

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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CHARTER COMMUNICATIONS, INC.,

Petitioner,

v.

IARNACH TECHNOLOGIES LTD.,  
Patent Owner.

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IPR2025-\_\_\_\_\_  
U.S. Patent No. 9,674,035

**PETITION FOR *INTER PARTES* REVIEW**  
UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104

(Claims 1-32)

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**PETITIONER’S EXHIBIT LIST**

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Ex. 1005	U.S. Patent Publication No. 2011/0072119A1 (“Bronstein”)
Ex. 1006	U.S. Patent No. 8,160,448 (“Tsuge”)
Ex. 1007	U.S. Patent No. 7,848,234 (“McKinnon”)
Ex. 1008	U.S. Patent Appl. 2008/0253771 (“Noel”)
Ex. 1009	KR Patent No. 10-0414671 (“Go”)
Ex. 1010	U.S. Patent No. 8,416,816 (“Bourgart”)
Ex. 1011	U.S. Patent No. 7,519,690 (“Barrow”)
Ex. 1012	J. Koshy and R. Pandey, "Remote incremental linking for energy-efficient reprogramming of sensor networks," <i>Proceedings of the Second European Workshop on Wireless Sensor Networks, 2005.</i> , Istanbul, Turkey, 2005, pp. 354-365, DOI: 10.1109/EWSN.2005.1462027, ISBN:0-7803-8801-1 (“Koshy”)
Ex. 1013	Data-Over-Cable Service Interface Specifications (DOCSIS), SP-OSSI-I01-970403
Ex. 1014	DOCSIS® Provisioning of EPON Specifications, DPoE Architecture Specification, DPoE-SP-ARCHv1.0-I01-110225
Ex. 1015	DOCSIS® Provisioning of EPON Specifications, DPoE Operations and Support System Interface Specification, DPoE-SP-OSSIV1.0-I01-110225

Ex. 1016	Complaint, <i>IARNACH TECHNOLOGIES, INC. v. CHARTER COMMUNICATIONS, INC., et al</i> , Case No. 2:24-cv-00230 (E.D. Tex.)
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Ex. 1018	Certified English Translation of KR Patent No. 10-0414671 (“Go”)
Ex. 1019	Declaration of Todd Hillmer

### Claim Listing

Ref. #	Listing of Challenged Claims
<b>1[preamble]</b>	1. A method of 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 method comprising:
<b>1[a]</b>	generating, using at least one computer, an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file;
<b>1[b]</b>	notifying a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU;
<b>1[c]</b>	providing, when requested by the vCM, to the vCM, the updated configuration file; and
<b>1[d]</b>	monitoring the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.
<b>2[a]</b>	2. The method of claim 1, further wherein the operation of generating the updated configuration file includes: detecting a configuration change need for the ONU; and
<b>2[b]</b>	modifying at least one service listed in the configuration file to generate the updated configuration file.
<b>3</b>	3. The method of claim 1, wherein the operation of notifying the vCM includes: changing a variable in a management information base (MIB) of the vCM.
<b>4[a]</b>	4. The method of claim 1, wherein the operation of providing the updated configuration file includes: receiving a dynamic host control protocol (DHCP) request from the vCM;
<b>4[b]</b>	providing the vCM information about a location of the updated configuration file; and
<b>4[c]</b>	permitting the vCM to download the updated configuration file using a file transfer protocol (FTP).
<b>5[preamble]</b>	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:

<b>Ref. #</b>	<b>Listing of Challenged Claims</b>
<b>5[a]</b>	a generator that generates an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file;
<b>5[b]</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; and
<b>5[c]</b>	a file provider that provides, when requested by the vCM, to the vCM, the updated configuration file; and
<b>5[d]</b>	a monitor that monitors the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.
<b>6[a]</b>	6. The apparatus of claim 5, further wherein the generator includes: a detector that detects a configuration change need for the ONU; and
<b>6[b]</b>	a modifier that modifies at least one service listed in the configuration file to generate the updated configuration file.
<b>7</b>	7. The apparatus of claim 5, wherein the notifier includes: a changer that changes a variable in a management information base (MIB) of the vCM.
<b>8[a]</b>	8. The apparatus of claim 5, wherein the file provider includes: a receiver receiving a dynamic host control protocol (DHCP) request from the vCM;
<b>8[b]</b>	a location provider that provides the vCM information about a location of the updated configuration file; and
<b>8[c]</b>	a file transferor that permits the vCM to download the updated configuration file using a file transfer protocol (FTP).
<b>9[preamble]</b>	9. A computer program product comprising a non-transitory computer-readable medium having code stored thereon, the code, when executed by a processor, causing the processor to implement a method of 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 method comprising:
<b>9[a]</b>	generating an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file;

<b>Ref. #</b>	<b>Listing of Challenged Claims</b>
<b>9[b]</b>	notifying a virtual cable modem (vCM), prior to successful update of the ONU, that the updated configuration file is available for the ONU; and
<b>9[c]</b>	providing, when requested by the vCM, to the vCM, the updated configuration file; and
<b>9[d]</b>	monitoring the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.
<b>10[a]</b>	10. The computer program product comprising the non-transitory computer-readable medium of claim 9, further wherein the operation of generating the updated configuration file includes: detecting a configuration change need for the ONU; and
<b>10[b]</b>	modifying at least one service listed in the configuration file to generate the updated configuration file.
<b>11</b>	11. The computer program product comprising the non-transitory computer-readable medium of claim 9, wherein the operation of notifying the vCM includes: changing a variable in a management information base (MIB) of the vCM.
<b>12[a]</b>	12. The computer program product comprising the non-transitory computer-readable medium of claim 9, wherein the operation of providing the updated configuration file includes: receiving a dynamic host control protocol (DHCP) request from the vCM;
<b>12[b]</b>	providing the vCM information about a location of the updated configuration file; and
<b>12[c]</b>	permitting the vCM to download the updated configuration file using a file transfer protocol (FTP).
<b>13[preamble]</b>	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:
<b>13[a]</b>	means for generating an updated configuration file for the ONU, wherein the ONU is configured with an existing configuration file;
<b>13[b]</b>	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

<b>Ref. #</b>	<b>Listing of Challenged Claims</b>
<b>13[c]</b>	means for providing, when requested by the vCM, to the vCM, the updated configuration file; and
<b>13[d]</b>	means for monitoring the vCM for an indication of successful update of the ONU by the vCM using the updated configuration file.
<b>14[a]</b>	14. A method of updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the method comprising: receiving a notification that an updated configuration file is available for the ONU, wherein the ONU is configured with a current configuration file;
<b>14[b]</b>	obtaining the updated configuration file;
<b>14[c]</b>	performing, using at least one computer, a first validation of the updated configuration file for structural errors;
<b>14[d]</b>	determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;
<b>14[e]</b>	performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and
<b>14[f]</b>	applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.
<b>15</b>	15. The method recited in claim 14, wherein the operation of receiving the notification includes detecting a change to a management information base (MIB) entry.
<b>16[a]</b>	16. The method recited in claim 14, wherein the operation of obtaining the updated configuration file includes: sending a dynamic host control protocol (DHCP) message;
<b>16[b]</b>	receiving one or more identities of servers storing the updated configuration file; and
<b>16[c]</b>	obtaining the updated configuration file from one of the servers using a file transfer protocol (FTP).
<b>17</b>	17. The method recited in claim 14, further including: indicating an ongoing configuration update using a MIB entry during the updating operation.
<b>18</b>	18. The method recited in claim 14, further including: deleting the updated configuration file from a local memory after successful completion of the applying operation.

<b>Ref. #</b>	<b>Listing of Challenged Claims</b>
<b>19</b>	19. The method of claim 14, further comprising: performing a third validation about whether an Optical Line Terminal (OLT) and a DOCSIS Ethernet passive optical network (DPoE) system include resources to implement the changes in the updated configuration file.
<b>20[preamble]</b>	20. An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising:
<b>20[a]</b>	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;
<b>20[b]</b>	an obtainer that obtains the updated configuration file;
<b>20[c]</b>	a first validator that performs a first validation of the updated configuration file for structural errors;
<b>20[d]</b>	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;
<b>20[e]</b>	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
<b>20[f]</b>	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.
<b>21</b>	The apparatus recited in claim 20, wherein the receiver includes: a detector that detects a change to a management information base (MIB) entry.
<b>22[a]</b>	The apparatus recited in claim 20, wherein the operation of obtaining the updated configuration file includes: a sender that sends a dynamic host control protocol (DHCP) message;
<b>22[b]</b>	another receiver that receives one or more identities of servers storing the updated configuration file; and
<b>22[c]</b>	another obtainer that obtains the updated configuration file from one of the servers using a file transfer protocol (FTP).
<b>23</b>	The apparatus recited in claim 20, further including: an indicator that indicates an ongoing configuration update using a MIB entry during the updating operation.

<b>Ref. #</b>	<b>Listing of Challenged Claims</b>
<b>24</b>	The apparatus recited in claim 20, further including: a deleter that deletes the updated configuration file from a local memory after successful completion of the applying operation.
<b>25</b>	The apparatus recited in claim 20, further comprising: a third validator that performs a third validation about whether an Optical Line Terminal (OLT) and a DOCSIS Ethernet passive optical network (DPoE) system include resources to implement the changes in the updated configuration file.
<b>26[preamble]</b>	A computer program product comprising a non-transitory computer-readable medium having code stored thereon, the code, when executed by a processor, causing the processor to implement a method of updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the method comprising:
<b>26[a]</b>	receiving a notification that an updated configuration file is available for the ONU wherein the ONU is configured with a current configuration file;
<b>26[b]</b>	obtaining the updated configuration file;
<b>26[c]</b>	performing a first validation of the updated configuration file for structural errors;
<b>26[d]</b>	determining changes between the current configuration file of the ONU and the updated configuration file to identify ONU resources to implement to the changes;
<b>26[e]</b>	performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and
<b>26[f]</b>	applying the changes to the ONU when it is determined that the ONU resources to implement the changes are available at the ONU.
<b>27</b>	The computer program product comprising the non-transitory computer-readable medium recited in claim 26, wherein the operation of receiving the notification includes detecting a change to a management information base (MIB) entry.
<b>28[a]</b>	The computer program product comprising the non-transitory computer-readable medium recited in claim 26, wherein the operation of obtaining the updated configuration file includes: sending a dynamic host control protocol (DHCP) message;
<b>28[b]</b>	receiving one or more identities of servers storing the updated configuration file; and

<b>Ref. #</b>	<b>Listing of Challenged Claims</b>
<b>28[c]</b>	obtaining the updated configuration file from one of the servers using a file transfer protocol (FTP).
<b>29</b>	The computer program product comprising the non-transitory computer-readable medium recited in claim 26, further including: indicating an ongoing configuration update using a MIB entry during the updating operation.
<b>30</b>	The computer program product comprising the non-transitory computer-readable medium recited in claim 26, further including: deleting the updated configuration file from a local memory after successful completion of the applying operation.
<b>31</b>	The computer program product comprising the non-transitory computer-readable medium of claim 26, further comprising: performing a third validation about whether an Optical Line Terminal (OLT) and a DOCSIS Ethernet passive optical network (DPoE) system include resources to implement the changes in the updated configuration file.
<b>32[preamble]</b>	An apparatus for updating configuration of an Optical Network Unit (ONU) in an Ethernet Passive Optical Network (EPON), the apparatus comprising:
<b>32[a]</b>	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;
<b>32[b]</b>	means for obtaining the updated configuration file;
<b>32[c]</b>	means for performing a first validation of the updated configuration file for structural errors;
<b>32[d]</b>	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;
<b>32[e]</b>	means for performing a second validation about whether the ONU resources to implement the changes are available or not at the ONU; and
<b>32[f]</b>	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.

## I. INTRODUCTION

Pursuant to 35 U.S.C. §§311, 314(a), and 37 C.F.R. §42.100, Charter Communications, Inc. (“Petitioner”) respectfully requests review and cancelation of claims 1-32 (“Challenged Claims”) of U.S. Patent No. 9,674,035 (“’035 Patent” or “the Patent,” Ex. 1001). This petition demonstrates a reasonable likelihood the Challenged Claims are unpatentable.

The Patent concerns cable systems communicating video, voice and data. EX1002, ¶35 (EX1001, 1:19-49).<sup>1</sup> Cable provider’s “headend” equipment—cable modem termination systems (CMTSs)—communicates with equipment—cable modems (CMs)—located near customers. *Id.* (EX1001, 2:56-67).

By 1997, cable network communications were standardized according to Data Over Cable Service Interface Specification (DOCSIS). EX1002, ¶36 (EX1013, 1-2). DOCSIS determines how CMs receive and transmit data. *Id.*

Cable networks have routinely communicated across high-capacity, optical fiber. EX1002, ¶37 (EX1001, 1:22-46). These hybrid fiber-coaxial networks (HFCs) employ an intermediate optical fiber portion, having Optical Line Terminals (OLTs) and Optical Network Units (ONUs). *Id.* (EX1001, 1:22-46 and

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<sup>1</sup> Parentheticals following citations in Lipoff Declaration (EX1002) are to exhibits cited therein.

EX1014, 1). OLTs connect to CMTSs (“headends”) and communicate with ONUs proximate to subscribers. *Id.* (EX1001, 2:56-3:17; EX1014, 5, Fig. 1).

These networks have point-to-multipoint topologies—each OLT services multiple ONUs. EX1002, ¶38 (EX1001, 1:22-46). *Passive* optical networks (PONs) employ unpowered splitters dividing downstream optical signals among receiving ONUs. *Id.* *Ethernet* passive optical networks (EPONs) communicate Ethernet-formatted data packets. *Id.* (EX1014, 44). The Institute of Electrical Engineers (IEEE) promulgated standards detailing EPONs as early as 2004. EX1002, ¶38.

DPoE networks (*i.e.*, DOCSIS Provisioning of Ethernet Passive Optical Networks) pair DOCSIS cable systems with EPON networks. EX1002, ¶39 (EX1014, 1). DPoE standards were promulgated before the ’035 Patent. *Id.* (EX1014, ii).

Applicant’s claims were rejected no less than four times during prosecution. EX1003 (84-100, 142-157, 183-198, 243-253). Each rejection detailed prior art disclosing configurations of DPoEs updating ONUs. *Id.* Arguments the prior art failed to disclose providing notice of available configuration updates were the claims allowed. EX1003 (257-270, 280-286). This Petition presents art not considered by the examiner.

No secondary considerations of non-obviousness exist. The challenged claims should be cancelled.

**II. MANDATORY NOTICES**

**A. Real Party in Interest (37 C.F.R. §42.8(b)(1))**

Petitioner certifies the real party-in-interest is Charter Communications, Inc.

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

The Patent is involved in the following proceedings:

Case	Case Filed	Defendants/Petitioners	Court
Iarnach Technologies Ltd., v. Charter Communications, Inc., et al., 2:24-cv-00230 (E.D. Tex.) (“Lawsuit”)	04/5/2024	Charter Communications, Inc., Charter Communications Holding Company, LLC, Charter Communications Operating, LLC, Spectrum Management Holding Company, LLC, Spectrum Gulf Coast, LLC	Eastern District of Texas

**C. Lead and Back-Up Counsel and Service Information**

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**D. Fee Payment Authorization (37 C.F.R. §§42.103(a) and 42.15(a))**

Payment of required fees is submitted herewith. The Patent Office is authorized to charge Deposit Account No. 13-2855 for all additional fees.

**III. GROUNDS FOR STANDING (37 C.F.R. §42.104(A))**

Petitioner certifies the '035 Patent is eligible for review. Petitioner is not barred or estopped.

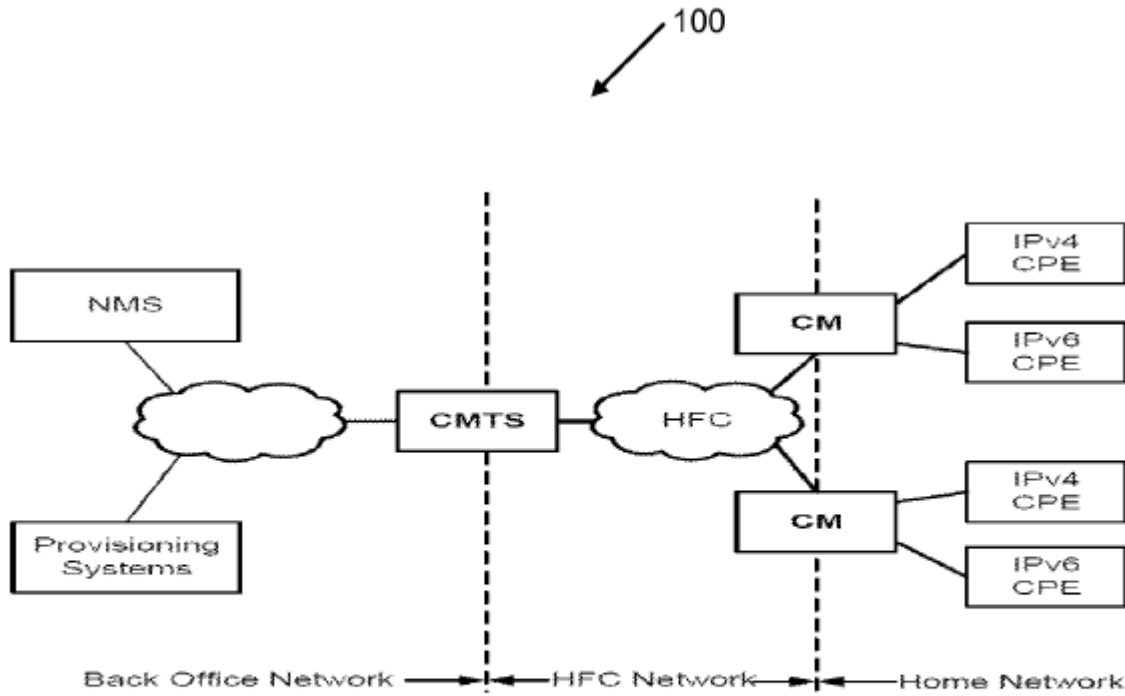
**IV. THE '035 PATENT**

**A. '035 Patent's Effective Filing Date**

U.S. Patent Application No. 13/433,235 filed March 28, 2012, claims priority to Provisional Application No. 61/468,504 filed March 28, 2011. The Patent is evaluated under pre-AIA rules.

**B. Specification**

Traditionally, cable back-office systems connected to downstream CMs via HFCs. EX1002, ¶41 (EX1001, 2:56-3:6). Figure 1 of the Patent illustrates traditional DOCSIS architecture:



**FIG. 1**

*Id.* ¶42 (EX1001, Fig. 1).

DPoE networks were also well-known. *Id.* ¶43 (EX1001, 1:19-46, 2:41-3:6). Back-office systems managed subscribers and services, communicating via DOCSIS protocols. *Id.* ¶44 (EX1001, 2:47-3:6). EPONs communicated optical signals from OLTs downstream to ONUs via different protocols and control messages and addressing. *Id.* ¶45 (EX1001, 1:19-46, 3:7-18). *Virtual* CMs (vCMs) bridged this divide, translating DOCSIS communications into optical transmissions and *vice versa*. *Id.* (EX1001, 3:27-53). This architecture was admittedly known. *Id.* (EX1001, 3:12-

18). Published DPoE standards illustrated vCMs [BLUE] used as “IP-addressable management entit[ies]” serving as ONU [ORANGE] proxies. DPoE Systems [GREEN] (including vCMs [BLUE]) allowed DOCSIS back-offices [PURPLE] to manage and control ONUs [ORANGE]:

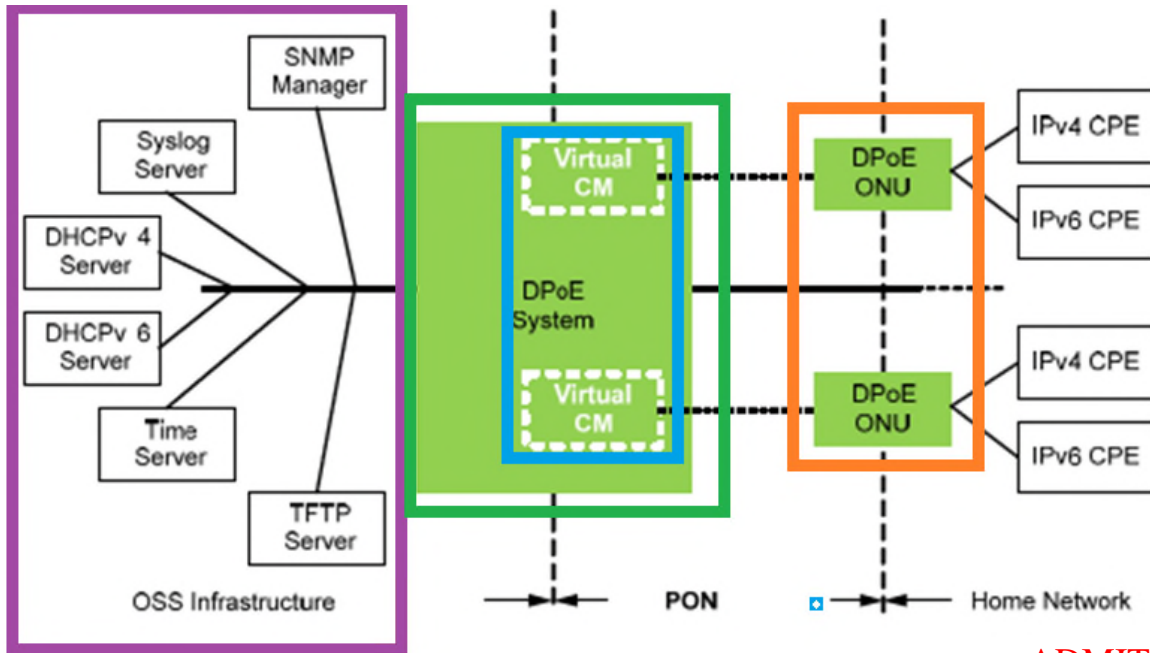


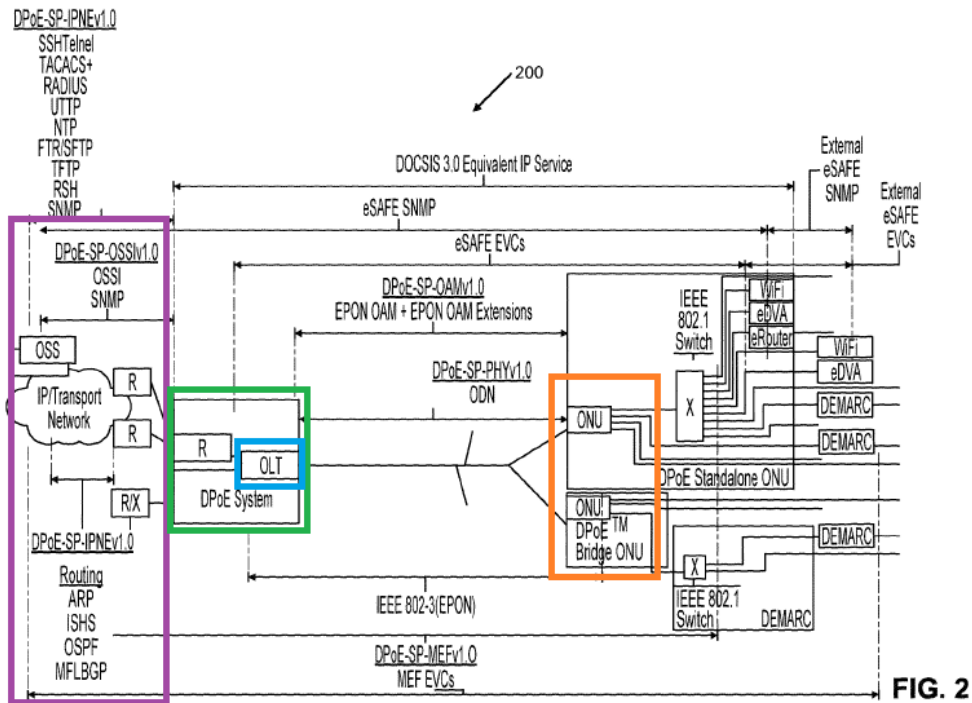
Figure 6 - DPoE Virtual CM (vCM) Concept

ADMITTED  
PRIOR ART

*Id.* ¶¶46-49 (EX1015, Figs. 6 (annotated), 17).

The Patent’s illustration is similar:

ADMITTED  
 PRIOR ART



EX1002, ¶¶50-51 (EX1001, Fig. 2 (annotated)).

To configure ONUs, vCMs issued dynamic host control protocol (DHCP) requests to back-office systems, received configuration file names/locations, obtained these files via TFTP, and translated them into ONU configuration parameters. Configuration parameters were delivered and applied to ONUs using established EPON eOAM messaging. EX1002, ¶52 (EX1001, 4:51-5:19).

After initial configuration, ONUs could be re-configured to reflect service modifications. *Id.* ¶¶53-55. The Patent argues cable operators favored power cycling (*i.e.* rebooting) ONUs to do so. EX1002, ¶56. According to the Patent, this was not technically required. Operators chose not to apply changes “on-the-fly” solely for

business reasons. *Id.* ¶¶56-58 (EX1001 5:13-19, 6:31-32 (allowed tighter provisioning of services and accounting)).

### C. Prosecution

The sole claim of the Provisional required updating configurations “**without rebooting the optical network unit device.**” EX1004, Claim 1 (emphasis added).

The utility application abandoned this requirement. EX1003, 27-34. No such requirement was relied upon to overcome rejections. EX1003 (257-270, 280-286).

Claims 1-13 were initially rejected based on Publication No. US2011/0131624A1 (Wu) alone or in view of Publication No. US2008/0232801A1 (Arnold). *Id.* 89-93. Later, Claims 1-13 were rejected as obvious over Wu and US2011/0072119A1 (Bronstein) (updating previously configured ONUs). *Id.* 145-155.

Claim 14 and related claims were rejected as obvious over Bronstein in view of Publication No. US2008/0010358A1 (Jin). *Id.* 93-98. Bronstein taught a means of re-provisioning ONUs following reboot:

Upon power-up, each ONU registers with its OLT prior to the request for the configuration file. The OLT may then check if the same ONU (through its unique MAC address) was provisioned earlier. ...

[T]he DOCSIS proxy compares the previous configuration file name to the file name retrieved in step 2. In addition, the DOCSIS proxy compares a message integrity code (MIC) from the previous configuration file to the current MIC. If both the names and MICs match, the accelerated configuration is confirmed.

**Otherwise, a full (non-accelerated) re-provisioning process is initiated.**

EX1005, [0033]-[0037] (emphasis added).

Applicant unsuccessfully argued Bronstein did not teach the invention. *Id.* 185-196, 227-237. The examiner disagreed, citing Bronstein’s re-provisioning during reboot. *Id.* 249-250. Thereafter, applicant did not contest that Bronstein applied updates to ONUs as claimed.

Instead, applicant argued combinations did not teach “receiving a notification that an updated configuration file is available for the ONU”. *Id.* 258-270. Claims 1-13 were amended to require notice “prior to the successful update of the ONU.” *Id.* Applicant did not differentiate Bronstein because reconfiguration occurred during reboot. *Id.* 232. “Prior notification” secured allowance. *Id.* 268-269, 285.

#### **D. Level of Skill**

Persons having ordinary skill in this art (“POSAs”) would have at least a B.S. in electrical engineering, computer science or comparable degree and 2-3 years experience relating to the design and/or maintenance of DOCSIS networks, portions of which include fiber optical elements.

**E. Claim Construction (37 C.F.R. §§42.104(b)(1) and (b)(3))**

For purposes of this Petition only and without prejudice, Petitioner proposes the following constructions for certain means-plus function claim limitations.<sup>2</sup>

Independent claims 13 and 32 recite “means for” performing certain functions. Specifically, means for “generating an updated configuration file,” “notifying a virtual cable modem,” “providing [updated configuration files],” “monitoring the vCM for an indication of successful update,” “receiving a notification,” performing a first/second/third validation, “determining changes,” and “applying the changes.” EX1001, 11:32-46.

These limitations are properly construed under Section 112, paragraph 6 (now Section 112(f)). *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015). They fail to recite sufficiently definite structure. EX1002, ¶74.

The Patent states “disclosed and other embodiments, modules and the functional operations described in this document ... can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware[.]” *Id.* (EX1001, 8:20-50, FIGs. 6, 8).<sup>3</sup>

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<sup>2</sup> Petitioner reserves the right to propose additional/alternative claim constructions in parallel District Court proceedings responsive to arguments advanced there.

<sup>3</sup> The specification describes claimed means only in functional terms. However, because indefiniteness is not an issue for the Board, for purposes of invalidity, the prior art discloses such means as discussed herein.

For this Petition only, each “means for” limitation has been construed as “digital electronic circuitry, or computer software or firmware operating on hardware” performing those recited functions, and equivalents thereof.

#### **V. DISCRETIONARY DENIAL INAPPROPRIATE**

This Petition relies on references not identified during prosecution. Under 35 U.S.C. §325(d), both art and arguments relied upon must have been previously presented. *See Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6, at 8 (PTAB Feb. 13, 2020) (precedential). This Petition thus presents new issues warranting institution. 35 U.S.C. §325(d).

No references were before the Examiner, nor evaluated, either alone or in combination with others. The Board has consistently declined to exercise discretion under Section 325(d) when references were not disclosed. *See, e.g., Advanced Bionics* at 9, n.10 (denial dependent upon “extent to which the asserted art was evaluated during examination”).

Tsuge in view of McKinnon, Noel, and/or Go teaches all recited limitations of Claims 1-13. Similarly, Bourgart, Barrow, Tsuge, Go and/or Koshy teach all recited limitations of claims 14-32. This Petition presents new arguments not previously addressed. Denial is inappropriate under 35 U.S.C. §325(d).

Discretionary denial also is inappropriate under 35 U.S.C. §314. Under the Director’s Interim Procedure for Discretionary Denials, the PTAB will not deny institution where compelling evidence of unpatentability exists. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential). This Petition provides such evidence. *Nokia of Am. Corp. v. TQ Delta*, IPR2022-00471, Paper 11 at 19-21 (PTAB Aug. 18, 2022) (concluding *Fintiv* analysis).

Regardless, the *Fintiv* factors strongly favor institution.

**A. Potential for Stay**

Petitioner has challenged all three patents asserted in the Lawsuit. Final written decisions on two Asserted Patents are anticipated at or before a jury’s verdict. Because the combined petitions resolve validity of all asserted patents, a stay is expected. However, without “specific evidence” how the court will rule, this factor is neutral. *Sand Revolution II, LLC v. Continental Intermodal Group-Trucking LLC*, IPR2019-01393, Paper 24 at 7 (PTAB June 16, 2020) (informative).

**B. Trial Timing**

Jury selection is scheduled for February 9, 2026. EX1017, 1. On August 9, 2024, Petitioner filed IPRs challenging two of three asserted patents. Final written decisions therein are likely around the time of trial (*i.e.* 18 months from filing). *Google, LLC v. Flypsi, Inc.*, IPR2023-00361, Paper 9 at 8-9 (PTAB July 31, 2023) (finding trial two months *before* FWD deadline slightly *avored* institution).

Petitioner was diligent in filing this and the other petitions (*i.e.* about 3 months before §315(b) deadline). This factor is neutral or weighs against denial. *Fintiv*, Paper 11 at 11 (“expeditiously” filed petitions “weigh[] against [denial]”).

**C. Litigation Investment**

Other than preliminary contentions and some discovery, the parties have invested little in the litigation, weighing against denial. *Samsung Elecs. v. Netlist, Inc.*, IPR2022-00063, Paper 13 at 8 (PTAB May 5, 2022) (instituting where no “claim construction and merits determinations” had occurred).

**D. Issue Overlap**

This Petition challenges all claims of the Patent, whereas only claims 1-18, 20-24, 26-30, and 32 are asserted in the litigation. Additionally, Petitioner previously challenged all claims of remaining two asserted patents, including non-asserted claims. Collectively, these petitions dispose of all issues raised in the litigation, as well as issues the district court will not address, weighing against denial. *Mark-forged, Inc. v. Continuous Composites, Inc.*, IPR2022-00679, Paper 7 at 32-33 (PTAB Oct. 25, 2022).

**E. Litigation Parties**

Petitioner is defendant, which is typical. *Sand Revolution II*, Paper 24 at 12-13.

## **F. Other Considerations**

Challenged claims are alleged to cover DPoE v2.0 standard, so their cancellation will provide public good, weighing against denial. EX1016, ¶¶41-46.

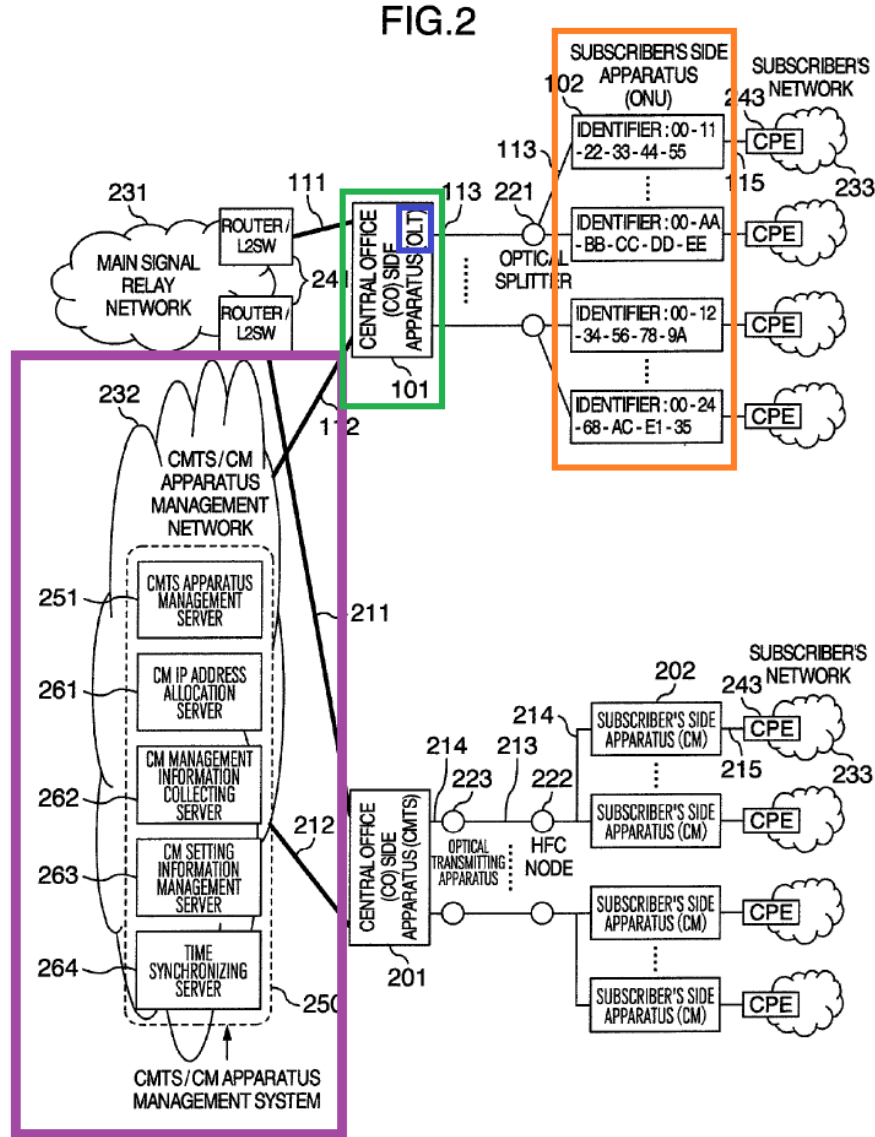
## **VI. STATE OF ART AND PRIOR ART**

### **A. Tsuge**

U.S. Patent No. 8,160,448 (“Tsuge”), entitled “Communication System Using Passive Optical Network and Passive Optical Network,” issued April 17, 2012, from an application filed March 17, 2009. EX1006, (45), (54). Tsuge is prior art under 35 U.S.C. §102(e).

Like the claimed invention, Tsuge describes provisioning ONUs in DPoE networks. EX1002, ¶84 (EX1006, 1:22-31, 4:12-40); *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004) (reference is analogous art if from same field of endeavor as claimed invention or would have “logically [] have commended itself to an inventor's attention in considering his problem”); *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1379-80 (Fed. Cir. 2007).

Tsuge uses vCMs to receive DOCSIS communications from CMTSs and translate them into optical transmissions to ONUs, and *vice versa*. EX1002, ¶¶85-87. Tsuge's DPoE network includes: (1) DOCSIS back-office system (“CMTS/CM Apparatus Management Network 232”) [PURPLE]; (2) DPoE system (“central office (CO) side apparatus (OLT) [GREEN] including software emulating traditional CMs (*i.e.*, vCMs) [BLUE]; and, (3) ONUs [ORANGE]:



*Id.* (EX1006, Fig. 2 (annotated)).

Tsuge's vCM initially configures ONUs by issuing DHCP requests for con-  
 figuration file's name and server address. EX1002, ¶88 (EX1006, 4:41-50). vCMs  
 retrieve configuration files via TFTP, converting the parameters into OAM messages  
 sent to ONUs who apply them. *Id.*

Tsuge further teaches configuring ONUs other than at initial registration. EX1002, ¶89 (EX1006, 14:20-15:15, 16:39-17:11, Figure 9).

**B. Noel**

U.S. Patent Application Publication No. 2008/0253771 (“Noel”) filed May 18, 2007, entitled “Method and Apparatus for Configuring Optical Network Terminals (ONT) in a Network,” published October 16, 2008. EX1008, (43), (54). Noel is prior art under 35 U.S.C. §102(e).

Like the claimed invention, Noel describes methods of re-configuring ONUs operating in PONs. EX1002, ¶91 (EX1008, [0002]-[0003]). Noel is analogous art. *Bigio*, 381 F.3d at 1325; *ICON Health*, 496 F.3d at 1379-80.

Noel’s PON comprises OLTs [BLUE], an Element Management System (EMS) [PURPLE], and ONUs [ORANGE]:

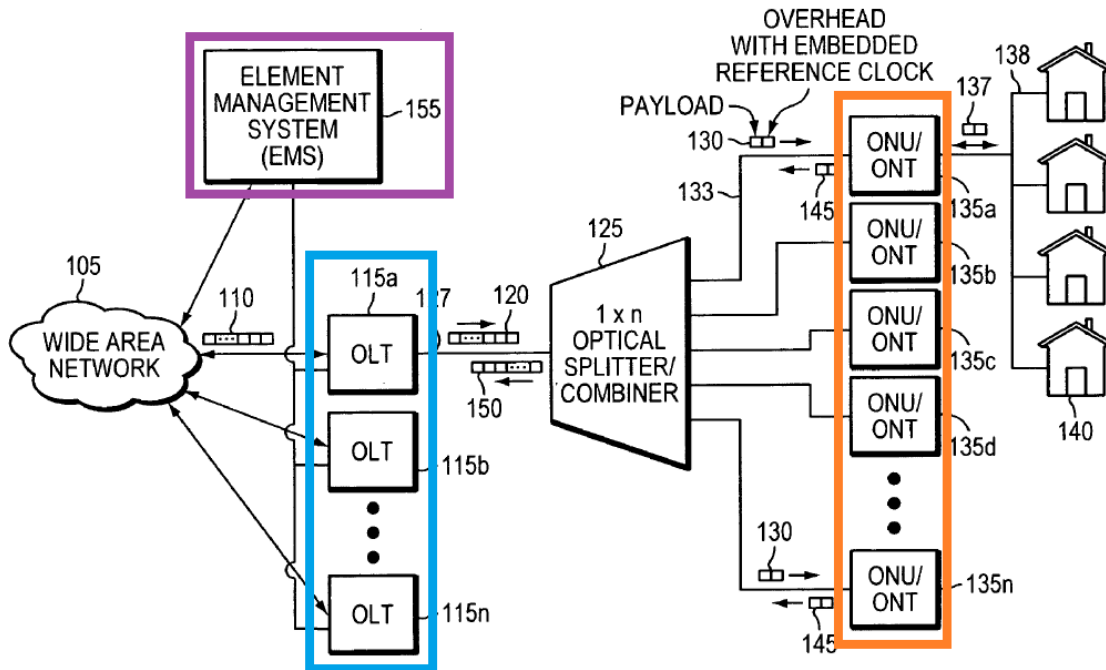


FIG. 1

EX1002, ¶92 (EX1008, [0021], Figure 1 (annotated)).

Noel's ONUs define services by stored settings. EX1002, ¶93 (EX1008, [0026]). Noel provides methods for reconfiguring ONUs to change services. *Id.* (EX1008, [0027], [0029]).

When new configurations are available, Noel's OLT receives a notification which it passes to ONUs. EX1002, ¶94 (EX1008, [0036]-[0039]). ONUs request updated configuration files (308) via OLTs. *Id.* Configuration Server 310 sends updated configuration files (309) via OLTs, reconfiguring ONUs. *Id.*

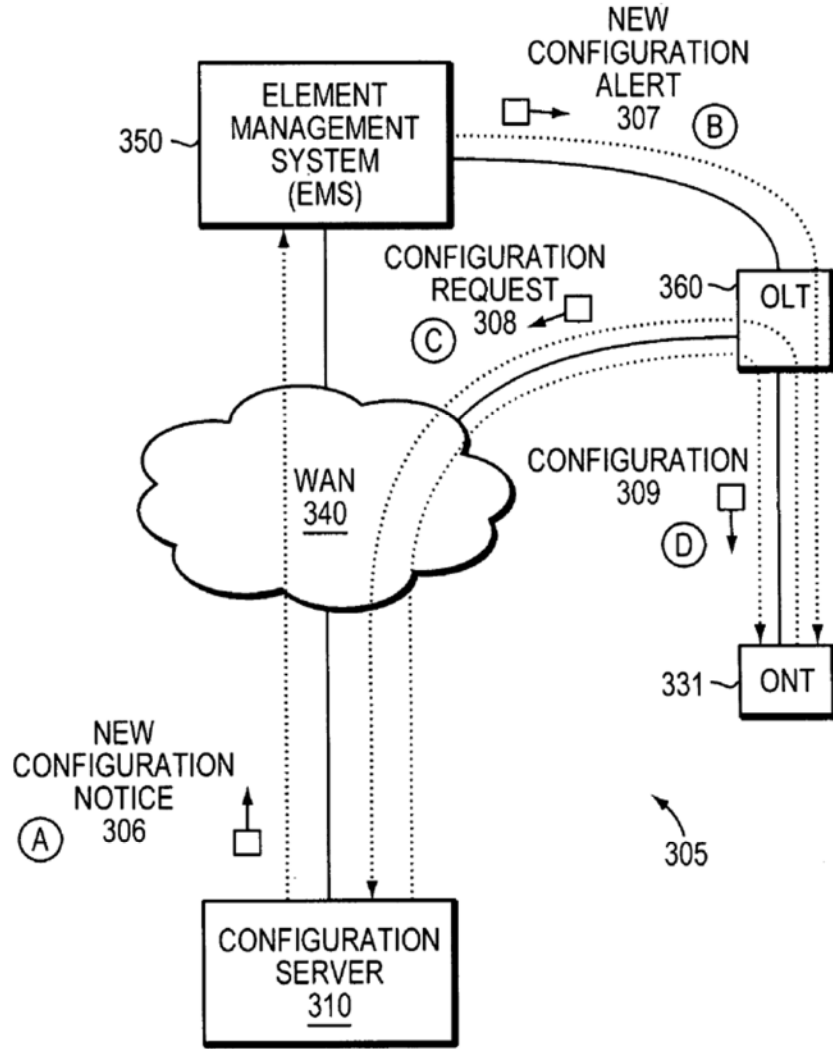


FIG. 3B

*Id.* (EX1008, Figure 3B).

**C. McKinnon**

Filed February 19, 2007, U.S. Patent No. 7,848,234 (“McKinnon”), entitled “Allocating Access Across Shared Communication Medium to User Classes,” issued December 7, 2010. EX1007, (45), (54). McKinnon is prior art under 35 U.S.C. §102(a), (e).

The '035 Patent updates ONUs using updated configuration files sent to vCMs from DOCSIS back-offices. McKinnon’s DOCSIS back-office generates updated configuration files, transmitting them to CMs used in fiber-coax networks. EX1002, ¶96 (EX1007, 1:18-22, 45-49). McKinnon would have logically commended itself to POSAs considering problems addressed by the Patent. McKinnon is analogous prior art. *See Bigio*, 381 F.3d at 1325; *ICON Health*, 496 F.3d at 1379-80.

McKinnon describes generating CM configuration files limiting bandwidth to pre-authorized amounts. EX1002, ¶96 (EX1007, 7:60-8:2). CMs are initially assigned a configuration file. *Id.* ¶97 (EX1007, 13:31-40). CM bandwidth allocations may later be modified. *Id.* ¶98 (EX1007, 17:1-26; 24:15-38; 26:56-27:21; 28:64-29:46 Fig. 23 (Step 2302)). Bandwidth Allocator 92 sends updated configuration files to TFTP servers. *Id.* (EX1007, 26:56-27:21; Fig. 23 (Step2304)). CMs are then notified, “causing the CMs to acquire and implement the CM configuration files[.]” *Id.* (EX1007, 27:17-21, 7:60-8:2).

McKinnon's network access manager 86 implements configuration changes. EX1002, ¶99 (EX1007, 14:12-63). Data Collector 88 collects CM data using SNMP and DOCSIS-compliant CM management information bases (MIBs). *Id.* (EX1007, 15:53-67, 16:1-10). Database Manager 90 receives CM performance data and provides it to Bandwidth Allocator 92. *Id.* (EX1007, 15:21-27, 16:17-22). Bandwidth Allocator 92 detects needed changes, based on collected data and/or changes to service level agreements (SLAs). *Id.* (EX1007, 26:30-55).

**D. Bourgart**

Filed June 28, 2010, U.S. Patent No. 8,416,616 ("Bourgart"), entitled "Re-configuration of Network Termination Devices," issued April 9, 2013 and claims priority to a French application filed September 4, 2007. EX1010, (45), (54). Bourgart is prior art under 35 U.S.C. §102(e). *Id.* (22).

Bourgart concerns the same field as the Patent (*i.e.* updating configuration files to reconfigure services provided over telecommunication equipment such as ONUs within PONs). EX1002, ¶¶101, 322 (EX1010, Abstract). Bourgart is analogous prior art. *See Bigio*, 381 F.3d at 1325; *ICON Health*, 496 F.3d at 1379-80.

Bourgart observes protocols governing communications between line termination devices (LTs) and network termination devices (NTs) are "likely to change." EX1002, ¶102 (EX1010, 1:46-60, 2:11-16). Bourgart's reconfiguration solution "does not require service interruption." EX1002, ¶¶103-104 (EX1010, 2:32-34).

Bourgart's LT simply communicates instructions to connected NTs, modifying their protocols. EX1002, ¶105 (EX1010, 2:38-55).

**E. Go**

Filed February 14, 2002, Korean Patent No. 10-0414671 ("Go"), entitled "Method for automatic remote software upgrade of cable modems," issued January 7, 2004. EX1009/EX1018, (45), (54). Go is prior art under 35 U.S.C. §102(b). *Id.* (22).

The '035 Patent discloses vCMs using pre-existing DOCSIS functionality, *e.g.* MIBs. EX1001, Abstract. Go likewise describes updating CMs via MIBs. EX1002, ¶107 (EX1009/EX1018, Abstract). Go would have logically commended itself to POSAs considering problems addressed by the Patent. Go is analogous art. *See Bigio*, 381 F.3d at 1325; *ICON Health*, 496 F.3d at 1379-80.

Go upgrades DOCSIS CM's via SNMP messages causing changes in MIB entries, prompting download from TFTP servers and application of updated configuration files. EX1002, ¶¶108-109. (EX1009/EX1018, Abstract, 2, 4-5).

**F. Barrow**

Filed February 28, 2002, U.S. Patent No. 7,519,690 ("Barrow"), entitled "Dynamically Updateable Parameters in Integrated Services Hub," issued April 14, 2009. EX1011, (45), (54). Barrow is prior art under 35 U.S.C. §102(b). *Id.* (22).

The '035 Patent professes interest in reconfiguring ONUs “on-the-fly.” EX1002, ¶111. Barrow reconfigures telecommunications network equipment without rebooting. *Id.* (EX1011, Abstract). Barrow would have logically commended itself to POSAs considering problems addressed by the Patent. Barrow is analogous art. *See Bigio*, 381 F.3d at 1325; *ICON Health*, 496 F.3d at 1379-80.

Barrow provides telephone/internet services via an Integrated Services Hub (ISH). EX1002, ¶112 (EX1011, 1:21-24). The ISH controller “requires configuration files to set parameters” for various interfaces. *Id.* (EX1011, 2:1-67). Barrow’s update module modifies these parameters on-the-fly. *Id.* (EX1011, 3:3-20, 7:59-67).

Barrow’s update module identifies needed configuration changes, dynamically updating elements without rebooting. EX1002, ¶113 (EX1011, 3:3-20, 9:3-9; 8:25-60).

### **G. Koshy**

An article entitled “Remote Incremental Linking for Energy-Efficient Re-programming of Sensor Networks” published in February and July, 2005 (“Koshy”). EX1012; EX1019, ¶¶5-7. Koshy is prior art under 35 U.S.C. §102(b).

The '035 Patent remotely reconfigures network elements (*i.e.* ONUs) by, *inter alia*, determining differences between current and updated configuration files. EX1001, Abstract. Koshy deploys reconfigurations to remote sensors in wireless

networks. EX1002, ¶115 (EX1012, 354). Koshy’s streamlined method updates devices with only changed parameters. *Id.* (EX1012, 355).

Koshy’s “diff-scripts” encapsulate differences between current and updated configuration to update devices. EX1002, ¶116 (EX1012 at 360-361). Koshy would have logically commended itself to POSAs considering problems addressed by the Patent. *See Bigio*, 381 F.3d at 1325; *ICON Health*, 496 F.3d at 1379-80. Koshy is analogous prior art. *Id.* ¶¶116, 448.

**VII. IDENTIFICATION OF CHALLENGE (37 C.F. R. §42.104(B))**

**A. Statutory Grounds (37 C.F.R. §42.104(b)(2))**

The challenged claims are unpatentable over combinations of these patents and non-patent literature:

<b>Exhibit</b>	<b>Patent/Pub. No.</b>	<b>To</b>	<b>Filed</b>	<b>Issued/Published</b>
1006	US 8,160,448	Tsuge	Mar. 17, 2009	Apr. 17, 2012
1007	US 7,848,234	McKinnon	Feb. 19, 2007	Dec. 7, 2010
1008	US2008/0253771	Noel	May 18, 2007	Oct. 16, 2008
1009	KR 10-0414671	Go	Feb. 14, 2002	Jan. 7, 2004
1010	US 8,416,816	Bourgart	Jun. 28, 2010	Apr. 9, 2013
1011	US 7,519,690	Barrow	Feb. 2002	Apr. 14, 2009

<b>Exhibit</b>	<b>Title</b>	<b>Author</b>	<b>Issued/Published</b>
1012	Remote Incremental Linking for Energy-Efficient Reprogramming of Sensor Networks	Koshy	Jan. 2005

Tsuge, Bourgart and McKinnon qualify as prior art under 35 U.S.C.

§ 102(e). McKinnon also qualifies under 35 U.S.C. § 102(a). Each of the other patents and non-patent literature qualifies as prior art under 35 U.S.C. § 102(b). *See* Section VI.

The challenged claims are unpatentable based upon the following grounds:

<b>Ground</b>	<b>Claims</b>	<b>Basis (Pre-AIA 35 U.S.C. §§ 102, 103)</b>
1	1-2, 4-6, 8-10, and 12-13	Obvious under 35 U.S.C. § 103 over Tsuge alone and/or in View of McKinnon and/or Noel
2	3, 7 and 11	Obvious under 35 U.S.C. § 103 over Tsuge alone and/or in view of McKinnon, Noel and/or Go
3	14, 20, 26 and 32	Obvious under 35 U.S.C. § 103 over Bourgart alone and/or in view of Barrow
4	15-17, 19, 21-23, 25, 27-29, and 31	Obvious under 35 U.S.C. § 103 over Bourgart in view of Barrow, Tsuge, and/or Go
5	18, 24 and 30	Obvious under 35 U.S.C. § 103 over Bourgart in view of Barrow and Koshy

Section VIII further describes these grounds. *See also* Declaration of Mr. Stuart Lipoff. (EX1002).

## VIII. DETAILED GROUNDS

### A. Ground 1: Claims 1-2, 4-6, 8-10, 12-13 Obvious Over Tsuge Alone and/or in View of McKinnon and/or Noel

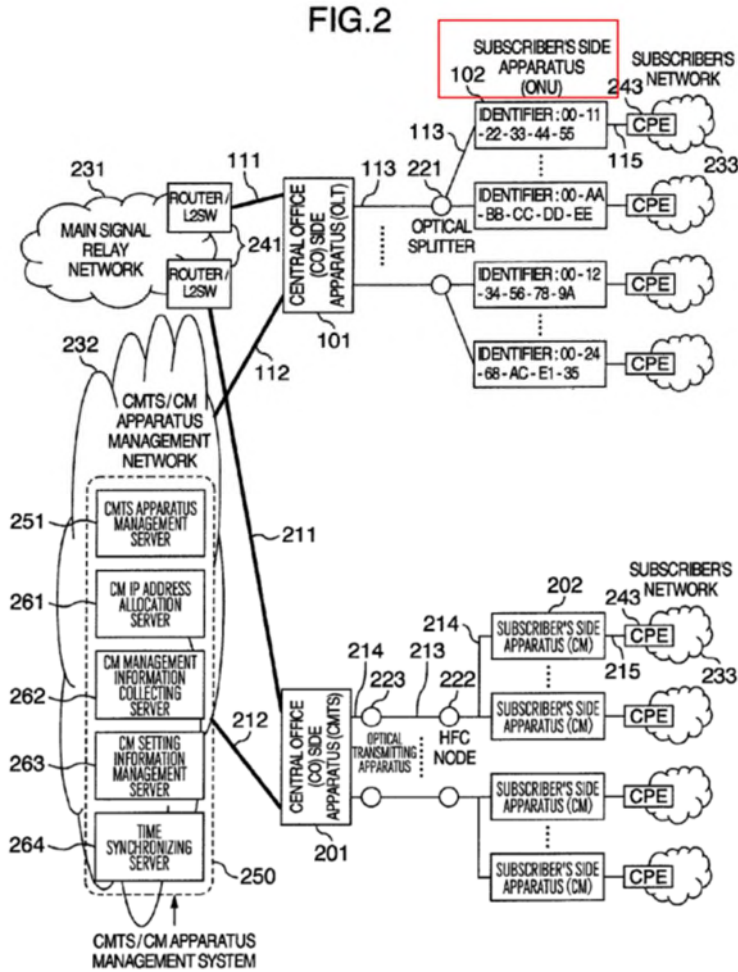
#### 1. Independent Claim 1

##### a. Preamble

If deemed limiting, Tsuge discloses *updating a configuration file used for operating an ONU in an EPON*, or POSAs would otherwise view such as obvious based on Tsuge alone, and/or in view of McKinnon, and/or Noel. EX1002, ¶118; Elements 1[a]-[b].

Tsuge discloses provisioning services provided by ONUs in an EPON. EX1002, ¶119 (EX1006, 6:47-55, 2:21-25, 14:40-15:22).

Figure 2 (below) illustrates Tsuge's system, including ONUs [RED]:



EX1002, ¶120 (EX1006, 6:24-26, Fig. 2 (annotated)).

**a. Element 1[a]**

POSAs would find it obvious to use at least one computer *to generate an updated configuration file for ONUs configured with an existing configuration file* based upon Tsuge alone and/or in view of McKinnon and/or Noel. EX1002, ¶121.

Tsuge uses vCMs to configure ONUs. EX1002, ¶122 (EX1006, 4:41-50). McKinnon supplies updated configuration files to CMs generated from, *inter alia*,

changed service level profiles/classes. *Id.* (EX1007, Abstract, 26:30-55). Noel similarly discloses using profiles to generate ONU reconfiguration files. *Id.* (EX1008, [0044]).

Tsuge’s OLT (101) configures ONUs using CM-ONU correspondence table 551. EX1002, ¶123 (EX1006, 20-29, Fig. 9 (Step 910), 11:4-17, 12:51-62, Fig. 6). The table associates CM IP addresses (1101) with unique ONU-identifiers (MAC address 1104). *Id.* (EX1006, 12:12-15, 63-66, 15:61-16:8, Fig. 11 (annotated):

**FIG.11**

551 1101 CM IP ADDRESS	1102 CM SETTING INFORMATION MANAGEMENT SERVER IP ADDRESS	1103 CM SETTING INFORMATION FILE NAME	1104 ONU INTRINSIC IDENTIFIER
10.1.2.3	10.100.1.253	default.cm	00-11-22-33-44-55
10.1.2.4	10.100.1.253	default.cm	00-AA-BB-CC-DD-EE
10.1.2.129	10.100.1.253	premium.cm	00-12-34-56-78-9A
⋮	⋮	⋮	⋮

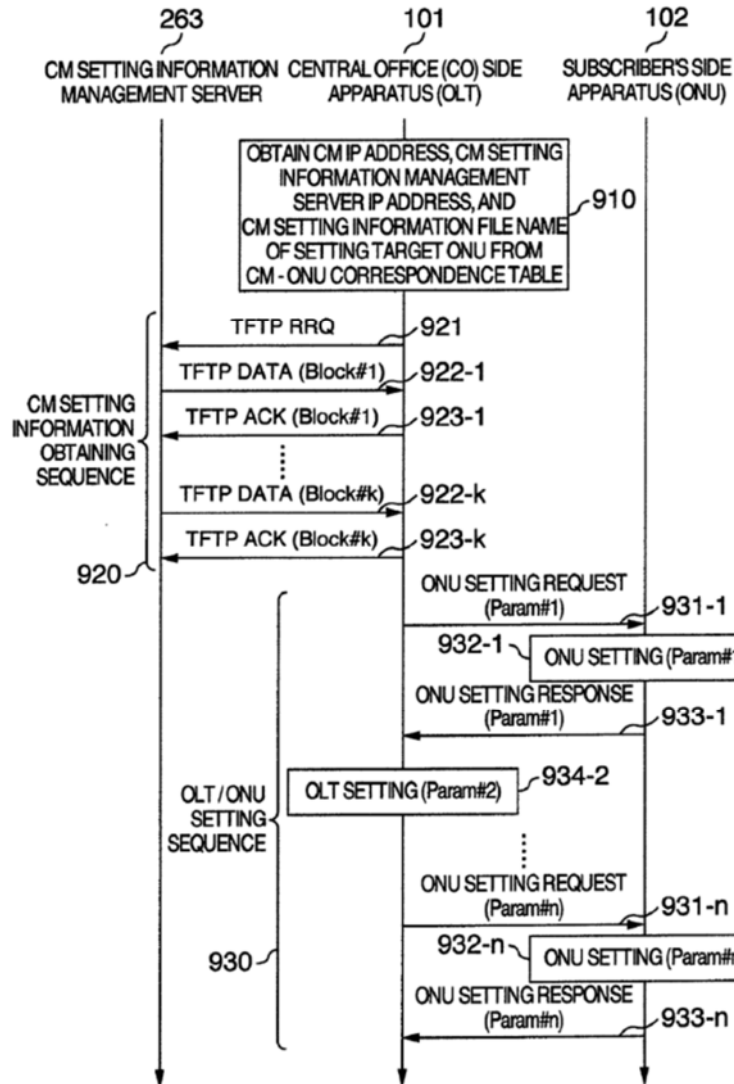
*Id.* (EX1010, 15:59-33, Fig. 11 (annotated)).

Table 551 also associates ONUs with a setting information file’s name [GREEN] and address [PURPLE]. EX1002, ¶124 (EX1006, 12:66-13:6, Fig. 11). Using that name/location, OLT 101 acquires the file using TFTP. *Id.* (EX1006, 40-46, 51-61, Fig. 9 (Step 920)).<sup>4</sup>

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<sup>4</sup> POSAs would understand Tsuge teaches **computer-generated** configuration files EX1002, ¶135 (*i.e.* electronically stored on server, electronically communicated via  
(Footnote Continued . . .)

FIG.9



OLT 101 sequentially interprets file parameters. EX1002, ¶125 (EX1006, 14:64-67, Fig. 9 (Step 930)). Parameters are converted into ONU setting information signals 543. *Id.* (EX1006, 14:67-15:4). Setting request messages for each parameter

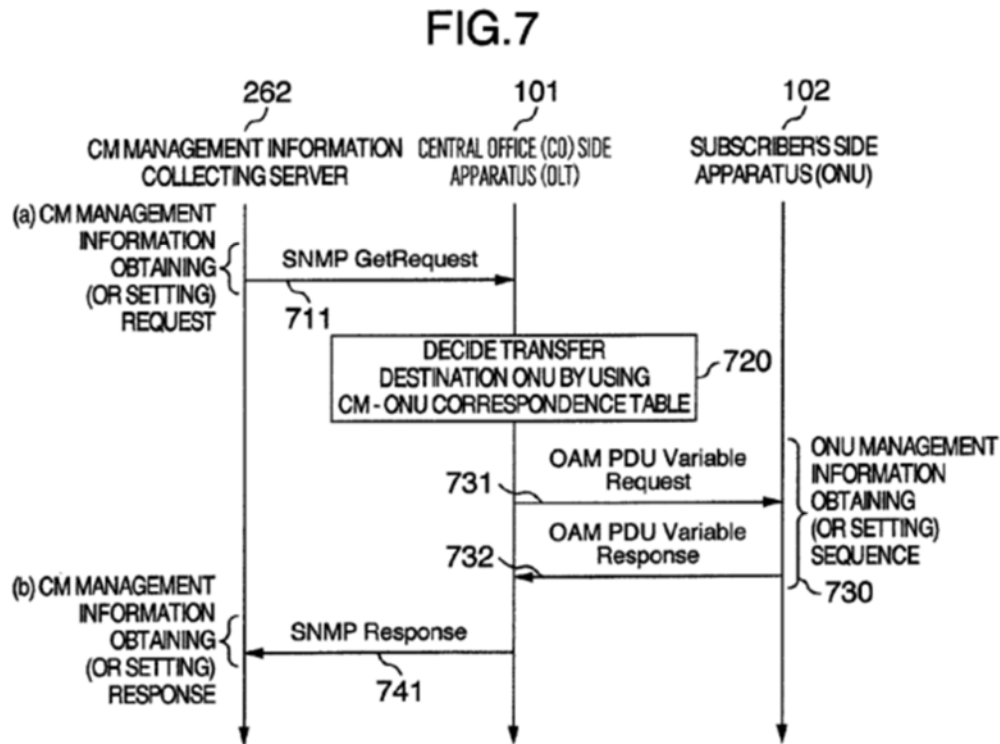
TFTP, and interpretable by software module 503). POSAs would have viewed as obvious computer-generated configuration files to ensure instructions would be properly interpreted, stored and transmitted. *Id.*

are transmitted to target ONUs. *Id.* (EX1006, 14:6-9, Fig. 9 (Step 931)). ONUs apply each setting, returning responses indicating successful application. *Id.* (EX1006, 15:9-12).

POSAs would understand Tsuge's method extends to updating configuration files for ONUs. EX1002, ¶126. Tsuge teaches application of configurations to ONUs having *existing configurations*. *Id.*

For example, Tsuge describes ONUs initially configured with files other than those denoted in table 551. EX1002, ¶¶127-128 (EX1006, 14:29-33 (noting server address/file name may initially be *preset*)). Tsuge further notes ONU configuration can occur other than at initial registration. *Id.* (EX1006, 14:33-39). POSAs would understand any subsequent configuration would ultimately employ the file identified in table 551. *Id.* As noted herein, POSAs would understand Tsuge's system contemplated upgrading that file to reflect service changes and system improvements (*i.e.* updated file). *Id.* POSAs would understand Tsuge would thereby update existing ONU configurations. EX1002, ¶129.

Tsuge further describes server 262 issuing SNMP setting request messages that force updating. *Id.* (EX1006, 13:7-20, Fig. 7 (Step 711)).



*Id.* (EX1006, Fig. 7, 13:16-20 (GetRequest or SetRequest)).

SNMP protocols remotely manage and monitor network-connected devices. EX1002, ¶130. Communications occur with a managed device's software module (*i.e.* SNMP agent). *Id.* SNMP agents manage a device's MIB. MIBs comprise a hierarchical organization of object variables reflecting the device's resources/settings. *Id.*

GetRequests retrieve MIB data, preparatory to changing values for objects. EX1002, ¶131. SetRequests are manager-initiated commands setting or changing MIB values, including configuration settings/parameters. *Id.*; *see also* Claim 3 (describing POSAs general knowledge of MIB provoked updating via SetRequests).

Tsuge illustrates GetRequests in Figure 7. OLT 101 receives request and determines target ONU using table 551. EX1002, ¶132 (EX1006, 13:21-25, Fig. 11). OLT 101 converts request to proper ONU signal 542. *Id.* (EX1006, 13:25-30, Fig. 5). OLT 101 communicates signal using IEEE 802.3ah OAM sub-layer (Step 731), and receives ONU's response (Step 732). *Id.* (EX1006, 13:16-20, Fig. 7). OLT returns data gathered (Step 730) as CM response message 741. *Id.* (EX1006, 13:40-50, Figs. 5, 7).

POSAs would understand Tsuge's ONUs were previously configured because (1) configuration information was obtainable, and (2) GetRequests precede updating ONU configurations via SetRequests. EX1002 ¶133 (EX1006, 13:12-16, 14:24-29, 14:40-61, 14:62-15:15).

Alternatively, POSAs understand Tsuge retrieves and applies configuration files identified via DHCP in table 551 if rebooted. EX1002 ¶134 (EX1006, 11:57-12:2). POSAs would have viewed as obvious updating such files between initialization and reboot (*see below*). During prosecution, applicant did not contest, nor does claim preclude, updating due to reboot. *Id.* (EX1003, 249-250, 258-270); Section IV(C).

In any event, based on POSAs' knowledge and Tsuge alone, and/or in view of Noel, and/or McKinnon, POSAs would further have viewed as obvious **updating**

*configuration files* for previously configured ONUs to accommodate service upgrades and/or system changes. EX1002, ¶136.

POSAs would understand subscriber services change, as do network capabilities/configurations. EX1002, ¶137. POSAs would understand Tsuge's system must accommodate changing customers' services, and/or allow necessary updates improving/maintaining services. *Id.*

Tsuge discloses service classes (*e.g.* "default," "premium"). EX1002, ¶138 (EX1006, Fig. 11). POSAs would have been motivated to permit subscription changes in service levels, and to technical improvements and/or adding services to existing/new service classes. *Id.* As discussed above, Tsuge incorporates mechanisms by which POSAs could have successfully prompted such updates (*e.g.* SetRequest and/or reboot). *Id.*

Additionally, Noel and/or McKinnon suggest computer-generated, updated configuration files for previously configured ONUs. EX1002, ¶139.

Configuration changes for Tsuge's service classes would affect multiple ONUs. Noel reconfigures multiple ONUs. EX1002, ¶140 (EX1008, [0023]). Noel proposes an "efficient method for configuring Optical Network Terminals (ONTs) in a network[,]" such as to "allow[] a network operator *to change services*" on multiple ONU(s). *Id.* (EX1008, [0003]) (emphasis added).

Like Tsuge, Noel transmits configuration file (392) to associated ONTs when requested. EX1002, ¶142 (EX1008, [0044], FIG. 3D). Noel’s teachings contemplate successfully modifying existing ONU configurations. EX1002, ¶141 (EX1008, [0026], [0048]). A “flow chart illustrating configuring Optical Network Terminals (ONTs)” encompasses updating existing ONT configurations:

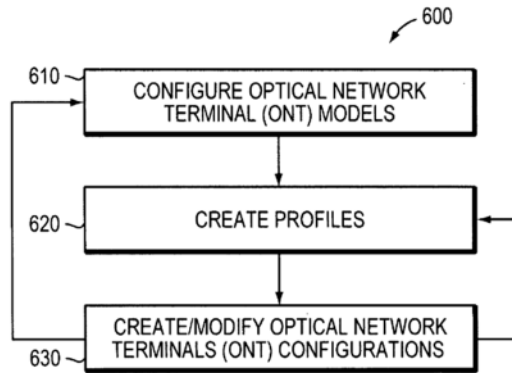


FIG. 6

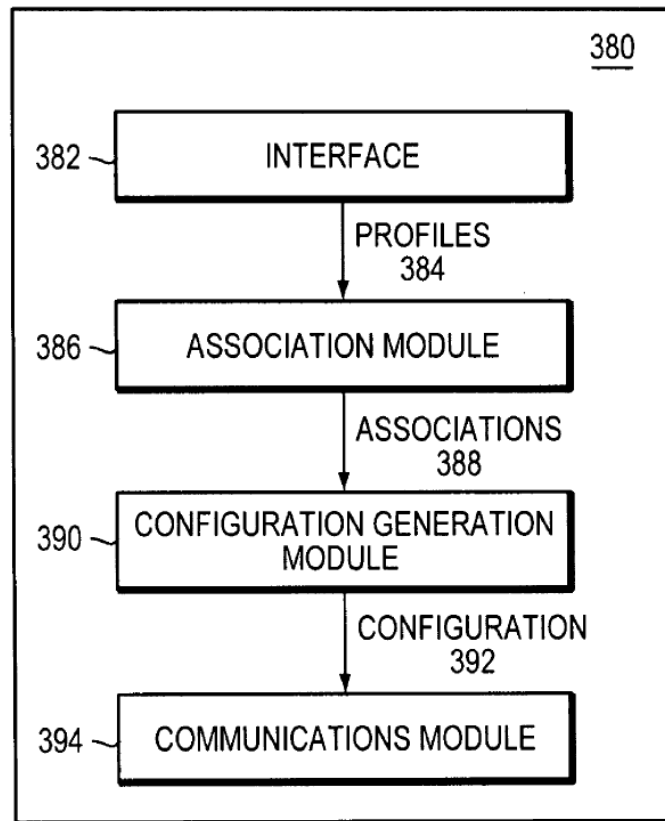
*Id.* (EX1008, [0013], FIG. 6)

Noel further discloses easy-to-use graphical interfaces (GUIs) by which network operators modify configuration files to simultaneously change services for multiple ONTs. *Id.* (EX1008, [Abstract], [0003], [0027]-[0028]).<sup>5</sup>

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<sup>5</sup> ONTs and ONUs are synonymous. EX1002, ¶142.

Noel's interface 382 alters stored profiles 384 defining communication parameters associated with ONTs (388). Configuration generation module (390) computer-generates configuration files (392) from these profiles:<sup>6</sup>



EX1002, ¶142 (EX1008, [0044], Fig. 3D).

McKinnon updates configuration files in DOCSIS networks having optical fiber. EX1002, ¶143 (EX1007, 1:18-22, 45-49). To service ever-increasing throughput demands: “Data packets representing voice or video, for example, now can be

<sup>6</sup> Noel notes configuration files may be dynamically generated upon request. EX1002, ¶142 (EX1008, [0037]). Like Tsuge's CM setting information file, however, it may also be pre-generated and stored in advance of request. *Id.*

identified and given priority transmission over data packets representing email, file transfers, and text-based Web documents.” *Id.* (EX1007, 3:51-60). Data packets are transmitted downstream from CMTSs to CMs. *Id.* (EX1007, 1:55-61). McKinnon computer-generates CM configuration files pre-authorizing bandwidth. *Id.* (EX1007, 7:48-8:2 (*e.g.* temporarily suspending downloads where bandwidth exceeded)).

McKinnon’s CM is initially assigned a configuration file. EX1002, ¶144 (EX1007, 13:31-40). McKinnon explains advantages of updating configurations based upon subsequent performance. *Id.* (EX1007, 28:27-55). Additionally, McKinnon touts desirability of easy-to-use GUIs through which subscribers can modify services. *Id.* (EX1007, 28:56-29:24).

McKinnon describes modifications based upon events occurring *after* initial configuration. EX1002, ¶145 (EX1007, 17:1-26; 24:15-38; 28:64-29:46). These may require changing bandwidth allocations. *Id.* (EX1007, 26:56-27:21, Fig. 23 (Step 2302)).

McKinnon generates updated configuration files using Bandwidth Allocator 92 and transmits them to TFTP servers. EX1002, ¶146 (EX1007, 26:56-27:21, Fig. 23 (Step2304)). Commands sent to CMs “caus[e] the CMs to acquire and implement the CM configuration files maintained on the TFTP server.” *Id.* (EX1007, 27:17-21). These CMs have existing configuration files. *Id.*

Based upon POSAs' knowledge and disclosures in Tsuge, Noel and/or McKinnon, POSAs would have viewed as obvious computer-generating updated configuration files and sending to Tsuge's vCM for reconfiguring EPON ONUs. EX1002, ¶147. POSAs would have been motivated to accommodate after-arising circumstances. *Id.* The desire for an easy-to-use, self-service GUI would also have motivated POSAs to provide for generating updated configuration files. *Id.*

As discussed herein and in Elements 1[b]-[d], POSAs would have reasonably expected success in generating updated configuration files for re-configuration of Tsuge's ONUs. EX1002, ¶148. POSAs would reasonably expect to generate modified Tsuge CM setting information files, stored for retrieval, from profiles or other information (*e.g.* terms of SLAs) updated via GUIs, as described in both McKinnon and Noel. EX1002, ¶183. Additionally, POSAs would also reasonably have expected successfully modifying Tsuge's CM setting information files to respond to measured performance, as described in McKinnon. *Id.*

**b. Element 1[b]**

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or in view of Noel. EX1002, ¶149.

Tsuge updates ONUs using updated configuration files and/or it would have been obvious to POSAs to so update Tsuge's ONU. EX1002, ¶150; Element 1[a].

Tsuge describes CMTS/CM apparatus management system 250 issuing SNMP SetRequests to OLT 101. Tsuge's setting request prompts retrieval of CM setting information files (configuration files) for target ONUs. *See* Element 1[a]; EX1002, ¶151 (EX1006, 13:16-20, Fig. 7). This *setting request is issued before the ONU is successfully updated*. *Id.* (EX1006, 14:6-9, 67-15:4, Fig. 9 (Step 931)). It serves to *notify the OLT of the updated configuration file's availability*. *Id.* As discussed below, Tsuge's OLTs, with various CM apparatus control signal converting functions 304, constitute vCMs. *Id.*

POSAs would further have viewed such notifications to be obvious based upon Tsuge alone and/or in view of McKinnon and/or Noel. EX1002, ¶152.

POSAs would have been motivated to notify Tsuge's OLT of an update's availability to permit downloading and application without delay. EX1002, ¶153. Providers would have sought to implement changes justifying increased revenues rapidly, or promptly reduce a user's access when premiums were no longer chargeable. *Id.* Providers would have been motivated to immediately push out changes intended to stabilize networks or address service issues. *Id.*

POSAs also would have viewed such notifications to be obvious based upon McKinnon and/or Noel. EX1002, ¶154.

After generating an updated configuration file, McKinnon sends commands to relevant CMs "causing the CMs to acquire and implement the CM configuration

files maintained on the TFTP server.” EX1002, ¶155 (EX1007, 27:17-21, 7:60-8:2).

CMs are notified of available updated configuration files prior to update. *Id.*

“When a new configuration is available,” Noel notifies OLTs of new configuration, which they pass to ONUs. EX1002, ¶156 (EX1008, [0031], [0038]-[0041]).

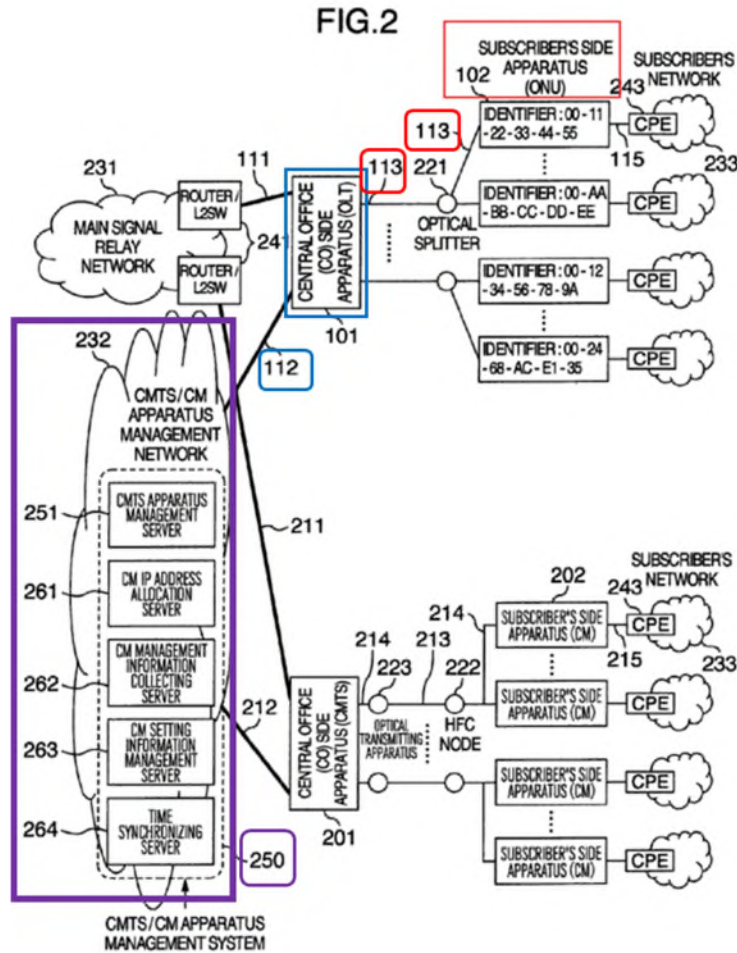
This notification occurs prior to successful update. As Noel explains, ONUs send “configuration requests” to acquire updated configuration file *after* receiving notification. *Id.*

In view of McKinnon and/or Noel, POSAs would have considered obvious notifying Tsuge’s OLT of availability of updated configuration files so OLT could thereafter request files using TFTP to update ONU’s configuration. EX1002, ¶157.

Tsuge’s OLT is a **vCM**. EX1002, ¶158. The ’035 Patent describes creating “an instance” of a vCM on an OLT. EX1002, ¶159 (EX1001, 3:28-34, Fig. 2). POSAs would understand this description and preface “*virtual* cable modem” signal software running on hardware (*e.g.* OLT) performing functions traditionally associated with CMs. *Id.*

Software modules permit Tsuge’s OLT to “transmit[] and receive[] control signals of the same format as apparatus control signals of a CMTS and a CM[,]” and transmit and receive signals to/from ONUs using PON formats. EX1002, ¶160 (EX1006, 4:22-40). “[C]ommunication in the PON interval [*i.e.* segment] ... is the same as the general PON system using the PON standard and the functions which

the ONU of the invention has are the same as those of the ONU of the general PON system,” whereby the “system administrator can easily manage the PON” by using “the same apparatus management system as that for the CMTS and the CM[.]” *Id.* (EX1006, 5:20-32). Tsuge illustrates:

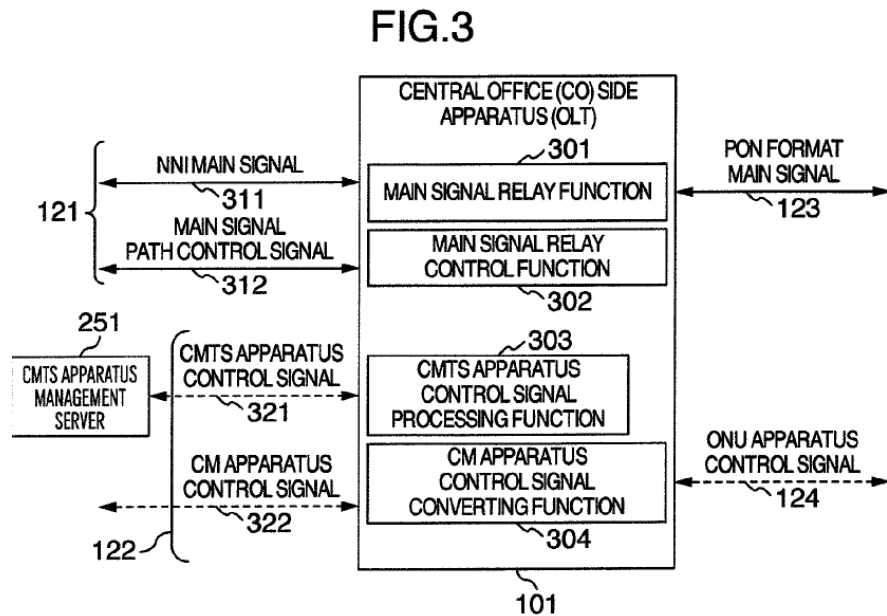


*Id.* (Fig. 2 (annotated)).

OTL 101 [BLUE] connects upstream to apparatus management network 232 [PURPLE] via interface 112. EX1002, ¶161 (EX1006, 7:7-9, 47-51). CMTS/CM apparatus management system 250 communicates CM apparatus control signals 322

to OLT 101's signal converting function 304. *Id.* (EX1006, 8:25-27, 10:8-17). OLT 101 converts these signals into ONU signals 124 transmitted to ONU 102 [RED] via PON line 113.

OLT 101 also converts signals received from ONU 102 into CM signals transmitted to CMTS/CM system 250:

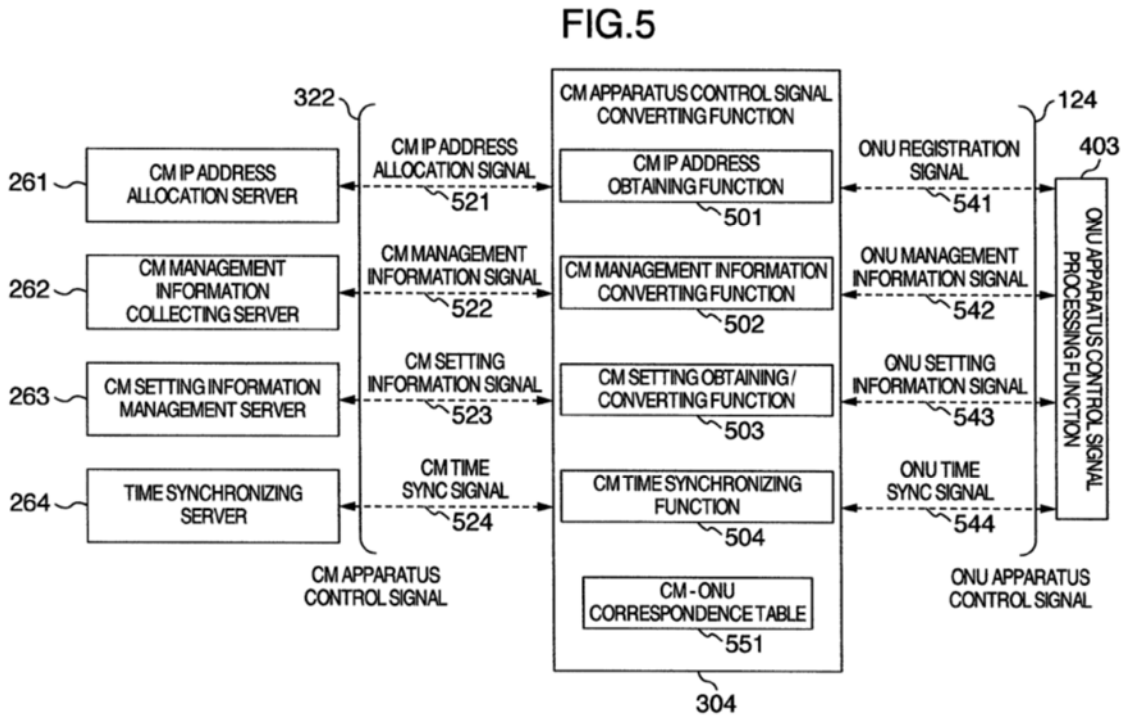


*Id.* (Fig. 3).

In traditional DOCSIS networks, “[A CM] obtains an IP address [] from a DHCP server by using an IP address allocation protocol called DHCP.” EX1002, ¶162 (EX1006, 3:24-38). The CM retrieves initial setting information from TFTP servers at this address. *Id.*

Tsuge replicates this functionality via the OLT's CM apparatus control signal converting function 304 having CM IP address obtaining function 501, CM

management information converting function 502, CM setting obtaining/convert-  
 ing function 503, and CM-ONU correspondence table 551. EX1002, ¶163  
 (EX1006, 3:23-38, 10:62-11:3, Figs. 3, 5).



Function 501 requests CM IP address allocation server 261 issue an address. EX1002, ¶164 (EX1006, 11:4-17, 12:51-62, Fig. 6). This address is associated with an ONU-specific identifier (*e.g.* MAC address) in table 551. *Id.* (EX1006, 12:12-15, 63-66, 15:61-16:8); Element 1[a]. Table 551 permits ONUs to be addressed at OLT as if they were CMs. *Id.* (EX1006, 12:12-15, 63-66).

The '035 Patent describes vCM's functions in nearly identical terms. EX1002, ¶165 (EX1001, 3:32-48 (claimed vCM obtains address/file name via DHCP, downloads file using TFTP, translates into ONU parameters communicated via OAM)).

The CM Apparatus Control Signal Converting Functions 304 of Tsuge's OLT constitute a vCM. EX1002, ¶166.

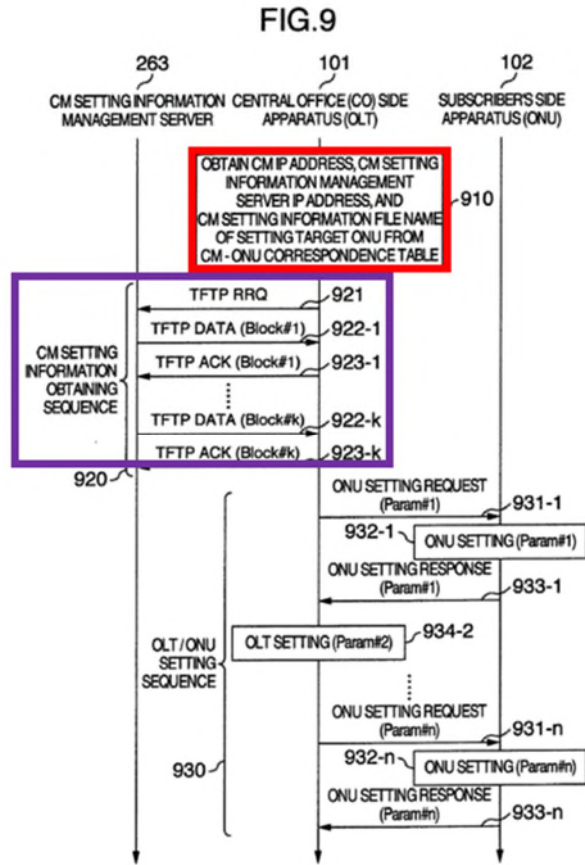
As discussed herein and in Elements 1[a], [c]-[d], POSAs would reasonably have expected to successfully notify Tsuge's vCM of the availability of an updated configuration file prior to successful configuration of its ONU using either DHCP or SNMP messaging. EX1002, ¶167.

**c. Element 1[c]**

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶168.

Tsuge discloses *providing requested updated configuration files* and/or it would have been obvious to POSAs to do so. EX1002, ¶169; Element 1[a].

The CM setting information file (*i.e.* updated configuration file) is provided *in response to requests from Tsuge's vCM* (Step 920 [PURPLE]):



EX1002, ¶170 (EX1006, 14:20-61, FIG. 9 (annotated)); Elements 1[a]-[b].

POAs also would have viewed this element to be obvious based further upon McKinnon and/or Noel. EX1002, ¶171.

Noel provides updated configuration files in response to request 308 forwarded by OLT 360. EX1002, ¶172 (EX1008, [0032]-[0033], [0039], Fig. 3B).

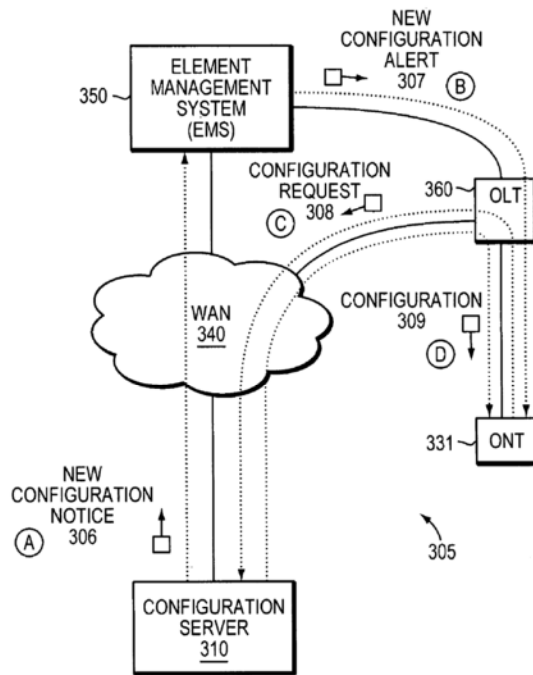


FIG. 3B

McKinnon provides updated configuration files in response to requests from CMs prompted by notice of file's availability. EX1002, ¶173 (EX1007, 27:17-21).

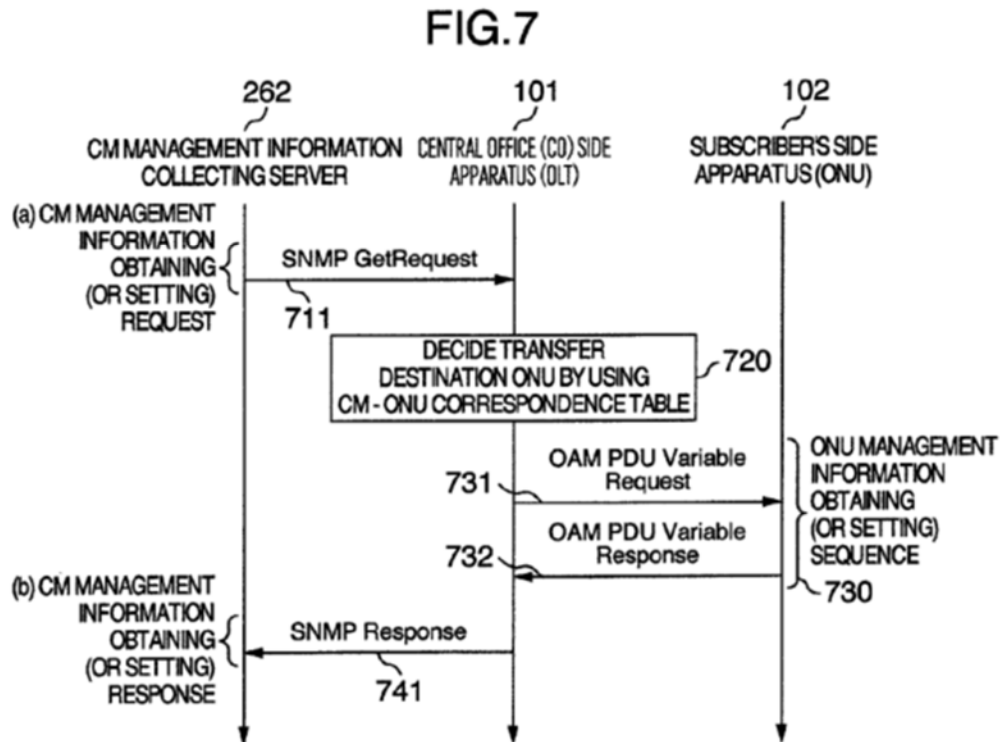
As discussed in Elements 1[a]–[d], POSAs would reasonably have expected success providing configuration files in response to requests by Tsuge's vCM (*i.e.* OLT) via TFTP. EX1002, ¶174.

**d. Element 1[d]**

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶175.

Tsuge *monitors* OLT 101 and its Converting Functions 304 (*i.e.* vCM) *to confirm successful implementation* by ONUs of setting requests. EX1002, ¶177

(EX1006, 15:9-15, Fig. 9 (Steps 932-933)). After sequence initiated by SNMP SetRequest is complete, Tsuge's OLT 101 returns a SNMP Response to the CMTS/CM apparatus management system. *Id.* ¶178 (EX1006, 13:40-50, Fig. 7 (Step 741) (using GetRequest example)):



If Tsuge does not disclose this element, it would have been obvious. EX1002, ¶179. It would have been obvious to POSAs to update Tsuge's ONU using an updated configuration file. EX1002, ¶176; Element 1[a]. POSAs would have monitored OLT 101 for update success because CMTS/CM apparatus management system 250 does not communicate directly with ONU 102 due to differing DOCSIS

versus PON communication protocols. *Id.* POSAs would have monitored updates at least because knowing if/when updating is successful is important to calculating billing changes regarding services. *Id.* Additionally, knowing success is essential to determining if further actions or renewed efforts are necessary. *Id.*

Tsuge's vCM successfully updates ONUs using updated configuration files, and/or success would have been reasonably expected. EX1002, ¶181. POSAs would also have expected success in monitoring Tsuge's vCM for responses indicating update has been applied. EX1002, ¶180; Elements 1[a]–[c].

Tsuge's vCM could readily be expected to accommodate and process updated configuration files, such as files generated by McKinnon, because it was designed to use “the same apparatus management system” as traditional CMTS/CM networks. EX1002, ¶¶181-184 (EX1006, 5:20-32). Software modules forming Tsuge's vCM expressly permit “transmit[ting] and receiv[ing] control signals of the same format as that of apparatus control signals of a CMTS and a CM[.]” *Id.* (EX1006, 4:22-40).

POSAs would thus have expected Tsuge's vCM to successfully translate parameters of updated configuration files into setting information signals applied by ONUs. EX1002, ¶185.

POSAs would have expected Tsuge's ONUs would successfully apply these signals to update its configuration. EX1002, ¶186. Tsuge and Noel teach an ONU's configuration may be selectively modified successfully via control signals. *Id.*

Claim 1 does not require application of updated configuration files avoid re-booting. EX1002, ¶187; Sections IV(B)-(C). Nevertheless, POSAs would have reasonably expected Tsuge's system to successfully implement configuration modifications without rebooting. *Id.*

Noel, for example, describes modifying configurations of a plurality of ONUs via transmission of an updated configuration file. Nowhere does Noel suggest re-configuring ONUs requires a reboot. EX1002, ¶188 (EX1008).

Additionally, Tsuge's CM is *virtual* (*i.e.*, software modules), not hardware requiring rebooting. EX1002, ¶189. POSAs would understand Tsuge's vCM would not require rebooting to acquire, translate, transmit and apply updated configuration changes reflected in updated files. *Id.* ¶125 (EX1006, 14:67-15:4, Fig. 9 (Step 930) (OLT 101 sequentially interprets/applies ONU parameters)).

Thus, Claim 1 would have been obvious to POSAs. EX1002, ¶190.

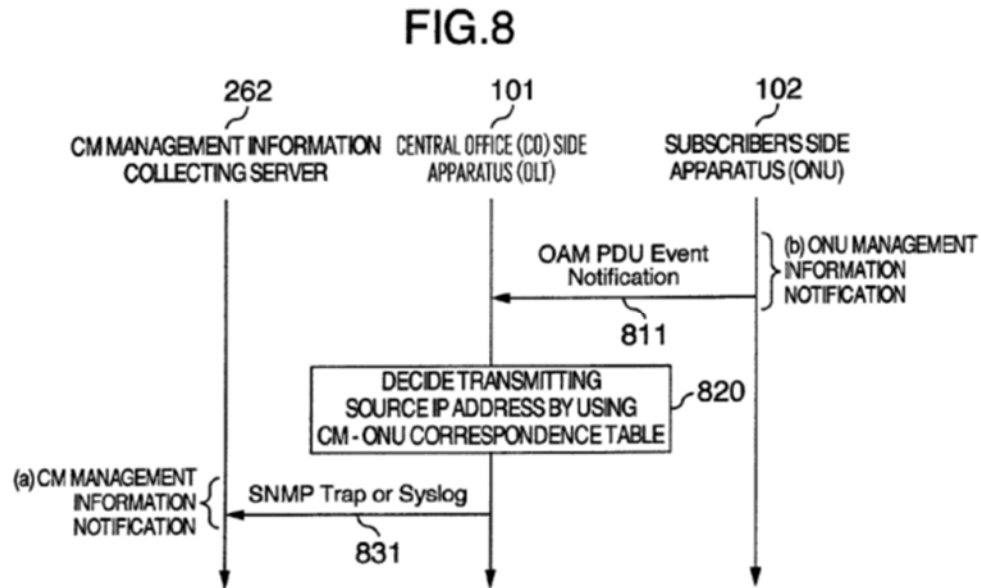
## **2. Claim 2**

### **a. Element 2[a]**

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶191; Elements 1[preamble]–[d].

Tsuge describes a CM management information notifying process. EX1002, ¶192 (EX1006, 13:50-54, Fig. 8). The OLT receives OAM PDU Event Notifications,

spontaneously generated by ONUs or prompted periodically by OLTs. *Id.* (EX1006, 13:50-54, Fig. 8 (Step 811), 14:10-19). The OLT converts notifications into SNMP Trap messages or syslogs communicated to CM management information collecting server 262. *Id.* (EX1006, 13:65-14:19, Fig. 8 (Step 831)).



OAM PDU Event Notifications and SNMP Trap messages/Syslogs report issues requiring configuration changes, such as bandwidth allocation. EX1002, ¶193.

CMTS/CM system's receipt of information concerning ONU state can prompt issuance of CM information setting requests (SNMP SetRequests) provoking retrieval of updated configuration files and application to the affected ONUs. EX1002, ¶194 (EX1006, 14:10-19); Element 1[b].

POSAs would also have viewed this as obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶195. POSAs would have been motivated

*to detect needed changes to ONUs* to promptly address those changes. *Id.* POSAs would have viewed it as obvious *to generate updated configuration files in response to detecting needed changes. Id.*

Noel's ONT periodically polls Configuration Server 310, detecting needed configuration changes. EX1002, ¶196 (EX1008, [0027]). Noel would have motivated POSAs to employ Tsuge's OAM PDU/SMTP data polling to recognize needed ONU configuration updates. *Id.*

McKinnon discloses Bandwidth Allocator 92 detecting needed configuration changes (*e.g.* changes in user SLAs). EX1002, ¶197 (EX1007, 26:30-55). Bandwidth Allocator 92 retrieves information from Database Manager 90, including information in SLAs which are "updated from time to time by Administrator 106." *Id.*

McKinnon further periodically monitors CMs for needed configuration changes. EX1002, ¶198 (EX1007, 16:1-10). Using SNMP, data is collected from CM DOCSIS-compliant MIBs. *Id.* (EX1007, 15:53-67). Data Collector 88 provides information concerning CM performance to Database Manager 90. Bandwidth Allocator 92 uses this data to generate updated configuration files. *Id.* (EX1007, 15:21-27, 16:17-22 ("Database Manager 90 "stores the information in a user statistics table ('stats') for later use by the Bandwidth Allocator 92[.]")).

McKinnon changes CM configurations using updated CM configuration files. Elements 1[preamble]-[a]. Tsuge's OLT CM Apparatus Control Signal Converting

Functions 304 (*i.e.* vCM) converts CM configuration files into OAM messages to configure ONUs. EX1002, ¶199. McKinnon motivates using Tsuge's OAM PDU/SNMP data monitoring to retrieve ONU data from which Tsuge's CMTS/CM System 250 can recognize needed configuration updates. *Id.*

POSAs would reasonably have expected success in detecting an ONU's needed configuration change, either by Tsuge's OAM PDU, Syslog, and/or SNMP Trap messaging or similar reporting, or by monitoring system performance and/or changes in authorizations as described in McKinnon/Noel. EX1002, ¶200.

**b. Element 2[b]**

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶201; Elements 1[a], 2[a].

Tsuge contemplates providing multiple services to users. EX1002, ¶202 (EX1006, 1:33-42, 19:58-20:11). Tsuge uses CM setting information files to configure services on ONUs. *Id.* (EX1006, 3:22-38, 21:4-16). POSAs would understand Tsuge *to generate updated configuration files modifying one or more services*. See Element 1[a].

If Tsuge does not disclose this element, POSAs would have viewed it as obvious given Tsuge and his/her knowledge because changing services was understood to require updated configuration files. EX1002, ¶203; Element 1[a].

POSAs would also have viewed this step as obvious in view of McKinnon and/or Noel. EX1002, ¶204.

McKinnon updates configuration files, modifying at least one service. Administrators or users may change stored SLAs used by Bandwidth Allocator to generate updated configuration files. EX1002, ¶206 (EX1007, 24:15-38, 28:64-29:46). These changes prompt, *inter alia*, revisions to user bandwidth allocations in relevant CM configuration files. *Id.* (EX1007, 26:56-27:21, Fig. 23 (Step 2302)). POSAs would have viewed it as obvious to update Tsuge's configuration files (*i.e.* CM setting information files) to modify provided services, such as changing bandwidth or priority. *Id.*

Noel also teaches providing a network operator with the capability to change services for one or more ONTs via configuration files. EX1002, ¶205 (EX1008, [0003], [0026], [0030], [0032]-[0033], [0036], [0041]).

POSAs would reasonably have expected success in modifying one or more parameters relating to services reflected in configuration files to generate updated files. EX1002, ¶207; Elements 1[preamble]-[d].

Thus, Claim 2 would have been obvious to POSAs. EX1002, ¶208.

**3. Claim 4**

**a. Element 4[a]**

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of Noel and/or McKinnon. EX1002, ¶209; Elements 1[preamble]–[c].

*Tsuge receives DHCP requests from vCM.* EX1002, ¶210 (EX1006, 3:24-38). To retrieve configuration files, Tsuge’s vCM requests a CM IP Address and a configuration file name/address using DHCP. *Id.* (comparing EX1006, 4:43-51, 12:51-13:6, Fig. 6 (Step 630)) and EX1001, 5:55-60, Fig. 4 (describing identical DHCP process)).

Likewise, Noel’s ONT requests updated configuration files using a “Dynamic Host Configuration Protocol (DHCP) Client Identifier[.]” EX1002, ¶211 (EX1008, [0037])).

Tsuge discloses, or it would have otherwise been obvious, that retrieved configuration files would have been updated. EX1002, ¶212; Elements 1[preamble]–[a].

POSAs would reasonably have expected success in employing DHCP to provide an updated configuration file. EX1002, ¶213; Elements 1[preamble]–[d].

**b. Element 4[b]**

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of Noel and/or McKinnon. EX1002, ¶214. POSAs would have *provided vCMs with file's location* to facilitate retrieval, and would have reasonably expected success in doing so. *Id.*; Elements 1[a]-[d], 4[a].

**c. Element 4[c]**

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of Noel and/or McKinnon. EX1002, ¶215; Elements 1[preamble]-[d].

Tsuge's OLT 101 control signal converting function 304 (*i.e.* vCM) and CM setting information management server 263 *download configuration files using TFTP*. EX1002, ¶216 (EX1006, 14:40-46, 51-61, Fig. 9 (Step 920)).

Using file transfer protocol would have been obvious—FTP was well known. In McKinnon, updated configuration files are retrieved from a TFTP Server. EX1002, ¶217 (EX1007, 27:13-21).

Tsuge discloses, or it would have been obvious to POSAs, that retrieved configuration files would have been updated. *See* Elements 1[preamble]-[a]. EX1002, ¶218.

POSAs would reasonably have expected success in employing TFTP, a species of file transfer protocol, to download updated configuration files. EX1002, ¶219; Elements 1[preamble]–[d].

Thus, Claim 4 would have been obvious to POSAs. EX1002, ¶220.

#### **4. Independent Claim 5**

##### **a. Preamble**

If limiting, this element would have been obvious to POSAs based upon Tsuge alone and/or in view of McKinnon and/or Noel. Tsuge discloses a *system facilitating updates to configuration files used for operation of ONUs in EPONs*. EX1002, ¶¶221-223; Elements 1[a]-[d], 5[a]-[d].

##### **b. Element 5[a]**

The Patent describes “*generator*” as “module 602 ... generating an updated configuration file for the ONU” which “can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware[.]” EX1002, ¶225 (EX1001, 7:34-36, 8:20-50, FIG. 6).

This element would have been obvious to POSAs based upon Tsuge alone and/or in view of McKinnon and/or Noel. EX1002, ¶¶224-235; Element 1[a], 2[a].

McKinnon’s generator (*i.e.* Bandwidth Allocator 92) generates updated configuration files. Bandwidth Allocator is a software module operating within a network access manager located in system’s headend:

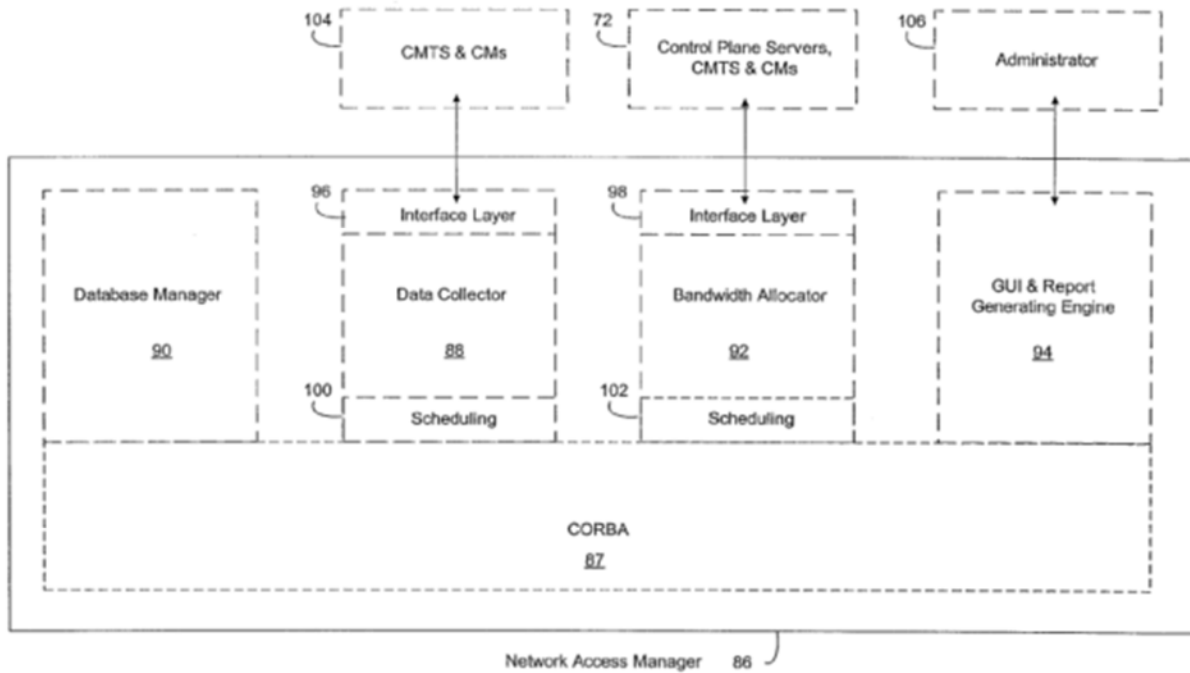


FIG. 6

EX1002, ¶¶229-230 (EX1007, 14:39-63, 14:12-23, Fig. 6).

Noel similarly discloses “a configuration generation module [] generat[ing] a configuration for the associated ONT[.]” EX1002, ¶¶233-234 (EX1008, [0044]).

POSAs would view as obvious using a generator in Tsuge’s CMTS/CM apparatus management network 232, including management system 250, to *generate updated configuration files for ONUs*. EX1002, ¶231; Elements 1[a]-[d]. POSAs would reasonably expect success in generating updated configuration files for re-configuration of ONUs in Tsuge. EX1002, ¶¶232, 235; Elements 1[a]-[d].

**c. Element 5[b]**

The Patent describes “*notifier*” as “module 604 ... notifying a virtual cable modem (vCM) that a configuration file update is available for the ONU” which “can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware[.]” EX1002, ¶237 (EX1001, 7:34-36, 8:20-50, FIG. 6). Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶¶236-239; Elements 1[a]-[d].

Tsuge’s CMTS/CM apparatus management network 232, including management system 250 having information collecting server 262, issues SNMP SetRequests to OLT 101. *Id.* SetRequests *notify the vCM of the updated configuration file’s availability*, or it would have been obvious to do so. *Id.* This message is issued before ONU update. *Id.*

POSAs would have viewed use of a notifier with Tsuge’s CMTS/CM apparatus management network 232 to have been obvious in view of McKinnon and/or Noel. EX1002, ¶239; Element 1[a]-[d].

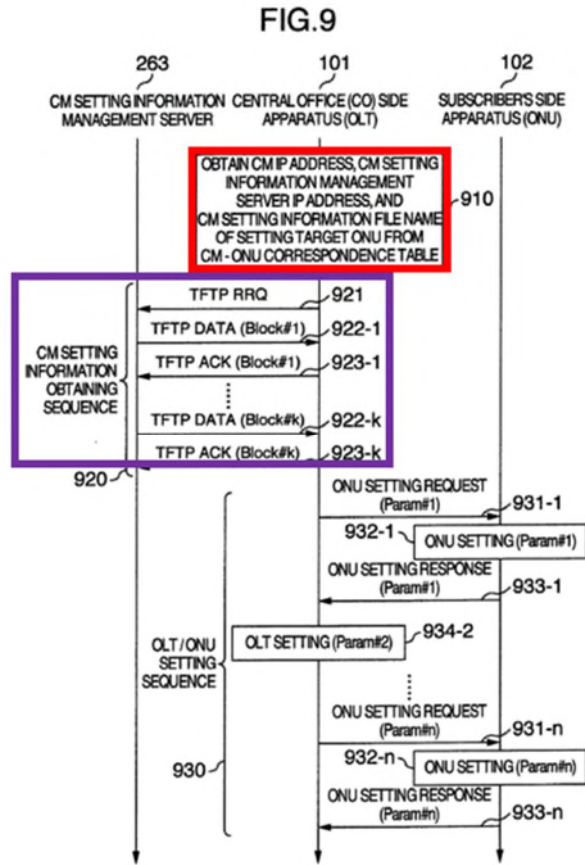
**d. Element 5[c]**

The Patent describes “*file provider*” as “module 606 ... providing, when requested by the vCM, the vCM the updated configuration file.” EX1002, ¶241 (EX1001, 7:34-40). The Patent notes “vCM uses the standard mechanism defined in

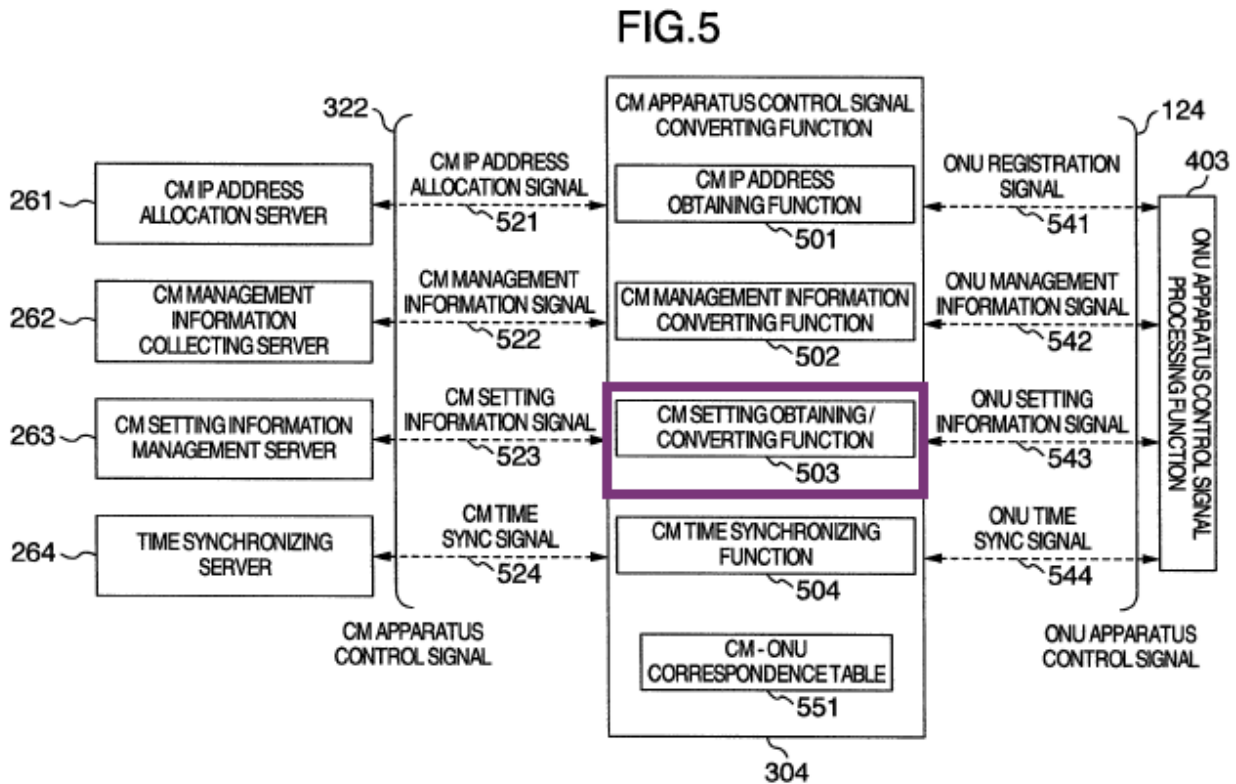
DPoE I01 specifications to obtain the said CM config file, starting with DHCP request message (402) and then following with (T)FTP download (404) of the new CM config file into the DPoE System for further processing.” EX1002, ¶242 (EX1001, 5:55-60, FIG. 6).

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶240.

Tsuge’s OLT 101 (*i.e.* vCM) requests CM setting information files (*i.e.* configuration files) from CMTS/CM apparatus management system 250, which ***provides that file in response via TFTP***. Tsuge’s Figure 9 illustrates this process (Step 920 [PURPLE]):



EX1002, ¶242 (EX1006, 8:62-9:12, 14:20-61, FIG. 9 (annotated)); Elements 1[a]-[d], 4[a]-[c]. System 250 employs CM setting information management server 263 and CM Setting Obtaining/Converting Function 503 operating on OLT 101, as depicted in Figure 5 (Module 503 [PURPLE]):



*Id.* (EX1006, 10:60-67, FIG. 5 (annotated)).

McKinnon likewise teaches TFTP servers (*i.e.* “file providers”) which maintain updated configuration files for delivery upon request. EX1002, ¶243 (EX1007, 26:56-27:21, Fig. 23 (Step 2304)).

**e. Element 5[d]**

The Patent describes “*monitor*” as “module 608 ... monitoring the vCM for an indication of successful update of the ONU by the vCM” which “can be implemented in digital electronic circuitry, or in computer software, firmware, or hard-

ware, including the structures disclosed in this document and their structural equivalents, or in combinations of one or more of them.” EX1002, ¶245 (EX1001, 7:34-42, 8:20-50, FIG. 6).

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or McKinnon and/or Noel. EX1002, ¶244; Element 1[d].

Tsuge’s OLT 101 (*i.e.* vCM) monitors ONUs to confirm setting requests were implemented. *Id.* (EX1006, 15:9-15, 16:65-17:33, Fig. 9 (Step 933)). In turn, CMTS/CM apparatus management system 250, including information collecting server 262, *monitors OLT 101 for such an indication.* EX1002, ¶¶246-247 (EX1006, 13:40-50, Fig. 7 (Step 741)); Element 1[d].

If Tsuge does not disclose this element, it would have been obvious. EX1002, ¶248. POSAs would have been motivated to employ a monitor to monitor OLTs for indications of successful update. *Id.*; Element 1[d].

Thus, Tsuge discloses and/or renders obvious, alone and/or in view of McKinnon and/or Noel, the apparatus recited in Claim 5. EX1002, ¶249.

## **5. Claim 6**

### **a. Element 6[a]**

The recited “*detector*” “can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware[.]” EX1002, ¶251 (EX1001, 7:34-36, 8:20-50, FIG. 6). Tsuge discloses this element, or it would have been obvious in

light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶¶250-259; Element 2[a].

Tsuge describes CM management information notifying process forming part of CM information converting function. EX1002, ¶253 (EX1006, 13:50-54, Fig. 8). Via OLT 101, Tsuge's CMTS/CM apparatus management network 232, including management information collecting server 262, *detects ONU conditions needing updating*. *Id.*; Element 2[a].

POSAs would also have viewed such a step as obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶256.

McKinnon discloses Bandwidth Allocator 92 detecting needed configuration changes from changes in SLAs. EX1002, ¶258 (EX1007, 26:30-55). Bandwidth Allocator 92 also *detects needs for changes* using data collected from CMs by Data Collector 88. EX1002, ¶257 (EX1007, 15:21-27, 53-67, 16:1-10, 17-22).

POSAs would have been motivated to detect needed changes to ONUs to address those needs, and if addressable by a configuration change, POSAs would have viewed it as obvious to then generate an updated configuration file. EX1002, ¶256.

**b. Element 6[b]**

The recited “*modifier*” “can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware[.]” EX1002, ¶261 (EX1001, 7:34-36, 8:20-50, FIG. 6).

POSAs would understand Tsuge's CMTS/CM Apparatus Management Network 232 generates updated configuration files *making modifications to one or more services*. EX1002, ¶¶260-266; Element 1[b]. POSAs would also have viewed as obvious use of a modifier in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶264; Element 2[b].

Noel's configuration generation module (390) generates updated configuration files and is implemented in software, firmware or hardware. EX1002, ¶264a (EX1008, [0065]). These files change services. *Id.* (EX1008, [0029]).

McKinnon's software Bandwidth Allocator 92 generates updated configuration files modifying existing services. EX1002, ¶265.

POSAs would have viewed as obvious modifiers generating updated configuration files (*i.e.* CM setting information file) in Tsuge to update ONUs modifying user's services (*e.g.* change bandwidth or priorities). *Id.*

POSAs would have been motivated to modify services in configuration files to generate updated files because any service update requires generating updated configuration files having service modifications. EX1002, ¶264.

The apparatus recited in Claim 6 is disclosed by Tsuge and/or would have been obvious to POSAs in light of Tsuge alone and/or in view of McKinnon and/or Noel. EX1002, ¶266.

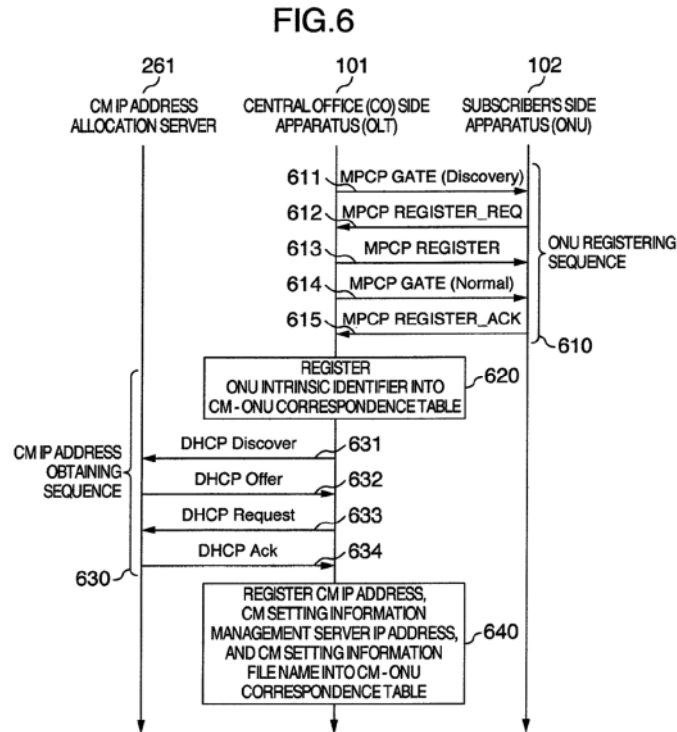
**6. Claim 8**

**a. Element 8[a]**

The recited “*receiver*” “can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware[.]” EX1002, ¶268 (EX1001, 7:34-36, 8:20-50, FIG. 6). The Patent explains “back-office systems” receive DHCP requests from vCMs. *Id.* (EX1001, 4:53-59).

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶267; Elements 1[preamble]–[c], 4[a].

Tsuge’s back-office system 250, including allocation server 261, *receives a DHCP request from the vCM*. EX1002, ¶269-70 (EX1006, 4:43-51, 12:51-13:6, Fig. 6 (Step 630)).



Tsuge discloses retrieving updated configuration files, or it would have otherwise been obvious. *Id.* ¶271; Element 1[a].

A receiver to receive a DHCP request from vCMs would have been obvious to facilitate download of updated configuration files. EX1002, ¶272; Elements 8[b]-[c], below.

**b. Element 8[b]**

The recited “*location provider*” “can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware[.]” EX1002, ¶274 (EX1001, 7:34-36, 8:20-50, FIG. 6). The Patent explains “in response, the back-office system informs the vCM about the ... list of (T)FTP address servers holding [sic] [the configuration] file.” *Id.* (EX1001, 4:53-63).

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or McKinnon. EX1002, ¶273; Elements 1[b]-[c], 4[b].

Tsuge's CMTS/CM apparatus management system 250, with its address allocation server 261, *provides the location of the configuration file*. EX1002, ¶275 (EX1006, 8:39-42, 12:51-13:6, 14:25-61, Fig. 6 (Step 630), Fig. 11); Elements 1[a]-[b], 4[a]. Tsuge discloses, or renders obvious in view of McKinnon/Noel, updating configuration files. EX1002, ¶276; Element 1[a].

**c. Element 8[c]**

The patent describes "*file transferor*" as "vCM us[ing] the standard mechanism ... to obtain the" configuration file, "starting with DHCP request message" and then "following with (T)FTP download" of updated configuration files. EX1002, ¶278 ( EX1001, 5:55-60).

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶277; Elements 1[b]-[c], 4[c].

Tsuge's CMTS/CM Apparatus Management System 250, including information management server 263, permits OLT 101 (*i.e.* vCM) to *download configuration files via TFTP* using Signal Converting Function 304. EX1002, ¶279 (EX1006, 8:39-42, 14:40-61, Fig. 9 (Step 920)).

CMs in McKinnon also download updated configuration files from a TFTP server. EX1002, ¶280 (EX1007, 27:13-21).

Tsuge discloses downloading updated configuration files, or it would have been obvious. Element 1[a].

Claim 8's apparatus would have been obvious. EX1002, ¶281.

## **7. Independent Claim 9**

### **a. Preamble**

If limiting, this element would have been obvious based upon Tsuge and/or McKinnon. EX1002, ¶¶282-290 (EX1006, 8:25-9:12 (describing back-office “servers” which inherently include software stored in memory); EX1007, 11:64-12:8, 14:24-63 (describing stored software/hardware modules performing claimed functionality)); Elements 9[a]-[d].

### **b. Element 9[a]**

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶291; Elements 1[a], 5[a], 6[a]-[b].

Tsuge's CMTS/CM apparatus management network 232 would employ non-transitory readable media having stored *computer programs executed by processors generating updated configuration files* for configured ONUs and/or servers employing such code would have been obvious in light of Tsuge and/or in view of McKinnon's and/or Noel's use of Bandwidth Allocator 92 (software module) executing on Network Access Manager 86 and/or configuration generation module 390 software executing on Configuration Server 310, respectively. EX1002, ¶¶282-287

(EX1006, 8:25-9:12; EX1007, 8:16-35 (software stored on hardware), 11:64-12:8 (using “hardware, firmware, or software, or various combinations thereof”), 12:24-26, 12:52-54, 14:24-63; EX1008, [0036], [0044], [0065] (may be implemented in software embodied in ROM)); Element 1[a], 5[a], 6[a]-[b]. POSAs would have been motivated to use software to update configuration files in Tsuge to increase flexibility and revenues and decrease cost. EX1002, ¶289 (EX1007, 27:41-29:3).

**c. Element 9[b]**

Tsuge’s CMTS/CM apparatus management network 232 employs stored software to *notify a vCM of the availability of an updated configuration file* via SNMP SetRequests and/or DHCP responses as claimed, or it would have been obvious in light of Tsuge and/or in view of McKinnon’s and/or Noel’s use of software to issue notifications by TFTP Server and/or Element Management System 350, respectively. EX1002, ¶¶283, 292 (EX1006, 8:25-9:12); Elements 1[b], 3, 5[b], 7, 9[a].

**d. Element 9[c]**

Tsuge’s CM setting information server 263 employs stored software to *provide the updated configuration file when requested* by vCM via TFTP as claimed, or it would have been obvious in light of Tsuge and/or in view of McKinnon’s and/or Noel’s use of software executing on TPFT Servers and/or Configuration Server 310, respectively, to so provide. EX1002, ¶293 (EX1006, 8:25-9:12); Elements 1[c], 4[a]-[c], 5[c], 8[a]-[c], 9[a].

**e. Element 9[d]**

Tsuge's CMTS/CM apparatus management system 250, OLT 101 and ONU 102 employ stored software to *monitor the vCM for successful update* of ONUs as claimed, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel to update configuration files used in Tsuge's configuration process. EX1002, ¶294 (EX 1006, 8:25-9:12, 18:1-17); Elements 1[d], 5[d], 9[a].

Claim 9's computer program product would have been obvious to POSAs. EX1002, ¶295.

**8. Claim 10**

**a. Element 10[a]**

*To detect a configuration change need*, Tsuge employs stored software as claimed executing on OLTs (receiving/causing receipt of OAM PDU Event Notifications) and/or CM management information collecting server 262 (responding to SNMP Trap messages or syslogs), or it would have been obvious in light of Tsuge and/or in view of McKinnon's and/or Noel's use of software (Allocator 92 and/or module 390) executing on Network Access Manager 86 and/or Configuration Server 310. EX1002, ¶296; Elements 1[a], 2[a], 6[a], 9[a].

**b. Element 10[b]**

Tsuge's CMTS/CM apparatus management network 232 employs stored software *to modify at least one service* in a configuration file as claimed, or it would

have been obvious in light of Tsuge and/or in view of McKinnon's and/or Noel's use of software to so modify files. EX1002, ¶297; Element 1[a], 2[b], 6[b], 9[a].

Claim 10's computer program product would have been obvious to POSAs. EX1002, ¶298.

**9. Claim 12**

**a. Element 12[a]**

Tsuge's CMTS/CM apparatus management system 250 would employ *stored computer programs*, and/or it would have been obvious to do so, *to receive a DHCP request from its vCM* in providing updated configuration files. EX1002, ¶299; Elements 1[c], 4[a]-[c], 5[b]-[c], 8[a]-[c], 9[a]-[c]. It otherwise would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel for Tsuge's system to receive such DHCP requests. *Id.*

**b. Element 12[b]**

Tsuge's CMTS/CM apparatus management system 250 would employ stored software, and/or it would have been obvious to do so, *to provide its vCM with location information* as claimed (*e.g.* CM IP Address obtaining sequence (630)). EX1002, ¶300; Elements 1[c], 4[a]-[c], 5[b]-[c], 8[a]-[c], 9. It otherwise would have been obvious in light of Tsuge and/or in view of McKinnon's and/or Noel's use of software to provide CMs and/or ONTs, respectively, with server locations of such files. *Id.*

**c. Element 12[c]**

Tsuge's control signal converting function 304 and CM setting information management server 263 employ stored software, and/or it would have been obvious to do so, to permit its vCM *to download the configuration file using FTP* as claimed. EX1002, ¶301; Elements 1[c], 4[a]-[c], 5 [c], 8[a]-[c], 9. It otherwise would have been obvious in light of Tsuge and/or Noel to download updated files and/or McKinnon to employ TFTP software to do so. *Id.* (EX1007, 27:13-21)

Claim 12's computer program product would have been obvious. EX1002, ¶302.

**10. Independent Claim 13**

**a. Preamble**

If limiting, Tsuge discloses an *apparatus for causing an update to a configuration file used for operation of ONUs in an EPON*, or it would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶303; Claims 1-9, Elements 13[a]-[d].

**b. Element 13[a]**

Tsuge discloses *means for* (digital electronic circuitry, or software/firmware operating on hardware) *generating updated configuration files* and equivalents thereof, or it otherwise would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶304 (EX1006, 5:8-23, 8:25-42, 10:17-20); Elements 1[a], 2, 5[a], 6[a]-[b], 9[a].

**c. Element 13[b]**

Tsuge discloses *means for* (digital electronic circuitry, or software or firmware operating on hardware) *notifying vCMs as claimed* and equivalents thereof, or it otherwise would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶305; Elements 1[b], 3, 5[b], 7, 9[b].

**d. Element 13[c]**

Tsuge discloses *means for* (digital electronic circuitry, or software or firmware operating on hardware) *providing updated configuration files as claimed* and equivalents thereof, or it otherwise would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶306; Elements 1[c], 4[a]-[c], 5[c], 8[a]-[c], 9[c].

**e. Element 13[d]**

Tsuge discloses *means for* (digital electronic circuitry, or software or firmware operating on hardware) *monitoring as claimed* and equivalents thereof, or it otherwise would have been obvious in light of Tsuge and/or in view of McKinnon and/or Noel. EX1002, ¶307; Elements 1[d], 5[d], 9[d].

**B. Ground 2: Claims 3, 7 and 11 Obvious Over Tsuge Alone and/or in View of McKinnon, Noel and/or Go**

**1. Claim 3**

Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon, Noel and/or Go. EX1002, ¶308; Elements 1[a]-[d], 2[a].

CMs interact with control signal data structures (MIBs) using SNMP. EX1002, ¶309 (EX1006, 3:3-18). POSAs understood MIBs' addressable data objects included configuration information. *Id.*

POSAs would have understood Tsuge may notify vCMs by ***changing MIB variables***. EX1002, ¶310. Applicant acknowledged “standard mechanism[s]” for downloading configuration files are “defined in [prior art] DPoE I01 specifications[,]” and include changing MIB variables:

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. The vCM changes the dpoeVcmDynCfgState object state to “downloadInProgress[.]”

*Id.* (EX1001, 5:41-60) (emphasis added).

POSAs would also have viewed the step as obvious. EX1002, ¶311. Tsuge sought seamless compatibility with existing DOCSIS networks. *Id.* (EX1006, 4:13-21); Element 1[b]. POSAs would have been motivated to employ addressable MIBs in Tsuge's vCMs to accommodate existing networks. *Id.*

POSAs also would have viewed it as obvious in view of Go. EX1002, ¶312. Go discloses methods for “convenient and rapid automatic upgrade of software for cable modems[.]” EX1002, ¶313 (EX1009/EX1018, (54)). CM is instructed to upgrade by changing MIB variables. *Id.* (EX1009/EX1018, 4-5 (“docsDevSwAdminStatus' is set to 'upgradeFromMgt(1)' through SNMP”)).

POSAs would reasonably have expected success notifying vCMs of update file availability by changing MIB variables. EX1002, ¶314; Elements 1[a]–[d]. The '035 Patent and Go acknowledge POSAs would have known how to use MIBs to provoke CM upgrades. *Id.*

Thus, Claim 3 would have been obvious to POSAs. EX1002, ¶315.

## 2. Claim 7

The recited “*changer*” may “be implemented in digital electronic circuitry, or in computer software, firmware, or hardware[.]” EX1002, ¶317 (EX1001, 8:25-6). Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of McKinnon, Noel and/or Go. EX1002, ¶316; Claim 3.

As discussed in Claim 3, Tsuge alone and/or in view of Go renders obvious a *changer* in form of standard OSS mechanisms to notify the vCM of availability of updated configuration files. EX1002, ¶318.

Apparatus of Claim 7 would have been obvious to POSAs. EX1002, ¶319.

**3. Claim 11**

As discussed in Claim 3, Tsuge discloses this element, or it would have been obvious in light of Tsuge and/or in view of Noel and/or McKinnon and/or Go. EX1002, ¶320; Claim 3, Element 9[a].

The *computer program product changing a variable in the vCM's MIB* recited in Claim 11 would have been obvious to POSAs. EX1002, ¶321.

**C. Ground 3: Claims 14, 20, 26 and 32 Obvious Over Bourgart Alone and/or in View of Barrow**

**1. Independent Claim 14**

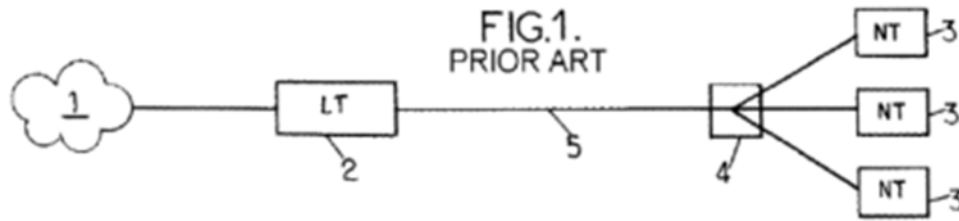
**a. Element 14[preamble]**

If deemed limiting, Bourgart discloses this element or Bourgart alone, and/or in view of Barrow, renders them obvious. EX1002, ¶¶322-329; Elements 14[a]-[f].

**b. Element 14[a]**

Bourgart discloses this element, describing OLTs *receiving notifications that updated configuration files are available for previously-configured ONUs*. EX1002, ¶330.

Bourgart discloses telecommunications networks including a line between line-termination device (LT) and network-termination devices (NTs). EX1002, ¶325 (EX1008, 1:15-18). Bourgart represented this network schematically:



*Id.* (EX1010, 1:22-23).

NTs may comprise ONUs. EX1002, ¶326 (EX1010, 5:51-54). LTs may comprise OLTs. *Id.* (EX1010, 5:5:47-50; 6:3-9). Line 5 may be an EPON optical line.

*Id.* (EX1010, 1:59-2:6).

Because communication protocols are “likely to change,” Bourgart proposes a “low-cost solution” for reconfiguring NTs that “does not require service interruption.” EX1002, ¶¶327-328 (EX1010, 1:59-60, 2:11-16, 2:32-34).

Bourgart’s LT communicates reconfiguration instructions to connected NTs. EX1002, ¶329 (EX1010, 2:38-55). OLTs may update ONUs’ clock frequency, line coding, scrambling and data encryption, bandwidth allocation, data format, and/or communications modes. *Id.* (EX1008, 8:15-23).

Bourgart’s OLT receives instructions (*i.e.* notifications) to update ONT configurations. EX1002, ¶331 (EX1010, 11:16-17). Notifications indicate availability of updated configuration files. *Id.* (EX1010, 11:28-34, Fig. 4 (Steps 50-52)).

NTs include those currently configured. EX1002, ¶332 (EX1010, 2:38-67). Bourgart describes LTs “interrogating” NTs “concerning [existing] ... firmware versions[.]” *Id.* (EX1010, 11:25-27, 9:49-63, 11:34-35).

**c. Element 14[b]**

Bourgart’s LT *obtains necessary updated configuration files*. EX1002, ¶333 (EX1010, 11:28-34). NTs then obtain updated configuration files via download phase 43 (steps 55 and 56). *Id.* (EX1010, 11:35-47).

**d. Element 14[c]**

In Bourgart, a computer first *validates updated configuration files for structural errors*. EX1002, ¶334. “After the download [of the updated configuration file], the LT [*i.e.* computer] can verify the integrality of the downloaded configurations.” *Id.* (EX1010, 9:59-60). Downloaded configuration files include “checksum bits.” NTs (computers) confirm “content of the file has indeed been retrieved without error.” *Id.* (EX1010, 10:11-19).

**e. Element 14[d]**

Bourgart discloses this element and/or it would have been obvious to POSAs from Bourgart alone, and/or in view of Barrow. EX1002, ¶335.

*Differences between existing and updated configuration files are determined to identify and verify needed ONU resources*. EX1002, ¶336 (EX1010, 9:49-57). Bourgart “envisage[s]” taking account of “hardware limitations” of equipment in updating NT configurations. *Id.* (EX1010, 3:25-31). Bourgart “interrogat[es] the

NTs concerning their hardware features to list the NTs that *are capable of supporting the change.*” *Id.* (EX1010, 9:49-57, 11:23-27). Bourgart determines if updates would exceed ONU capabilities. *Id.* (EX1010, 3:18-24, 37-48).

POSAs would also have deemed this step obvious in view of Barrow. EX1002, ¶337.

Bourgart interrogates NTs to determine whether resources will support updates. EX1002, ¶338 (EX1010, 3:25-31, 9:52-54). This determination would obviously entail identifying new requirements (*i.e.* changes from existing configurations). *Id.* Doing so would simplify updates, saving time, processing resources and avoiding unnecessary messaging overhead. *Id.*

POSAs would have reasonably expected success identifying changes. Bourgart describes successfully identifying additional/new resources required of updated configurations. EX1002, ¶339 (EX1010, 3:25-31, 4:24-30, 9:52-54).

POSAs also would have deemed this step obvious in view of Barrow. EX1002, ¶¶340-341.

Barrow reconfigures remote networked telecommunications elements, such as integrated services hubs (ISHs). EX1002, ¶342 (EX1011, 2:1-67). Like ONUs, ISHs are “hardware component[s] that link[]...devices such as telephones and computers to [] network[s] through a plurality of [network] interfaces,” which “require[]

configuration files to set parameters for the various interfaces for the POTS ports, Ethernet ports, etc.” *Id.*

Barrow notes needing to periodically “update parameters in the configuration file” after initial configuration. *Id.* ¶343 (EX1011, 2:1-67, 7:59-67).

“Update module” dynamically updates ISH configurations without rebooting by identifying and dynamically applying changes:

Each module checks the new configuration file against its current parameters, determines if any changes require it to reboot[.] ...If no reboot is needed, the update module issues an update function call to all modules, which then update their parameters to the new configuration file setting dynamically, *i.e.* without a reboot.

*Id.* ¶344 (EX1011, 3:3-20, 8:25-60, 9:3-9). Barrow depicts this process:

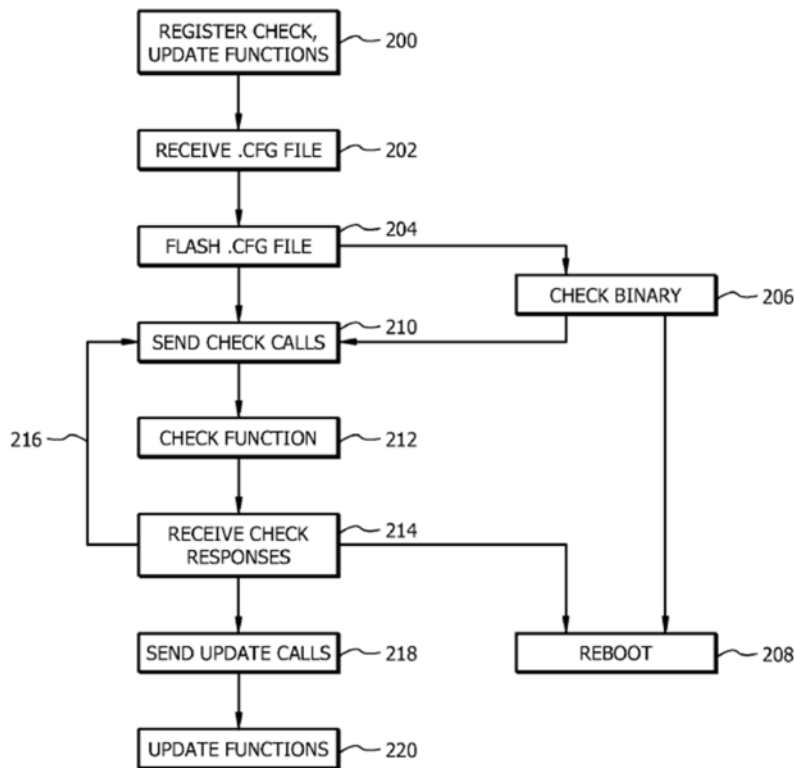


FIG. 3

*Id.* ¶345 (EX1011, FIG. 3 (Step 220), 9:3-9).

POSAs would have been motivated to employ Barrow's update module to determine configuration changes to reduce processing, time and cost of evaluating whether resources are sufficient. EX1002, ¶346.

Barrow's approach is straightforward for computers with consistently-format-  
ted configuration files such that POSAs would reasonably have expected success in  
Bourgart's system. EX1002, ¶347 (EX1010, 9:49-63).

**f. Element 14[e]**

Bourgart interrogates and *validates whether ONUs have resources to implement changes*. EX1002, ¶348 (EX1010, 3:18-48, 9:49-57, 11:23-34); Element 14[d]. Bourgart excludes from updates those lacking necessary resources. *Id.*

POSAs also would have deemed this step obvious in view of Barrow’s predicate determination of device’s capability to effect changes. EX1002, ¶348a; Element 14[d].

**g. Element 14[f]**

Bourgart *applies changes if ONUs have sufficient resources*. EX1002, ¶349; Elements 14[d]-[e]. Updated configuration files are downloaded only to NTs “capable of supporting the change[.]” *Id.* ¶350 (EX1010, 9:49-63). Thereafter, “in a switchover phase 44, the LT transmits, during a step 58, an instruction to switch [to updated configurations].” EX1002, ¶351 (EX1010, 9:49-63, 11:48-51).

Bourgart discloses limiting configuration updates to changed parameters, leaving remaining parameters unaffected. *Id.* ¶352 (EX1010, 2:58-67, 5:30-40).

POSAs would also have viewed it as obvious to employ Barrow’s “update module,” updating parameters when determined that a new configuration may be applied dynamically. *Id.* ¶352a (EX1011, 3:3-20, 8:25-60, 9:3-9).

Claim 14 does not require configuration changes to occur without reboot. EX1002, ¶353. Nevertheless, it would have been obvious in view of Bourgart and/or

Barrow to apply changes without rebooting. *Id.* (EX1010, 2:61-67, 3:32-48); Element 14[d].

Thus, Claim 14 would have been obvious to POSAs. EX1002, ¶354.

## 2. Independent Claim 20

Bourgart and Barrow each employ software stored in non-transitory memory executing on a CPU. EX1002, ¶¶355-56. (EX1010, 5:1-29 (“computer program designed to be stored in a memory of a line-termination device . . . comprising instructions for executing[.]”); EX1011, 4:40-63 (“CPU 50 loads the control software into RAM from which it is executed by the CPU 50”)).

### a. Element 20[preamble]

If limiting, Bourgart describes an apparatus for *updating ONUs in an EPON network*. EX1002, ¶357; Elements 14[a]-[f], 20[a]-[f].

### b. Element 20[a]

OLT/LT functions (receiver) *receive notification that an updated configuration file is available*. EX1002, ¶331 (EX1010, 11:16-17, 11:28-34, Fig. 4 (Steps 50-52)), ¶¶358-360; Element 14[a].

### c. Element 20[b]

OLT/LT functions (obtainer) *obtain necessary updated configuration files*. EX1002, ¶333 (EX1010, 11:28-34), ¶¶361-363; Element 14[b].

**d. Element 20[c]**

OLT/LT functions (first verifier) “*verify [i.e. validate] the integrity of the downloaded configurations.*” EX1002, ¶334 (EX1010, 9:59-60), ¶¶364-366; Element 14[c].

**e. Element 20[d]**

Bourgart alone and/or in view of Barrow renders obvious the claimed *determiner*. EX1002, ¶¶367-369; Element 14[d]. OLT/LT code (determiner) “interrogat[es] the NTs concerning their hardware features” to list NTs “*capable of supporting the change.*” *Id.* ¶336 (EX1010, 9:49-57, 11:23-27). It determines if updating would exceed ONU capabilities. *Id.* (EX1010, 3:18-24; 3:37-48). It necessarily/obviously *determines the changes and identifies resources necessary.* *Id.* It would also have been obvious in view of Barrow’s “update module” to determine configuration changes and identify whether NT’s have required resources. *Id.* ¶¶340-347 (EX1011, 3:3-20, 8:25-60, 9:3-9), ¶369; Element 14[d].

**f. Element 20[e]**

Bourgart alone and/or in view of Barrow renders obvious the *second validator*. OLT/LT code excludes from updates those ONUs lacking necessary resources. EX1002, ¶370; Elements 14[e], 20[c]. It would further have been obvious to do so in view of Barrow’s update module only issuing update function calls to devices capable of updating without interruption. *Id.*

**g. Element 20[f]**

Bourgart alone and/or in view of Barrow renders this element obvious. EX1002, ¶¶371-373; Element 14[f]. OLT/LT code (*applier*) *downloads updated configuration files to NTs “capable of supporting the change,” and transmits “an instruction to switch [to updated configurations].”* EX1002, ¶¶350-351 (EX1010, 9:49-63, 11:48-51, Fig. 4 (Step 58)).

This would also have been obvious in view of Barrow’s “update module” (applier) issuing update function calls when new configurations are deemed dynamically applicable. *Id.* ¶¶349-354 (EX1011, 3:3-20, 8:25-60, 9:3-9).

Claim 20’s apparatus would have been obvious to POSAs. EX1002, ¶374.

**3. Independent Claim 26**

POSAs would understand Bourgart and Barrow perform functions/operations described in Claim 26 using processors executing *computer programs stored on non-transitory computer-readable media*. EX1002, ¶¶ 355, 375 (EX1010, 5:1-29; EX1011, 4:40-63); Elements 14[a]-[f], 20[a]-[f].

**a. Element 26[preamble]**

If limiting, these limitations would have been obvious based upon Bourgart alone and/or in view of Barrow. EX1002, ¶376; Elements 14[preamble], 20[preamble], 26[a]-[f].

**b. Element 26[a]**

POSAs would interpret Bourgart’s LT/OLT as a computing device having a processor executing programs stored in non-transitory memory causing receipt of instructions (*i.e.* notifications) to update ONT configurations, or would have viewed such elements as obvious in view thereof. EX1002, ¶377; Elements 14[a], 20[a].

**c. Element 26[b]**

POSAs would understand LT/OLT’s processor executes stored programs to collect (*i.e.* obtain) necessary firmware files (*i.e.* updated configuration files), or would have viewed such elements as obvious in view thereof. EX1002, ¶378; Elements 14[b], 20[b].

**d. Element 26[c]**

POSAs would interpret LT/OLT’s “verify[ing] the integrity of downloaded configurations” as a processor executing stored programs to validate for structural errors, or would have viewed such elements as obvious in view thereof. EX1002, ¶379; Elements 14[c], 20[c].

**e. Element 26[d]**

POSAs would understand LT/OLT’s interrogation of NTs employs a processor executing stored programs to determine changes between current and updated ONU configuration files and to identify resources needed to implement, or would have viewed such elements as obvious in view thereof and/or in further view of Barrow whose “update module” software is designed to be stored in non-transitory

memory (flash memory 54) and execute on CPU 50. EX1002, ¶380 (EX1010, 3:18-48, 9:49-57, 11:23-27; EX1011, 4:40-63); Elements 14[d], 20[d].

**f. Element 26[e]**

POSAs would understand LT/OLT's downloading files only to NTs "capable of supporting the change" employs a processor executing stored programs to perform validation of ONU's resources, or would have viewed such elements as obvious in view thereof and/or further view of Barrow whose "update module" identifies ONUs capable of immediately applying updates using existing resources. EX1002, ¶381 (EX1011, 8:42-9:9); Elements 14[e], 20[e].

**g. Element 26[f]**

POSAs would understand Bourgart's LT/OLT's transmission of instructions to switch discloses a processor executing stored programs causing application of changes to an ONU when necessary resources are determined available, or would have viewed such elements as obvious in view thereof and/or in further view of Barrow whose "update module" causes the application of changes to the remote networked telecommunications elements. EX1002, ¶382; Elements 14[f], 20[f].

Claim 26's computer program product would have been obvious. EX1002, ¶375.

**4. Independent Claim 32**

**a. Element 32[preamble]**

If limiting, these limitations would have been obvious based upon Bourgart alone and/or in view of Barrow. EX1002, ¶384; Elements 14[preamble], 20[preamble], 26[preamble], 32[a]-[f].

**b. Element 32[a]**

Bourgart's programmed LT/OLT receives instructions (*i.e. means for receiving notifications*) indicating updated configuration files are available. EX1002, ¶385; Elements 14[a], 20[a], 26[a]; Sections IV(E), VIII(C)(1)-(2).

**c. Element 32[b]**

Bourgart's LT/OLT obtains necessary updated configuration files (*i.e. means for obtaining*). EX1002, ¶386; Elements 14[b], 20[b], 26[b].

**d. Element 32[c]**

Bourgart's LT/OLT verifies the integrality of the downloaded configurations (*i.e. means for performing first validation*). EX1002, ¶387; Elements 14[c], 20[c], 26[c].

**e. Element 32[d]**

POSAs would understand LT/OLT's interrogating NTs discloses *means for determining changes* between current and updated ONU configuration files *to identify needed ONU resources*, or would have viewed such elements as obvious in view

thereof and/or in further view of Barrow's "update module." EX1002, ¶388; Elements 14[d], 20[d], 26[d].

**f. Element 32[e]**

POSAs would understand LT/OLT's downloading updated files to NTs "capable of supporting the change" as *means for performing a second validation*, or would have viewed such elements as obvious in view thereof and/or further view of Barrow whose "update module" identifies ONUs capable of immediately applying updates with existing resources. EX1002, ¶389; Elements 14[e], 20[e], 26[e].

**g. Element 32[f]**

POSAs would interpret LT/OLT's instruction to switch as *means for applying* change to the ONU, or would have viewed such elements as obvious in view thereof and/or further view of Barrow whose "update module" issues calls and updates parameters when new configurations may be applied dynamically. EX1002, ¶390; Elements 14[f], 20[f], 26[f].

Claim 32's apparatus would have been obvious. EX1002, ¶¶ 355, 383 (EX1010, 5:1-29; EX1011, 4:40-63).

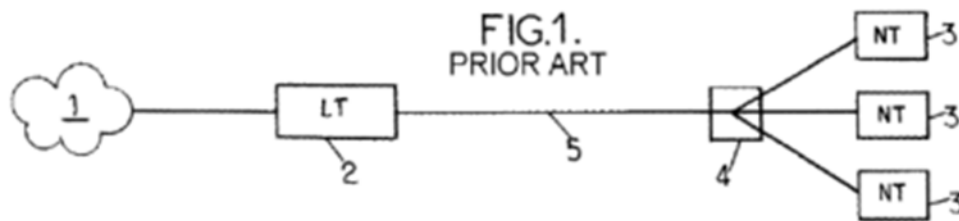
**D. Ground 4: Claims 15-17, 19, 21-23, 25, 27-29, 31 Obvious Over Bourgart in View of Barrow, Tsuge and/or Go**

**1. Claim 15**

Claim 15 would have been obvious in light of Bourgart and/or Barrow, Tsuge and/or Go. EX1002, ¶¶391-394; Claim 14.

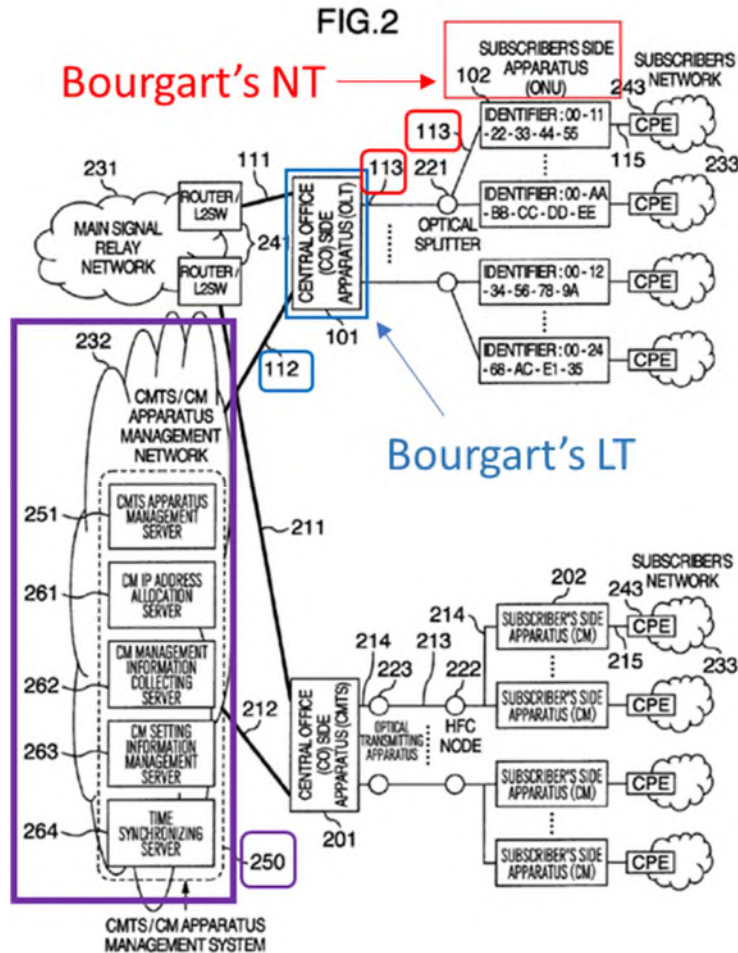
POSAs would have viewed as obvious *notifications including detecting changes to MIB entries*, particularly in light of Tsuge. EX1002, ¶397 (EX1010, 1:60, 5:30-31, 6:15-16).

Bourgart discloses communication networks including OLTs communicating with ONT(s). EX1002, ¶395; Element 14[a]. Bourgart contemplates LT/OLTs “provid[ing] the interface with the rest of the telecommunications network shown under reference number 1[.]”



*Id.* (EX1010, 1:15-32, Fig. 1). Bourgart envisages communicating updated configuration files to LTs. *Id.* (EX1010, 3:57-61). These files are stored or dynamically generated. *Id.* ¶396 (EX1010, 11:28-32). POSAs would view as obvious necessary configuration files are communicated from the network. *Id.*

Tsuge advantageously employs a PON, such as disclosed in Bourgart, in a DOCSIS network. EX1002, ¶398 (EX1006, 1:33-2:32). Tsuge’s system aligns with Bourgart’s:



EX1002, ¶399 (EX1006, Fig. 2 (annotated)).

Tsuge configures OLTs with software modules permitting them to “transmit[] and receive[] control signals of the same format as that of [] a CMTS and a CM” (*i.e.* vCM). EX1002, ¶400 (EX1006, 4:22-40); Elements 1[a]-[d].

Tsuge’s vCMs employ MIBs. EX1002, ¶401 (EX1006, 3:5-28). POSAs would understand Tsuge’s SNMP SetRequest messages are addressed to these MIBs. *Id.* ¶¶401-402 (EX1006, 13:16-20); Elements 1[b]-[c], Claim 3.

Go discloses methods for “the convenient and rapid automatic upgrade of software” for CMs. EX1002, ¶403 (EX1009/EX1018, (54)). Go explains CMs are instructed to upgrade by software changing variables in the CM’s MIB. *Id.* (EX1009/EX1018, 4-5); Claim 3.

In view of Tsuge and/or Go, POSAs would be motivated to employ vCMs having MIBs when Bourgart’s EPON interfaces with a DOCSIS telecommunications network. EX1002, ¶404. POSAs would have employed MIB entry changes to notify OLTs that updated configuration files are available, because this enables DOCSIS advantages, while also realizing benefits of Bourgart’s EPON hardware management. *Id.*

POSAs would also have reasonably expected success employing MIBs with Bourgart's EPON. EX1002, ¶405. Tsuge’s vCM operates on Bourgart’s OLT, translating DOCSIS parameters into parameters useable by Bourgart’s ONTs. EX1002, ¶406.

It would have been obvious to detect changes to MIB entries to receive notification that updated configuration files are available. EX1002, ¶407.

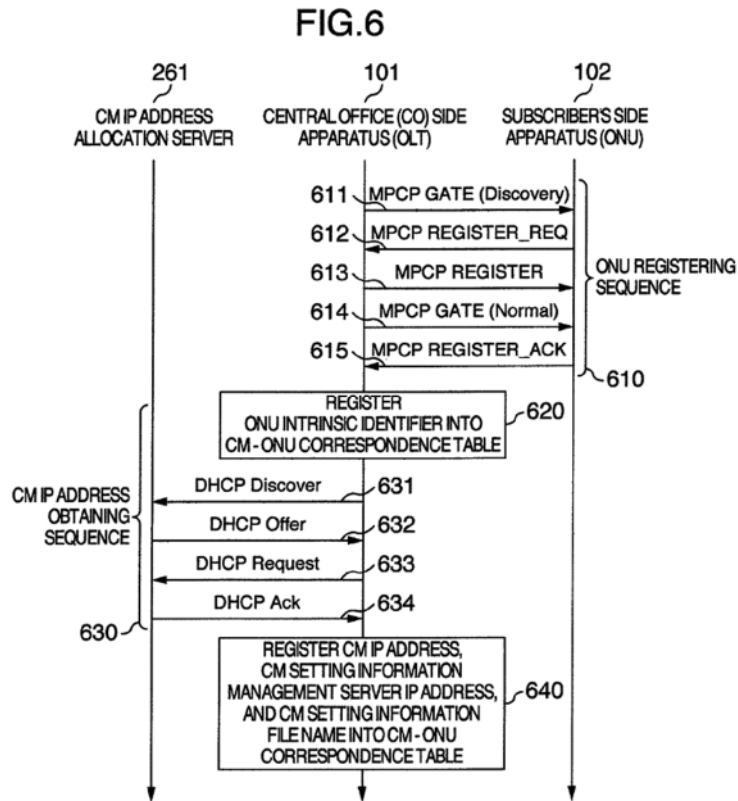
## **2. Claim 16**

### **a. Element 16[a]**

Bourgart in view of Barrow and/or Tsuge renders this element obvious. EX1002, ¶408; Element 4[a].

It would have been obvious for Bourgart's system to interface with a DOCSIS network as described in Tsuge. EX1002, ¶409; Claim 15.

Tsuge's DOCSIS network includes *an OLT that sends a DHCP message to retrieve CM configuration files for configuring ONUs*. EX1002, ¶410; Elements 1[a]-[d], 4[a]-[c]. OLT sends DHCP message(s) to CM IP address allocation server 261:



*Id.* ¶411 (EX1006, 12:53-56, Fig. 6).

This element would have been obvious. EX1002, ¶412.

**b. Element 16[b]**

Bourgart in view of Barrow and/or Tsuge renders this element obvious. EX1002, ¶¶413-419; Elements 4[b], 16[a].

Tsuge's CM setting obtaining/converting function first obtains a "CM IP address." EX1002, ¶411 (EX1006, 12:51-62, 14:20-23, Fig. 6, Fig. 9 (step 910)). An OLT *receives the configuration file's name and the identity of the server storing it*. EX1002, ¶418 (EX1006, 11:57-12:2, 14:24-45, Fig. 9 (Step 920)).

**c. Element 16[c]**

Bourgart in view of Barrow and/or Tsuge renders this element obvious. EX1002, ¶¶420-424; Elements 1[a]-[d], 4[c], Claim 15.

Tsuge teaches OLTs *obtaining updated configuration files using TFTP*. EX1002, ¶423 (EX1006, 14:40-61).

Claim 16 would have been obvious to POSAs. EX1002, ¶424a.

**3. Claim 17**

Bourgart in view of Barrow, Tsuge and/or Go renders Claim 17 obvious. EX1002, ¶425; Element 4[b], Claim 15.

MIBs in Bourgart's network would have been obvious. *Id.* POSAs would have understood existing *MIB mechanisms included indications of ongoing configuration updates* via MIB entries. *Id.* (EX1009/EX1018, 4-5 ("docsDevSwOperStatus'

reflects the status of the cable modem software upgrade, consisting of 'InProgress(1)' for indicating that an upgrade is ongoing[.]”); EX1001, 5:41-55 (same)).

**4. Claim 19**

Bourgart in view of Barrow and Tsuge renders this element obvious. EX1002, ¶426; Elements 14[a]-[f].

Bourgart *verifies the NT, the LT/OLT, and the line (i.e. network) are compatible with updates*. EX1002, ¶¶427-429 (EX1010, 3:25-31, 8:15-23). A *third validation* of OLTs and DPoE networks would have been obvious to ensure compatibility with the upgrade. EX1002, ¶428-430; Claim 15.

**5. Claim 21**

*MIB detecting changes (i.e. detector)* would have been obvious in view of Bourgart, Barrow, Tsuge and/or Go. EX1002, ¶431; Claims 15, 17, 20.

**6. Claim 22**

The apparatus of Claim 22 would have been obvious in view of Bourgart, Barrow, and/or Tsuge. EX1002, ¶432; Claims 15-16, 20.

**a. Element 22[a]**

It would have been obvious to use Tsuge’s CMTS/CM management system 250 and/or OLT 101 with converting function 304 (*i.e. senders*) to *send DHCP messages* in combination with Bourgart’s EPON. EX1002, ¶433 (EX1010, 5:1-29; EX1006, 18:1-25, FIG. 16); Element 16[a], Claim 20.

**b. Element 22[b]**

Bourgart's use of Tsuge's OLT *obtaining function 501 to receive server identities (i.e. another receiver)* would have been obvious. EX1002, ¶434 (EX1010, 5:1-29; EX1006, 18:1-25, FIG. 16); Element 16[b], Claim 20.

**c. Element 22[c]**

Bourgart's use of Tsuge's *obtaining function 503 (i.e. another obtainer) to obtain updated configuration files using TFTP* would have been obvious. EX1002, ¶435 (EX1006, 8:39-42, 14:40-61, 18:1-25, Fig. 9 (Step 920); EX1010, 5:1-29); Element 16[c], Claim 20.

**7. Claim 23**

An apparatus including *MIB entries indicating ongoing configuration updates (e.g. docsDevSwOperStatus) (i.e. indicator)* would have been obvious in view of Bourgart, Barrow, Tsuge and/or Go. EX1002, ¶436 (EX1010, 5:1-29; EX1009/EX1018, 4-5); Claims 17, 20.

**8. Claim 25**

An apparatus including *a third validator performing Claim 19's method* would have been obvious in view of Bourgart and Barrow. EX1002, ¶437 (EX1010, 5:1-29; EX1011, 4:40-63); Claim 19.

**9. Claim 27**

In view of Tsuge and/or Go, POSAs would view as obvious Bourgart's LT/OLT processor executing programs stored in non-transitory memory to detect

MIB changes notifying availability of updated configuration files. EX1002, ¶438 (EX1006, 18:1-17, FIG. 16; EX1009/10018, 4); Claims 15, 26.

**10. Claim 28**

Computer programs performing Claim 16's method are obvious in view of Bourgart, Barrow and Tsuge. EX1002, ¶439; Claims 16, 26.

**a. Element 28[a]**

POSAs would view as obvious Bourgart's LT/OLT's processor executing programs stored in non-transitory memory to transmit DHCP messages obtaining identity of servers storing updated configuration files, in view of Tsuge. EX1002, ¶440; Element 16[a].

**b. Element 28[b]**

POSAs would view as obvious so executing such programs to receive responses from CM IP address allocation servers identifying location of stored files, in view of Tsuge. EX1002, ¶441; Element 16[b].

**c. Element 28[c]**

POSAs would view as obvious so executing such programs to obtain updated configuration files using TFTP, in view of Tsuge. EX1002, ¶442; Element 16[c].

**11. Claim 29**

POSAs would view as obvious so executing such programs to indicate ongoing updates via MIB entries, in view of Tsuge and Go and his/her knowledge. EX1002, ¶443; Claims 17, 26.

**12. Claim 31**

POSAs would view as obvious executing such programs to perform a third validation verifying Bourgart's OLT and DPoE system taught by Tsuge includes resources necessary for changes. EX1002, ¶444; Claims 19, 26.

**E. Ground 5: Claims 18, 24, 30 Obvious Over Bourgart in View of Barrow and Koshy**

**1. Claim 18**

It would have been obvious to also *delete updated configuration files from local memory after successful application* over Bourgart in view of Barrow and Koshy, to save memory and cost and ensure efficient, non-fragmented operation. EX1002, ¶¶445-449; Claim 14.

After successfully applying changes, Koshy clears local memory of updated files. EX1002, ¶449 (EX1012, 356). POSAs would view as obvious deleting updated configuration files from Bourgart's OLT after successful application to ONTs. *Id.* POSAs would be motivated to delete updated configuration files to free up memory and reduce resource usage, constraints, and costs. *Id.* Deletion of now-unnecessary data was well within POSAs' ordinary skill. *Id.*

**2. Claim 24**

Inclusion of an apparatus, software and/or firmware to practice Claim 18's method would have been obvious in view of Bourgart, Barrow and/or Koshy.

EX1002, ¶¶450-455 (EX1010, 5:1-29; EX1011, 4:40-63; EX1012, 355); Claims 18, 20.

**3. Claim 30**

POSAs would view as obvious Bourgart's processor executing programs recited in Claim 26 to delete updated configuration file from local memory after successful application, in view of Barrow and/or Koshy. EX1002, ¶456; Claims 18, 20, 26.

**IX. CONCLUSION**

Claims 1-2, 4-6, 8-10, and 12-13 are obvious over Tsuge alone and/or in view of McKinnon and/or Noel; Claims 3, 7 and 11 are obvious over Tsuge alone and/or in view of McKinnon, Noel and/or Go; Claims 14, 20, 26 and 32 are obvious over Bourgart alone and/or in view of Barrow; Claims 15-17, 19, 21-23, 25, 27-29 and 31 are obvious over Bourgart in view of Barrow, Tsuge and/or Go; and Claims 18, 24 and 30 are obvious over Bourgart in view of Barrow and Koshy.

Dated: January 15, 2025

Respectfully submitted,

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**CERTIFICATE OF COMPLIANCE**

I hereby certify that this petition complies with the type-volume limitations of 37 C.F.R. §42.24 because it contains 13,889 words (as determined by the Microsoft Word word-processing system used to prepare the petition), excluding the parts of the petition exempted by 37 C.F.R. §42.24.

Dated: January 15, 2025

/s/ Raymond R. Ricordati III, Reg #62,856  
Raymond R. Ricordati III (Reg. No. 62,856)  
Lead Counsel for Petitioner  
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**CERTIFICATE OF SERVICE**

The undersigned certifies pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a) that on January 15, 2025, a true and correct copy of the foregoing “PETITION FOR *INTER PARTES* REVIEW” was served via UPS (Tracking No. 1Z0964W30196878532) on the Patent Owner at the following correspondence address of record as listed in the USPTO electronic filing system:

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and was served via electronic mail upon counsel of record for the Patent Owner in the litigation in the U.S. District Court for the Eastern District of Texas:

*Iarnach Technologies Ltd. v. Charter Communications, Inc., et al.,  
Case No. 2:24-cv-00230*

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