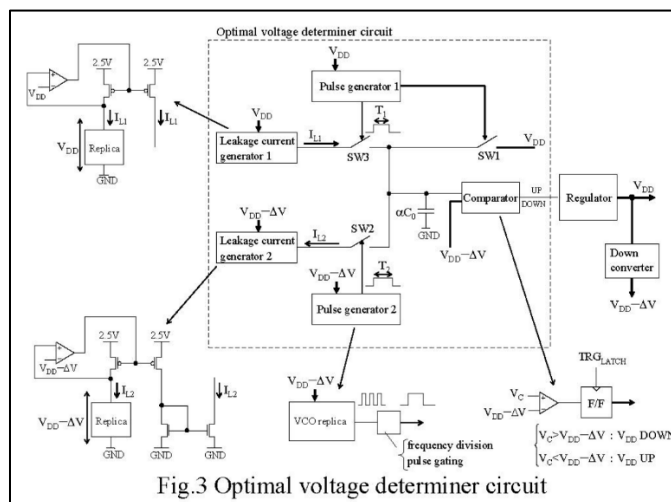
Id. at 7:65-8:1. In my opinion, module 808 is an example embodiment of the claimed determiner. *See id.*; *see also id.* at 8:20-22.

120. “Determiner” has a well understood meaning. For example, in the context of electronic circuitry, a determiner circuit makes a decision of some sort based upon signal information it receives. Such information could be digital or analog in nature. Likewise, the decision result of the determiner circuit could be digital or analog in nature. The term “determiner” would have been understood by persons of ordinary skill at the time of the priority date as having a sufficiently definite meaning as a name for particular structure or class of structures.

121. This paper from 2007 explains that a determiner circuit can be used to establish an optimal voltage level. In this case the determiner has a particular structure in the form of an electronic circuit. Y. Ikenaga, M. Nomura, Y. Nakazawa and Y. Hagihara, "*An Optimal Supply Voltage Determiner Circuit for Minimum Energy Operations*," 2007 IEEE Symposium on VLSI Circuits, Kyoto, Japan, 2007, pp. 156-157, doi: 10.1109/VLSIC.2007.4342696. (<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4342696&isnumber=4342661>)

(“Abstract: We have developed a circuit for determining an optimal supply voltage, VOPT for which energy consumption in circuit operations will be minimized in devices suffering from high-leakage. This VOPT is determined on the basis of a trade-off between power consumption and delay time. Experimental results with a 90-nm CMOS device indicate that the proposed circuit successfully determines VOPT within 3% of actual minimum energy consumption. VOPT operations with power gating at 40 MHz, and where VDD=0.67 V, results in an energy reduction of 52.8% over that achieved with DVFS alone at 5 MHz (1/20 of maximum operational frequency).”).

122. As noted in the paper’s abstract, the determiner, in the particular structure of an electronic circuit, successfully determines V_{OPT} (the optimal voltage) within 3% of actual minimal energy consumption. The determiner, a circuit, was fabricated using 90-nm CMOS technology (page156). Figure 3 from this paper shows the authors’ optimal voltage determiner circuit. This confirms my contention that the term “determiner” connotes a particular structure and would have been understood by a person of ordinary skill at the priority date.



123. Nonetheless, if it is determined by the Court that “determiner” is governed by 35 U.S.C. § 112(f), it is my opinion that the agreed construction for the “means for determining” term of claim 32 would apply.

124. In summary, it is my opinion that persons of skill understand that the term “determiner” connotes particular structure in the art and that it is not a nonce word. This is supported by the specification and claims. As such, 35 U.S.C. §112, ¶6 is inapplicable to “determiner” and this term should be construed as per its plain and ordinary meaning.

- I. “a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU” (‘035 claim 20)

Iarnach’s Construction	Charter’s Construction
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Plain and ordinary meaning. Not governed by 35 U.S.C. §112, ¶6	Governed by 35 U.S.C. §112(f) <u>Function:</u> performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU <u>Structure:</u> instruction steps disclosed at '035 patent, 5:24-51, 6:35-64, 7:43-8:7, 8:10-19, Figure 2, Figure 3, Figure 4, Figure 7, Figure 8, and equivalents thereof.
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125. Charter contends that the term “a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU” is governed by 35 U.S.C. §112(f) (post-AIA) / 35 U.S.C. §112, ¶6 (pre-AIA). I disagree. Unlike ‘035 claim 32, which uses “means for performing a second validation...” to make clear that 35 U.S.C. §112, ¶6 applies, the patentee deliberately chose a different format when drafting ‘035 claim 20 to make equally clear that 35 U.S.C. §112, ¶6 does not apply; claim 20 does not use the term “means for performing a second validation,” but rather recites a “second validator.” Persons of skill understand that the term “validator” connotes particular structure in the art; it is not a nonce word. As such, 35 U.S.C. §112, ¶6 is inapplicable and this term should be construed as per its plain and ordinary meaning.

126. The disputed term appears in Claim 20 of the ‘035 Patent, which I reproduce below:

20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising:

a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;

an obtainer that obtains the updated configuration file;

a first validator that performs a first validation of the updated configuration file for structural errors;

a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;

a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and

an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.

'035 Patent at 12:22-40 (emphasis added).

127. Claim 20 is very similar to claim 32—with one important difference. As shown below, claim 20 is not drafted in means-plus-function format (*i.e.*, “means for...”), whereas claim 32 is drafted in means-plus-function format. A person of ordinary skill would understand from this that 35 U.S.C. §112, ¶6 does not apply to claim 20, but does apply to claim 32. If 35 U.S.C. §112, ¶6 did apply to claim 20, then claim 20 would be substantively identical to claim 32. Persons of ordinary skill understand that, per the doctrine of claim differentiation, different words mean different things, and different claims are presumed to be different. A person of ordinary skill would not understand claims 20 and 32 to be exactly the same—which is what would happen if 35 U.S.C. §112, ¶6 were to apply to claim 20 (like it does to claim 32).

'035 Claim 20	'035 Claim 32
20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file; an obtainer that obtains the updated configuration file; a first validator that performs a first validation of the updated configuration file for structural errors; a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;	32. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: means for receiving a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file; means for obtaining the updated configuration file; means for performing a first validation of the updated configuration file for structural errors; means for determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;

<u>a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU;</u> and an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.	<u>means for performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU;</u> and means for applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.
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128. The specification also confirms my understanding that a “second validator” is a particular structural module. For example, Figure 8 is described as “a block diagram representation of an apparatus 800 for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON).” See ’035 Patent at 7:58-60. The specification refers to module 810, stating that “[t]he module 810 is for performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU.” *Id.* at 8:1-4. In my opinion, module 810 is an example embodiment of the claimed second validator. See *id.*; see also *id.* at 8:20-22.

129. “Second validator” has a well understood meaning. In the context of software and computer engineering, the term “second validator” has been used in professional literature since at least 2008 and would have been understood by persons of ordinary skill at the time of the priority date as having a sufficiently definite meaning as a name for particular structure or class of structures.

130. This 2008 paper concerning software development for facial tracking employs a “second validator.” S. Shen and Y. Liu, “An Efficient Multiple Faces Tracking System,” 2008 Congress on Image and Signal Processing, Sanya, China, 2008, pp. 161-165, doi: 10.1109/CISP.2008.113.

(<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4566636&isnumber=4566597>)

(“Abstract: A multiple faces tracking system was presented based on Relevance Vector Machine (RVM) and Boosting learning. In this system, a face detector based on Boosting learning is used to detect faces at the first frame, and the face motion model and color model are created. In the tracking process different tracking methods are used according to different states of faces, and the states are changed according to the tracking results. When the full image search condition is satisfied, a full image search is started in order to find new coming faces and former occluded faces. In the full image search and local search, the similarity matrix is introduced to help matching faces efficiently. Experimental results demonstrate the capability and efficiency of the proposed system.”).

131. The authors explain that a “second validator uses the face model to measure the similarity between the result and the face color model, and it gives a positive response if the similarity is bigger than a threshold” (page 163). The paper is based upon machine learning, which is software centric technology. The authors’ technology uses RVM (relevance vector machine), a machine learning technique that uses Bayesian inference to learn sparse models for regression and classification tasks and AdaBoost, short for Adaptive Boosting, which is a powerful ensemble learning algorithm that combines multiple weak learners (like decision trees) to create a strong classifier (Google AI search result for “relevance vector machine” and also “AdaBoost”). This paper confirms my contention that a “second validator” is of a particular structural module, a software module in this case, and would have been well understood at the priority date by a person of ordinary skill in the art.

132. Nonetheless, if it is determined by the Court that “second validator” is governed by 35 U.S.C. § 112(f), it is my opinion that the agreed construction for the “means for performing a second validation” term of claim 32 would apply.

133. In summary, it is my opinion that persons of skill understand that the term “second validator” connotes particular structure in the art and that it is not a nonce word. This is supported by the specification and claims. As such, 35 U.S.C. §112, ¶6 is inapplicable to “second validator” and this term should be construed as per its plain and ordinary meaning.

J. “an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU” (‘035 claim 20)

Iarnach’s Construction	Charter’s Construction
Plain and ordinary meaning. Not governed by 35 U.S.C. §112, ¶6	Governed by 35 U.S.C. §112(f) <u>Function</u> : applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU <u>Structure</u> : instruction steps disclosed at 035 patent, 5:24-51, 7:43-8:7, 8:10-19, Figure 2, Figure 3, Figure 4, Figure 7, Figure 8, and equivalents thereof.

134. Charter contends that the term “an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU” is governed by 35 U.S.C. §112(f) (post-AIA) / 35 U.S.C. §112, ¶6 (pre-AIA). I disagree. Unlike ‘035 claim 32, which uses “means for applying...” to make clear that 35 U.S.C. §112, ¶6 applies, the patentee deliberately chose a different format when drafting ‘035 claim 20 to make equally clear that 35 U.S.C. §112, ¶6 does not apply; claim 20 does not use the term “means for applying,” but rather recites an “applier.” Persons of skill understand that the term “applier” connotes particular structure in the art; it is not a nonce word. As such, 35 U.S.C. §112, ¶6 is inapplicable and this term should be construed as per its plain and ordinary meaning.

135. The disputed term appears in Claim 20 of the ‘035 Patent, which I reproduce below:

20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising:

a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;

an obtainer that obtains the updated configuration file;

a first validator that performs a first validation of the updated configuration file for structural errors;

a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;

a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and

an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.

’035 Patent at 12:22-40 (emphasis added).

136. Claim 20 is very similar to claim 32—with one important difference. As shown below, claim 20 is not drafted in means-plus-function format (*i.e.*, “means for...”), whereas claim 32 is drafted in means-plus-function format. A person of ordinary skill would understand from this that 35 U.S.C. §112, ¶6 does not apply to claim 20, but does apply to claim 32. If 35 U.S.C. §112, ¶6 did apply to claim 20, then claim 20 would be substantively identical to claim 32. Persons of ordinary skill understand that, per the doctrine of claim differentiation, different words mean different things, and different claims are presumed to be different. A person of ordinary skill would not understand claims 20 and 32 to be exactly the same—which is what would happen if 35 U.S.C. §112, ¶6 were to apply to claim 20 (like it does to claim 32).

’035 Claim 20	’035 Claim 32
20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: a receiver that receives a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;	32. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising: means for receiving a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;

an obtainer that obtains the updated configuration file; a first validator that performs a first validation of the updated configuration file for structural errors; a determiner that determines changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes; a second validator that performs a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and <u>an applier that applies the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.</u>	means for obtaining the updated configuration file; means for performing a first validation of the updated configuration file for structural errors; means for determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes; means for performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and <u>means for applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.</u>
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137. The specification also confirms my understanding that an “applier” is a particular structural module. For example, Figure 8 is described as “a block diagram representation of an apparatus 800 for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON).” *See* ’035 Patent at 7:58-60. The specification refers to module 812, stating that “[t]he module 812 is for applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.” *Id.* at 8:4-7. In my opinion, module 812 is an example embodiment of the claimed applier. *See id.*; *see also id.* at 8:20-22.

138. “Applier” has a well understood meaning. In the context of computers, software, and artificial intelligence, the term “applier” has been used in professional literature since at least 1981 and would have been understood by persons of ordinary skill at the time of the priority date as having a sufficiently definite meaning as a name for a particular structure or class of structures.

139. In this 1981 paper, an early article on artificial intelligence, the author teaches “a technique called hierarchical task management for constructing computer language-processing systems comprising an arbitrary number of distinct, potentially distributed processes” (page 52). The tasks, as described in the article are managed by a task manger, and are illustrated in a multiprocess story understander using what the author denotes as a *distributed script applier mechanism* that reads and summarizes newspaper stories about plane crashes. R. E. Cullingford, "Integrating Knowledge Sources for Computer "Understanding" Tasks," in IEEE Transactions on Systems, Man, and Cybernetics, vol. 11, no. 1, pp. 52-60, Jan. 1981, doi: 10.1109/TSMC.1981.4308578.

(<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4308578&isnumber=4308570>)

(“Abstract: Recent research in artificial intelligence has identified a number of knowledge sources which appear to be needed for effective automatic "understanding" of connected natural language speech and text. These include word-and phrase-level semantics, models for actors and objects, and inference techniques for using script- or goal-oriented knowledge structures. A unified model of the understanding process can be defined using the distributed-computing viewpoint, provided some way can be found to integrate and control a collection of "experts," each one associated with a certain kind of knowledge source. A technique is described, called hierarchical task management, for constructing computer language-processing systems comprising an arbitrary number of distinct, potentially distributed, processes. The technique is based upon the repeated activation and expansion of data structures called tasks, which define important components of the understanding process in terms of a controlled interaction among the experts. The tasks are maintained on several "agendas," and are manipulated by a uniform monitor called the task manager. The process of task

management is illustrated in a *multiprocess story understander* called a distributable script applier mechanism (DSAM), which reads and summarizes newspaper stories about plane crashes.”).

140. The author explains that amongst many other requirements “a story understanding program, for example, needs access to information about the conceptual structures that words, phrases, and sentences build.” (page 52) The author also explains that “the understanding process seems to be decomposable in principle into a large number of functionally distinct subprocesses, at least some of which could run in parallel. A subprocess can be thought of as being an "expert" at a certain kind of activity.” (page 52) In other words, the author is stating that the machine learning process can be broken down into multiple specialized software modules (scripts). The distributed script *applier* mechanism manages the scripts and applies them with the task of careful reading. The author further explains (page 53) “knowledge about causal or typical relations among stereotypical events in the world...is contained in the script, and manipulated by an expert called a script applier.” (page 53) The applier is a specialized software module, therefore of particular structure, designed to carry out the task as described. This serves to confirm my contention that the term “applier” connotes a particular structural module and this certainly would have been understood by a person of ordinary skill in the art at the priority date.

141. Nonetheless, if it is determined by the Court that “applier” is governed by 35 U.S.C. § 112(f), it is my opinion that the agreed construction for the “means for applying” term of claim 32 would apply.

142. In summary, it is my opinion that persons of skill understand that the term “applier” connotes particular structure in the art and that it is not a nonce word. This is supported by the specification and claims. As such, 35 U.S.C. §112, ¶6 is inapplicable to “applier” and this term should be construed as per its plain and ordinary meaning.