

**UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NORTH CAROLINA
WESTERN DIVISION**

RED HAT, INC.,	)	
	)	
Plaintiff,	)	
	)	Case No. 5:24-cv-505-D-BM
v.	)	
	)	
COMPETITIVE ACCESS SYSTEMS,	)	
INC.,	)	
	)	
Defendant.	)	

**DEFENDANT COMPETITIVE ACCESS SYSTEMS, INC.’S
AMENDED ANSWER AND COUNTERCLAIM**

Defendant Competitive Access Systems, Inc. (“CAS”), by and through its undersigned attorneys, hereby responds to Red Hat, Inc.’s (“Red Hat” or “Plaintiff”) Complaint with the following Answer and Affirmative Defenses. Any allegation not expressly admitted, denied, or explained are denied by CAS. CAS specifically denies that Plaintiff is entitled to any relief from CAS.

NATURE OF THE ACTION

1. CAS admits that Plaintiff purports to allege an action for declaratory relief arising under the patent laws of the United States and for judgment of a violation of the North Carolina Abusive Patent Assertion Act (N.C. Gen. Stat. §§ 75-140 et. seq.) (hereinafter the “APAA”). CAS denies that Plaintiff is entitled to declaratory relief and denies any violation of the APAA as alleged herein. Unless expressly admitted, all remaining allegations contained in paragraph 1 of the Verified Complaint are denied.

2. CAS admits that it alleges in its Counterclaim that Plaintiff infringes seven U.S. Patents: (1) U.S. Patent No. 11,582,343 (the ’343 patent); (2) U.S. Patent No. 11,418,641 (the ’641

patent); (3) U.S. Patent No. 10,868,908 (the '908 patent); (4) U.S. Patent No. 9,350,649 (the '649 patent); (5) U.S. Patent No. 8,861,349 (the '349 patent); (6) U.S. Patent No. 8,228,801 (the '801 patent); and (7) U.S. Patent No. 7,606,156 (the '156 patent), (collectively, the "Asserted Patents"). CAS denies all remaining allegations contained in paragraph 2 of the Verified Complaint.

3. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS admits that N.C. Gen. Stat. Ann. § 75-141 is accurately quoted. CAS denies all remaining allegations contained in paragraph 3 of the Verified Complaint.

4. CAS admits that it sent Plaintiff a letter entitled "Notice/Licensing – The Delangis Patent Portfolio" (the "Notice Letter") on or about October 2, 2023, and that a copy of this letter is attached to the Verified Complaint as Exhibit 8 [D.E. 1-10]. CAS admits that Clay McGurk engaged in a handful of emails, phone calls, and one video conference with counsel for Red Hat over a period of about nine months. CAS denies all remaining allegations contained in paragraph 4 of the Verified Complaint.

5. CAS admits that it alleges Red Hat infringes all seven of the Asserted Patents in its Counterclaim. CAS denies all remaining allegations contained in paragraph 5 of the Verified Complaint.

6. CAS denies the allegations contained in paragraph 6 of the Verified Complaint.

7. CAS denies the allegations contained in paragraph 7 of the Verified Complaint.

8. CAS admits that Plaintiff purports to request the relief set forth in this paragraph but denies that Plaintiff is entitled to the relief requested in this paragraph, or any relief whatsoever, in connection with the allegations made in the Verified Complaint. CAS denies all remaining allegations contained in paragraph 8 of the Verified Complaint.

THE PARTIES

9. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 9 of the Verified Complaint and therefore denies the same.

10. CAS admits that it is incorporated under the laws of the State of Texas and its principal place of business is located in Plano, Texas. CAS admits that it was founded by Eric Delangis, the sole named inventor of the Asserted Patents. CAS denies all remaining allegations contained in paragraph 10 of the Verified Complaint.

11. This paragraph contains legal conclusions to which no response is required. CAS admits that it does not manufacture, sell, or offer for sale any product that is covered by the Asserted Patents. CAS denies all remaining allegations contained in paragraph 11 of the Verified Complaint.

12. CAS admits that it accuses Plaintiff of infringing the Asserted Patents in its Counterclaim. CAS denies all remaining allegations contained in paragraph 12 of the Verified Complaint.

JURISDICTIONAL STATEMENT

13. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS admits that Plaintiff purports to bring an action under the Declaratory Judgment Act, 28 U.S.C. § 2201, but Plaintiff lacked standing to sue. See [D.E. 15, p. 9-13]. CAS admits that Plaintiff alleges that this action arises “under the patent laws of the United States, 35 U.S.C. §§ 1-390.” CAS denies that Plaintiff is entitled to any relief under any statute. CAS denies all remaining allegations contained in paragraph 13 of the Verified Complaint.

14. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies that Plaintiff has established subject matter

jurisdiction through the allegations in its Verified Complaint. See [D.E. 15, p. 18]. CAS denies all remaining allegations contained in paragraph 14 of the Verified Complaint.

15. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies the allegations contained in paragraph 15 of the Verified Complaint. See also [D.E. 15, p. 14-15].

16. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies the allegations contained in paragraph 16 of the Verified Complaint.

17. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies that it is subject to personal jurisdiction in this Court. See [D.E. 15, p. 5-9]. CAS denies all remaining allegations contained in paragraph 17 of the Verified Complaint.

18. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies that it is subject to personal jurisdiction in this Court. See [D.E. 15, p. 5-9]. CAS denies all remaining allegations contained in paragraph 18 of the Verified Complaint.

19. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies that it is subject to personal jurisdiction in this Court. CAS denies all remaining allegations contained in paragraph 19 of the Verified Complaint.

20. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies that it is subject to personal jurisdiction in this Court. CAS denies all remaining allegations contained in paragraph 20 of the Verified Complaint.

21. This paragraph contains legal conclusions to which no response is required and the statute speaks for itself. CAS denies all remaining allegations contained in paragraph 21 of the Verified Complaint.

22. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies the allegations contained in paragraph 22 of the Verified Complaint.

23. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 23 of the Verified Complaint and therefore denies the same.

24. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies the allegations contained in paragraph 24 of the Verified Complaint.

BACKGROUND

25. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 25 of the Verified Complaint and therefore denies the same.

26. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 26 of the Verified Complaint and therefore denies the same.

27. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 27 of the Verified Complaint and therefore denies the same.

28. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 28 of the Verified Complaint and therefore denies the same.

29. CAS admits that it sent to Plaintiff a letter dated October 2, 2023, and a copy of which is attached as Exhibit 8 to the Verified Complaint. CAS denies all remaining allegations contained in paragraph 29 of the Verified Complaint.

30. This paragraph contains legal conclusions to which no response is required. To the extent a response is required, CAS denies all allegations contained in paragraph 30 of the Verified Complaint.

31. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies all allegations contained in paragraph 31 of the Verified Complaint.

32. CAS admits that its October 2, 2023 Letter, a copy of which is attached as Exhibit 8 to the Complaint, did not include as attachments any infringement contentions or claim charts. CAS denies all remaining allegations contained in paragraph 32 of the Verified Complaint.

33. CAS admits that the letter attached as Exhibit 8 to the Verified Complaint is a copy of a letter sent to Plaintiff and it speaks for itself. CAS lacks sufficient information at this time to admit or deny that “Red Hat, however, does not sell or distribute any Unix products” and therefore denies this. CAS denies all the remaining allegations contained in paragraph 33 of the Verified Complaint.

34. CAS denies the allegations contained in paragraph 34 of the Verified Complaint.

35. CAS admits the October 2, 2023 Letter, a copy of which was attached as Exhibit 8 to the Verified Complaint, was addressed to the “General Counsel” of “Red Hat Corporate HQ” at 100 East Davie Street, Raleigh, NC 27601. CAS denies all remaining allegations contained in paragraph 35 of the Verified Complaint.

36. CAS lacks sufficient information to admit or deny where Red Hat was or is located. CAS denies all allegations contained in paragraph 36 of the Verified Complaint.

37. CAS admits that the October 2, 2023 Letter, a copy of which is attached as Exhibit 8 to the Verified Complaint, was signed by Patent Attorney Clay McGurk. CAS denies all remaining allegations contained in paragraph 37 of the Verified Complaint.

38. CAS admits that Red Hat initiated communications with Clay McGurk after October 2, 2023, comprising a handful of emails, phone calls, and one video conference over a period of about nine months. CAS denies all remaining allegations contained in paragraph 38 of the Verified Complaint.

39. CAS denies the allegations contained in paragraph 39 of the Verified Complaint.

40. CAS lacks sufficient information at this time to admit or deny that David B. Perry is or was “an in-house attorney at Red Hat who serves as Director of Litigation & Intellectual Property at Red Hat” and therefore denies same. CAS admits that Clay McGurk communicated with an individual named David Perry. CAS denies all remaining allegations contained in paragraph 40 of the Verified Complaint.

41. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 41 of the Verified Complaint and therefore denies the same.

42. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 42 of the Verified Complaint and therefore denies the same.

43. CAS admits that it provided claim charts to David Perry on or around June 18, 2024. CAS denies all remaining allegations contained in paragraph 43 of the Verified Complaint.

44. CAS admits that, on January 29, 2024, David Perry sent an email to Clay McGurk that states as follows: “Red Hat respects the intellectual property of others, hence the reason we sought claim charts to meaningfully evaluate CAS’s allegations of patent infringement. Please

[sic] us know if or when we can expect to receive this information.” CAS denies all remaining allegations contained in paragraph 44 of the Verified Complaint.

45. CAS admits that, on February 2, 2024, Clay McGurk sent an email to David Perry that stated the following: “We have been delayed in providing the claim charts and hopefully will be providing these soon.” CAS denies all remaining allegations contained in paragraph 45 of the Verified Complaint.

46. CAS admits that, on May 1, 2024, David Perry sent an email to Clay McGurk that stated the following: “we again request that CAS promptly inform Red Hat whether it intends to provide the requested claim charts (and if so, when Red Hat can expect to receive them). If claim charts are provided, we would be open to good-faith discussions if appropriate after our evaluation.” CAS denies all remaining allegations contained in paragraph 46 of the Verified Complaint.

47. CAS admits that, on June 18, 2024, Clay McGurk sent an email to David Perry that states the following: “Attached are three sets of patent claims for 8,861,349, 9,350,649 and 11,582,343. The claims in these patents cover RFC 8684, especially method claims 13-17 from ‘649 (i.e., covers MP_Join) and method claims 16-19 in ‘349 (i.e., covers MP_Capable). Red Hat’s use of MPTCP as standardized in RFC 8684 in Linux 9 (and other previous versions) looks like what is claimed in these CAS method claims.” The email included the following attachments: “Computer MPTCP Claim Charts 9350649.pdf”; “Computer MPTCP Claim Charts 8861349.pdf”; and “Computer MPTCP Claim Charts 11582343.pdf.” CAS denies all remaining allegations contained in paragraph 47 of the Verified Complaint.

48. CAS admits that the following U.S. Patents are currently expired: 8,861,349, 9,350,649 and 11,582,343. CAS denies all remaining allegations contained in paragraph 48 of the Verified Complaint.

49. CAS denies the allegations contained in paragraph 49 of the Verified Complaint.

50. CAS denies the allegations contained in paragraph 50 of the Verified Complaint.

51. CAS denies the allegations contained in paragraph 51 of the Verified Complaint.

52. CAS denies the allegations contained in paragraph 52 of the Verified Complaint.

53. CAS denies the allegations contained in paragraph 53 of the Verified Complaint.

54. CAS admits that it accuses Plaintiff of infringing the Asserted Patents in its Counterclaim. CAS denies all remaining allegations contained in paragraph 54 of the Verified Complaint.

55. CAS admits that it has not provided any licensing terms, as it has not demanded a license from Plaintiff. CAS denies all remaining allegations contained in paragraph 55 of the Verified Complaint.

56. CAS denies the allegations contained in paragraph 56 of the Verified Complaint.

57. CAS denies the allegations contained in paragraph 57 of the Verified Complaint.

58. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 58 of the Verified Complaint and therefore denies the same.

59. CAS admits that Plaintiff attached as Exhibit 9 a copy of a document titled “Internet Engineering Task Force (IETF) Request for Comments: 6824.” CAS admits that Plaintiff attached as Exhibit 10 a copy of a document titled “Internet Engineering Task Force (IETF) RFC: 8684.” These documents speak for themselves. CAS denies all the remaining allegations contained in paragraph 59 of the Verified Complaint.

60. CAS denies the allegations contained in paragraph 60 of the Verified Complaint.

61. CAS denies the allegations contained in paragraph 61 of the Verified Complaint.

62. CAS denies the allegations contained in paragraph 62 of the Verified Complaint.

63. CAS denies the allegations contained in paragraph 63 of the Verified Complaint.

64. CAS denies the allegations contained in paragraph 64 of the Verified Complaint.

65. CAS denies the allegations contained in paragraph 65 of the Verified Complaint.

66. CAS denies the allegations contained in paragraph 66 of the Verified Complaint.

67. CAS denies the allegations contained in paragraph 67 of the Verified Complaint.

68. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies the allegations contained in paragraph 68 of the Verified Complaint.

69. CAS admits that its October 2, 2023 Letter, a copy of which is attached as Exhibit 8 to the Verified Complaint, alleged that Plaintiff “may already be using MPTCP protocol, or a proprietary method, in [its] Unix products.” CAS further admits that the Letter does not accuse Red Hat of patent infringement. CAS denies all remaining allegations contained in paragraph 69 of the Verified Complaint.

70. CAS denies the allegations contained in paragraph 70 of the Verified Complaint.

71. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies the allegations contained in paragraph 71 of the Verified Complaint.

72. CAS denies the allegations contained in paragraph 72 of the Verified Complaint.

73. CAS admits that the Letter, attached as Exhibit 8 to the Verified Complaint, states the following: “Your company may already be using MPTCP protocol, or a proprietary method,

in your Unix products. Using the CAS routing techniques in your devices most likely has increased the speed of your devices by factors of 10x to 100x while substantially increasing your products' reliability and enhancing your consumer's experience." CAS denies all of the remaining allegations contained in paragraph 73 of the Verified Complaint.

74. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 74 of the Verified Complaint and therefore denies the same.

75. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 75 of the Verified Complaint and therefore denies the same.

76. CAS denies the allegations contained in paragraph 76 of the Verified Complaint.

77. CAS admits that it provided claim charts, at Plaintiff's request, approximately eight months after sending the October 2, 2023 Letter. CAS denies that the Letter was a "Demand Letter." CAS denies the remaining allegations contained in paragraph 77 of the Verified Complaint.

78. CAS denies the allegations contained in paragraph 78 of the Verified Complaint.

79. CAS denies the allegations contained in paragraph 79 of the Verified Complaint.

80. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies the allegations contained in paragraph 80 of the Verified Complaint.

81. CAS admits that, on January 29, 2024, David Perry sent an email to Clay McGurk that stated the following: "I wanted to follow up on Red Hat's previous requests for information not included in your October 2 ,2023 letter. When we spoke on November 28, 2023, I requested claim charts so that we could evaluate your statement that 'CAS is providing notice about its

patents to your company.’ You agreed to send those charts by mid-December. I did not receive them.” CAS denies the remaining allegations contained in paragraph 81 of the Verified Complaint.

82. CAS denies the allegations contained in paragraph 82 of the Verified Complaint.

83. CAS admits that, on June 18, 2024, Clay McGurk sent an email to David Perry that states the following: “Attached are three sets of patent claims for 8,861,349, 9,350,649 and 11,582,343. The claims in these patents cover RFC 8684, especially method claims 13-17 from ‘649 (i.e., covers MP_Join) and method claims 16-19 in ‘349 (i.e., covers MP_Capable). Red Hat’s use of MPTCP as standardized in RFC 8684 in Linux 9 (and other previous versions) looks like what is claimed in these CAS method claims.” The email included the following attachments: “Computer MPTCP Claim Charts 9350649.pdf”; “Computer MPTCP Claim Charts 8861349.pdf”; and “Computer MPTCP Claim Charts 11582343.pdf.” CAS denies all remaining allegations contained in paragraph 83 of the Verified Complaint.

84. CAS admits that, on June 18, 2024, Clay McGurk sent an email to David Perry that states the following: “Attached are three sets of patent claims for 8,861,349, 9,350,649 and 11,582,343. The claims in these patents cover RFC 8684, especially method claims 13-17 from ‘649 (i.e., covers MP_Join) and method claims 16-19 in ‘349 (i.e., covers MP_Capable). Red Hat’s use of MPTCP as standardized in RFC 8684 in Linux 9 (and other previous versions) looks like what is claimed in these CAS method claims.” The email included the following attachments: “Computer MPTCP Claim Charts 9350649.pdf”; “Computer MPTCP Claim Charts 8861349.pdf”; and “Computer MPTCP Claim Charts 11582343.pdf.” CAS denies all remaining allegations contained in paragraph 84 of the Verified Complaint.

85. CAS denies the allegations contained in paragraph 85 of the Verified Complaint.

86. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies the allegations contained in paragraph 86 of the Verified Complaint.

87. CAS denies the allegations contained in paragraph 87 of the Verified Complaint.

88. CAS denies the allegations contained in paragraph 88 of the Verified Complaint.

89. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies the allegations contained in paragraph 89 of the Verified Complaint.

90. CAS denies the allegations contained in paragraph 90 of the Verified Complaint.

91. CAS denies the allegations contained in paragraph 91 of the Verified Complaint.

92. CAS admits that the Letter, attached as Exhibit 8 to the Verified Complaint, states the following: “Your company may already be using MPTCP protocol, or a proprietary method, in your Unix products. Using the CAS routing techniques in your devices most likely has increased the speed of your devices by factors of 10x to 100x while substantially increasing your products’ reliability and enhancing your consumer’s experience.” CAS lacks sufficient information at this time to admit or deny that “Red Hat does not produce or distribute Unix-based products” and therefore denies the same. CAS denies all of the remaining allegations contained in paragraph 92 of the Verified Complaint.

93. CAS lacks sufficient information at this time to admit or deny the allegations in paragraph 93 of the Verified Complaint and therefore denies the same.

94. CAS admits that its October 2, 2023 Letter, a copy of which is attached as Exhibit 8 to the Verified Complaint, alleged that Plaintiff “may already be using MPTCP protocol, or a proprietary method, in [its] Unix products.” CAS further admits that the Letter does not accuse

Red Hat of patent infringement. CAS admits that, on June 18, 2024, Clay McGurk sent an email to David Perry that states the following: “Attached are three sets of patent claims for 8,861,349, 9,350,649 and 11,582,343. The claims in these patents cover RFC 8684, especially method claims 13-17 from ‘649 (i.e., covers MP_Join) and method claims 16-19 in ‘349 (i.e., covers MP_Capable). Red Hat’s use of MPTCP as standardized in RFC 8684 in Linux 9 (and other previous versions) looks like what is claimed in these CAS method claims.” The email included the following attachments: “Computer MPTCP Claim Charts 9350649.pdf”; “Computer MPTCP Claim Charts 8861349.pdf”; and “Computer MPTCP Claim Charts 11582343.pdf.” CAS denies all remaining allegations contained in paragraph 94 of the Verified Complaint.

95. CAS denies the allegations contained in paragraph 95 of the Verified Complaint.

96. CAS denies the allegations contained in paragraph 96 of the Verified Complaint.

97. CAS denies the allegations contained in paragraph 97 of the Verified Complaint.

98. This paragraph contains legal conclusions to which no response is required. To the extent any response is required, CAS denies the allegations contained in paragraph 98 of the Verified Complaint.

99. CAS denies the allegations contained in paragraph 99 of the Verified Complaint.

100. CAS denies the allegations contained in paragraph 100 of the Verified Complaint.

101. CAS denies the allegations contained in paragraph 101 of the Verified Complaint.

102. CAS denies the allegations contained in paragraph 102 of the Verified Complaint.

FIRST COUNT

(Declaration of Non-Infringement of U.S. Patent No. 11,582,343)

103. CAS restates and incorporates by reference, as if fully set forth herein, its answers to “all allegations in this Verified Complaint,” including its answers to the preceding paragraphs of the Verified Complaint.

104. CAS admits that it claims to and does own all rights, title, and interest, including the right to seek damages for past, present, and future infringement thereof, in the ‘343 Patent. CAS lacks sufficient information at this time to admit or deny whether a true and correct copy of the ‘343 Patent is attached to the Verified Complaint as Exhibit 1 and therefore denies the same.

105. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘343 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. CAS denies the remaining allegations contained in paragraph 105 of the Verified Complaint.

106. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘343 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. Therefore, CAS admits that a controversy exists between CAS and Plaintiff regarding whether RHEL infringes or has infringed one or more claims of the ‘343 patent. CAS lacks sufficient information at this time to admit or deny that, “MPTCP as a function that is disabled by default” and therefore denies same. CAS denies that Plaintiff has any rights or is entitled to any relief regarding the ‘343 patent and further denies all remaining allegations contained in paragraph 106 of the Verified Complaint.

107. CAS denies the allegations contained in paragraph 107 of the Verified Complaint.

SECOND COUNT

(Declaration of Non-Infringement of U.S. Patent No. 11,418,641)

108. CAS restates and incorporates by reference, as if fully set forth herein, its answers to “all allegations in this Verified Complaint,” including its answers to the preceding paragraphs of the Verified Complaint.

109. CAS admits that it claims to and does own all rights, title, and interest, including the right to seek damages for past, present, and future infringement thereof, in the ‘641 Patent. CAS lacks sufficient information at this time to admit or deny whether a true and correct copy of the ‘641 Patent is attached to the Verified Complaint as Exhibit 2 and therefore denies the same.

110. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘641 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. CAS denies the remaining allegations contained in paragraph 110 of the Verified Complaint.

111. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘641 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. Therefore, CAS admits that a controversy exists between CAS and Plaintiff regarding whether RHEL infringes or has infringed one or more claims of the ‘641 patent. CAS lacks sufficient information at this time to admit or deny that “MPTCP as a function that is disabled by default” and therefore denies same. CAS denies that Plaintiff has any rights or is entitled to any relief regarding the ‘641 patent and further denies all remaining allegations contained in paragraph 111 of the Verified Complaint.

112. CAS denies the allegations contained in paragraph 112 of the Verified Complaint.

THIRD COUNT

(Declaration of Non-Infringement of U.S. Patent No. 10,868,908)

113. CAS restates and incorporates by reference, as if fully set forth herein, its answers to “all allegations in this Verified Complaint,” including its answers to the preceding paragraphs of the Verified Complaint.

114. CAS admits that it claims to and does own all rights, title, and interest, including the right to seek damages for past, present, and future infringement thereof, in the ‘908 Patent. CAS lacks sufficient information at this time to admit or deny whether a true and correct copy of the ‘908 Patent is attached to the Verified Complaint as Exhibit 3 and therefore denies the same. CAS further denies all remaining allegations contained in paragraph 114 of the Verified Complaint.

115. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘908 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. CAS denies the remaining allegations contained in paragraph 115 of the Verified Complaint.

116. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘908 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. Therefore, CAS admits that a controversy exists between CAS and Plaintiff regarding whether RHEL infringes or has infringed one or more claims of the ‘908 patent. CAS lacks sufficient information at this time to admit or deny that “MPTCP as a function that is disabled by default” and therefore denies same. CAS denies that Plaintiff has any rights or is entitled to any relief regarding the ‘908 patent and further denies all remaining allegations contained in paragraph 116 of the Verified Complaint.

117. CAS denies the allegations contained in paragraph 117 of the Verified Complaint.

FOURTH COUNT

(Declaration of Non-Infringement of U.S. Patent No. 9,350,649)

118. CAS restates and incorporates by reference, as if fully set forth herein, its answers to “all allegations in this Verified Complaint,” including its answers to the preceding paragraphs of the Verified Complaint.

119. CAS admits that it claims to and does own all rights, title, and interest, including the right to seek damages for past, present, and future infringement thereof, in the ‘649 Patent. CAS lacks sufficient information at this time to admit or deny whether a true and correct copy of the ‘649 Patent is attached to the Verified Complaint as Exhibit 4 and therefore denies the same. CAS further denies all remaining allegations contained in paragraph 119 of the Verified Complaint.

120. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘649 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. CAS denies the remaining allegations contained in paragraph 120 of the Verified Complaint.

121. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘649 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. Therefore, CAS admits that a controversy exists between CAS and Plaintiff regarding whether RHEL infringes or has infringed one or more claims of the ‘649 patent. CAS lacks sufficient information at this time to admit or deny that “MPTCP as a function that is disabled by default” and therefore denies same. CAS denies that Plaintiff has any rights or is entitled to any relief regarding the ‘649 patent and further denies all remaining allegations contained in paragraph 121 of the Verified Complaint.

122. CAS denies the allegations contained in paragraph 122 of the Verified Complaint.

FIFTH COUNT

(Declaration of Non-Infringement of U.S. Patent No. 8,861,349)

123. CAS restates and incorporates by reference, as if fully set forth herein, its answers to “all allegations in this Verified Complaint,” including its answers to the preceding paragraphs of the Verified Complaint.

124. CAS admits that it claims to and does own all rights, title, and interest, including the right to seek damages for past, present, and future infringement thereof, in the ‘349 Patent. CAS lacks sufficient information at this time to admit or deny whether a true and correct copy of the ‘349 Patent is attached to the Verified Complaint as Exhibit 5 and therefore denies the same. CAS further denies all remaining allegations contained in paragraph 124 of the Verified Complaint.

125. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘349 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. CAS denies the remaining allegations contained in paragraph 125 of the Verified Complaint.

126. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘349 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. Therefore, CAS admits that a controversy exists between CAS and Plaintiff regarding whether RHEL infringes or has infringed one or more claims of the ‘349 patent. CAS lacks sufficient information at this time to admit or deny that “MPTCP as a function that is disabled by default” and therefore denies same. CAS denies that Plaintiff has any rights or is entitled to any relief regarding the ‘349 patent and further denies all remaining allegations contained in paragraph 126 of the Verified Complaint.

127. CAS denies the allegations contained in paragraph 127 of the Verified Complaint.

SIXTH COUNT

(Declaration of Non-Infringement of U.S. Patent No. 8,228,801)

128. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the '801 Patent based on Plaintiff's RHEL software, which incorporates MPTCP. CAS denies the remaining allegations contained in paragraph 128 of the Verified Complaint.

129. CAS admits that it claims to and does own all rights, title, and interest, including the right to seek damages for past, present, and future infringement thereof, in the '801 Patent. CAS lacks sufficient information at this time to admit or deny whether a true and correct copy of the '801 Patent is attached to the Verified Complaint as Exhibit 6 and therefore denies the same. CAS further denies all remaining allegations contained in paragraph 129 of the Verified Complaint.

130. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing the '801 Patent based on Plaintiff's RHEL software that incorporates MPTCP. CAS denies the remaining allegations contained in paragraph 130 of the Verified Complaint.

131. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the '801 Patent based on Plaintiff's RHEL software, which incorporates MPTCP. Therefore, CAS admits that a controversy exists between CAS and Plaintiff regarding whether RHEL infringes or has infringed one or more claims of the '801 patent. CAS lacks sufficient information at this time to admit or deny that "MPTCP as a function that is disabled by default" and therefore denies same. CAS denies that Plaintiff has any rights or is entitled to any relief regarding the '801 patent and further denies all remaining allegations contained in paragraph 131 of the Verified Complaint.

132. CAS denies the allegations contained in paragraph 132 of the Verified Complaint.

SEVENTH COUNT

(Declaration of Non-Infringement of U.S. Patent No. 7,606,156)

133. CAS restates and incorporates by reference, as if fully set forth herein, its answers to “all allegations in this Verified Complaint,” including its answers to the preceding paragraphs of the Verified Complaint.

134. CAS admits that it claims to and does own all rights, title, and interest, including the right to seek damages for past, present, and future infringement thereof, in the ‘156 Patent. CAS lacks sufficient information at this time to admit or deny whether a true and correct copy of the ‘156 Patent is attached to the Verified Complaint as Exhibit 7 and therefore denies the same. CAS further denies all remaining allegations contained in paragraph 134 of the Verified Complaint.

135. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘156 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. CAS denies the remaining allegations contained in paragraph 135 of the Verified Complaint.

136. CAS admits that in its Counterclaim, it accuses Plaintiff of infringing one or more claims of the ‘156 Patent based on Plaintiff’s RHEL software, which incorporates MPTCP. Therefore, CAS admits that a controversy exists between CAS and Plaintiff regarding whether RHEL infringes or has infringed one or more claims of the ‘156 patent. CAS lacks sufficient information at this time to admit or deny that “MPTCP as a function that is disabled by default” and therefore denies same. CAS denies that Plaintiff has any rights or is entitled to any relief regarding the ‘156 patent and further denies all remaining allegations contained in paragraph 136 of the Verified Complaint.

137. CAS denies the allegations contained in paragraph 137 of the Verified Complaint.

EIGHTH COUNT

(Violation of the North Carolina Abusive Patent Assertion Act)

138. CAS restates and incorporates by reference, as if fully set forth herein, its answers to “all allegations in this Verified Complaint,” including its answers to the preceding paragraphs of the Verified Complaint.

139. CAS denies the allegations contained in paragraph 139 of the Verified Complaint.

140. CAS denies the allegations contained in paragraph 140 of the Verified Complaint.

141. CAS denies the allegations contained in paragraph 141 of the Verified Complaint.

142. CAS denies the allegations contained in paragraph 142 of the Verified Complaint.

143. CAS denies the allegations contained in paragraph 143 of the Verified Complaint.

144. CAS denies the allegations contained in paragraph 144 of the Verified Complaint.

145. CAS admits that Plaintiff purports to seek equitable and monetary relief but denies that Plaintiff is entitled to any relief requested in paragraph 145 of the Verified Complaint, or otherwise. CAS denies all remaining allegations contained in paragraph 145 of the Verified Complaint.

146. CAS denies that Plaintiff has properly reserved any purported rights as alleged in paragraph 146 of the Verified Complaint. CAS further denies that Plaintiff would be entitled to such relief. CAS denies all remaining allegations contained in paragraph 146 of the Verified Complaint.

ANSWER TO PLAINTIFF’S PRAYER FOR RELIEF

CAS denies that Plaintiff is entitled to the relief requested in Plaintiff’s Prayer for Relief, or any relief whatsoever, in connection with the allegations made in the Verified Complaint and CAS respectfully requests that judgment be entered in CAS’ favor on Counts 1-8 in the Verified

Complaint. Further, to the extent that Plaintiff's Prayer for Relief includes any factual allegations, CAS denies those allegations.

AFFIRMATIVE DEFENSES

Subject to the responses above, CAS alleges and asserts the following defenses in response to Plaintiff's allegations. By asserting the following defenses, CAS does not affirmatively undertake any burden that Plaintiff bears the burden of proving as a matter of applicable substantive procedural law. In addition, CAS specifically reserves all rights to assert additional defenses that become known to it through the course of discovery.

First Defense

Plaintiff's Verified Complaint, and each Count contained therein, fails to state a claim upon which relief may be granted, and should be dismissed pursuant to Federal Rule of Civil Procedure 12(b)(6). For example, Red Hat fails to plead a viable APAA claim. See [D.E. 15, p. 15-17].

Second Defense

CAS's conduct constituted the lawful exercise of its legal rights and does not violate the APAA or any other law or legal duty.

Third Defense

As set forth in CAS' Counterclaims which are hereby incorporated by reference, Plaintiff has infringed and is currently infringing and/or inducing the infringement of one or more claims of the Asserted Patents.

Fourth Defense

Plaintiff's damages, if any, are limited for failure to mitigate damages or harm.

Fifth Defense

The Verified Complaint fails to state a claim that could support an award of attorneys' fees.

Sixth Defense

This Court lacks personal jurisdiction over CAS. See [D.E. 15, p. 5-9].

Seventh Defense

Plaintiff's claim purporting to arise under the North Carolina Abusive Patent Assertion Act is preempted by federal patent law.

Eighth Defense

Plaintiff's claim purporting to arise under the North Carolina Abusive Patent Assertion Act is barred by the First Amendment of the U.S. Constitution and the *Noerr-Pennington* doctrine.

Ninth Defense

The North Carolina Abusive Patent Assertion Act violates the First Amendment, the Equal Protection Clause of the Fourteenth Amendment, and the Commerce Clause.

CAS PRAYER FOR RELIEF IN RESPONSE TO PLAINTIFF'S COMPLAINT

WHEREFORE, CAS respectfully prays that the Court enter judgment in its favor and against Plaintiff on all of the claims in Plaintiff's Complaint, and grant the following further relief:

- A. Dismissal of all of Plaintiff's claims against CAS in their entirety and with prejudice;
- B. Judgment that Plaintiff take nothing by way of its claims;
- C. An order awarding CAS its costs pursuant to Rule 54(d) of the Federal Rules of Civil Procedure;
- D. An order finding this to be an exceptional case as to Plaintiff's claims, and awarding CAS its costs, expenses, and reasonable attorney fees under 35 U.S.C. § 285 and all other applicable statutes and rules in common law as may apply; and
- E. An order awarding CAS such further relief as the Court may deem appropriate under the circumstances.

JURY DEMAND

CAS demands a jury trial on all issues and claims arising out of Plaintiff's Verified Complaint so triable.

AMENDED COUNTERCLAIM FOR PATENT INFRINGEMENT

Competitive Access Systems, Inc. ("CAS") hereby brings this Amended Counterclaim, including a demand for a jury trial, against Red Hat, Inc. ("Red Hat") and alleges as follows.

Nature of the Action

1. This is an action for infringement of the following U.S. Patent Nos.: 8,228,801, entitled "Broadband Communications Device" (the '801 patent), a true and accurate copy of which is attached as Exhibit 1; U.S. Patent No. 9,350,649, entitled "Multi-path Communication Devices and Methods" (the '649 patent), a true and accurate copy of which is attached as Exhibit 2; U.S. Patent No. 10,868,908, entitled "Devices and Methods for Multipath Communications" (the '908 patent), a true and accurate copy of which is attached as Exhibit 3; U.S. Patent No. 11,582,343, entitled "Devices and Methods for Multipath Communications" (the '343 patent), a true and accurate copy of which is attached as Exhibit 4; U.S. Patent No. 11,418,641, entitled "Devices and Methods for Multipath Communications" (the '641 patent), a true and accurate copy of which is attached as Exhibit 5; U.S. Patent No. 8,861,349, entitled "Broadband Communications Device" (the '349 patent), a true and accurate copy of which is attached as Exhibit 6; and U.S. Patent No. 7,606,156, entitled "Residential Communications Gateway (RCG) for Broadband Communications over a Plurality of Standard POTS lines, with Dynamic Allocation of Said Bandwidth, that Requires No Additional Equipment or Modifications to the Associated Class 5 Offices or the PSTN at Large" (the '156 patent), a true and accurate copy of which is attached as Exhibit 7 (collectively "the Asserted Patents").

2. This action seeks past money damages (for all patents) and ongoing money damages (for one patent) for Red Hat's making, using, offering for sale, selling, and/or importing into the United States its Red Hat Enterprise Linux ("RHEL") software that includes Multipath TCP ("MPTCP") operations (such as those discussed in RFC 6824 and RFC 8684) and servers and other computer and network devices running this software, such as smartphones, laptops, tablets, routers, base stations, etc., which infringe the Asserted Patents. This action also seeks past money damages (for all patents) and ongoing money damages (for one patent) for Red Hat's acts of actively inducing infringement in CAS's rights in the Asserted Patents, including by advertising, providing instructions for, and/or servicing its RHEL software that includes MPTCP operations and servers and other computer and network devices running this software, such as smartphones, laptops, tablets, routers, base stations, etc.

The Parties

3. Counterclaimant Competitive Access Systems, Inc. is incorporated under the laws of the State of Texas, and its principal place of business is located in Plano, Texas.

4. On information and belief, Counter-Defendant Red Hat is a North Carolina corporation organized and existing under the laws of the state of Delaware, with its principal place of business in this District at 100 East Davie Street, Raleigh, North Carolina 27601.

Jurisdiction and Venue

5. This action arises under the United States patent laws, 35 U.S.C. § 101, *et seq.*, including 35 U.S.C. § 271. This Court has subject matter jurisdiction under 28 U.S.C. § 1331 and § 1338(a).

6. Red Hat is subject to this Court's specific and general jurisdiction, pursuant to constitutional due process, due at least to its extensive business in this District, including its

infringement alleged herein. Additionally, Red Hat's principal place of business is in this District. Red Hat, directly or through subsidiaries or intermediaries, ships, distributes, makes, uses, offers for sale, imports, and/or advertises its products and services in the United States and in this District.

7. On information and belief, Red Hat, directly and through subsidiaries or intermediaries, has purposefully and voluntarily placed one or more of its infringing products, as described below, into the stream of commerce with the expectation that those products will be purchased and used by customers or consumers in this District, including the RHEL product. Red Hat therefore has committed acts of infringement within the Eastern District of North Carolina giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over Red Hat would not offend traditional notions of fair play and substantial justice.

8. Venue is proper in this District under 28 U.S.C. §§ 1391(b) and 1400(b).

9. As alleged in the Verified Complaint, Red Hat operates a regular and established place of business in Raleigh, North Carolina from which its employees provide services to customers within this judicial district. On information and belief, Red Hat has also sold and serviced infringing RHEL products to customers in this judicial district.

Introduction

CAS and Eric Delangis

10. CAS was founded by Eric Delangis as a technology design and development company.

11. Mr. Delangis has extensive experience designing communications systems for satellites and terrestrial applications. While living in rural Colorado, Mr. Delangis was unable to obtain high speed internet. Rather than settle for slow, dial-up internet, Mr. Delangis attempted to

find a commercial solution for pooling multiple internet connections. When he was unable to locate any solutions to his problem, Mr. Delangis invented innovative technology to route data over several internet connections, including DSL, ISDN, dial-up, and wireless connections, and combine the received data for the intended receiving device.

12. In particular, Mr. Delangis developed a variety of systems and protocols for transmitting and receiving data in a faster and more efficient manner by transmitting data over multiple communication channels to improve the effective bandwidth between the sender and recipient of the data. The usage of multiple communication channels further provides enhanced reliability as data can be transmitted even when some of the communication channels are suffering from reduced performance or are unavailable. This improves the functionality of the computer networks themselves, particularly as compared to the solutions available at the time Mr. Delangis invented his technology.

13. Mr. Delangis's solution is necessarily rooted in computer technology to overcome a problem specifically arising in the realm of computer networks.

Red Hat and RHEL

14. Red Hat has developed, made, tested, used, offered for sale, and sold, and continues to develop, make, test, use, offer for sale, and sell, RHEL and provides support and instructions to customers of RHEL. See, e.g., [D.E. 1, p. 6-7 ¶¶ 25-28].

15. Red Hat provides RHEL to customers, who use, copy, modify, offer for sale, sell, and distribute RHEL under a license with Red Hat.

16. Customers purchase a subscription to RHEL. This is demonstrated by the Red Hat Enterprise Linux subscription guide, for example. A true and accurate copy of the Red Hat Enterprise Linux subscription guide is attached hereto as Exhibit 8.

17. Red Hat distributes RHEL to customers who use RHEL on its platform and/or platforms of third-party cloud services providers. This is shown by, for example, the Red Hat Enterprise subscription guide, a true and accurate copy of which is attached hereto as Exhibit 8, and Red Hat's Cloud Access Guide, a true and accurate copy of which is attached hereto as Exhibit 11. *See* Exhibit 8 (Red Hat Enterprise subscription guide), at p.14; Exhibit 11 (Red Hat Cloud Access), at p. 2 ("It makes your subscriptions portable, so you may choose the best architecture and infrastructure for your needs-in your datacenter or on public clouds").

18. Red Hat provides third-party support for RHEL running on enterprise hardware, software, and certified cloud providers. *See* Exhibit 8 at p 14. The Red Hat product certification provides assurance that a customer's third-party tools and solutions are tested and certified on Red Hat Enterprise Linux, as shown in the Red Hat Enterprise subscription guide. *Id.* One example of a third-party tool is Amazon EC2, as explained in the Red Hat Enterprise Linux on Amazon EC2 FAQs, a true and accurate copy of which is attached hereto as Exhibit 9. *See* Exhibit 9, at p. 2. Red Hat Enterprise Linux on Amazon EC2 is offered for sale to customers and includes Amazon EC2 compute charges and Red Hat Enterprise Linux subscription charges. *Id.*, at p. 4. Other examples of Red Hat certified hardware that are certified for Red Hat platforms, such as RHEL, include the following manufacturer's hardware: Dell, Fujitsu Siemens, HP, and IBM. True and accurate copies of Red Hat certified hardware are attached hereto as Exhibit 16.

19. Red Hat provides instructions to customers for installing RHEL over a network. Such instructions are shown in the document titled, "Interactively installing RHEL over the network," a true and accurate copy of which is attached hereto as Exhibit 10.

20. Red Hat also offers a system called Red Hat Satellite. A true and accurate copy of a document showing the Red Hat Satellite system offering, titled “Red Hat Satellite on Red Hat Enterprise Linux” is attached hereto as Exhibit 12. *See* Exhibit 12, at p. 3.

21. Red Hat Satellite is a dedicated server that allows customers to manage their Red Hat software, including RHEL. *See* Exhibit 12 (Red Hat Satellite on Red Hat Enterprise Linux), at p. 3-5.

22. Red Hat customers use RHEL to support and power software and technologies for automation, cloud, containers, middleware, storage, application development, microservices, virtualization, management, and artificial intelligence.

23. RHEL included MPTCP functionality at least as early as version 8.3 which was available for use by customers at least as early as November 3, 2020. A true and accurate copy of “Multipath TCP on RHEL 8: From one to many subflows,” is attached hereto as Exhibit 13. *See* Exhibit 13, at p. 2-3. MPTCP is an extension of the Transmission Control Protocol (TCP) to use multiple paths between peers simultaneously. *Id.*, at p. 2.

24. Red Hat advertises, encourages the use of, and provides instructions for the use of MPTCP functionality in RHEL, as shown in Exhibits 13 and 14. *Id.*, at p. 3. *See also* Exhibit 14, 9.0 Release Notes, at p. 6 (“You can use the new MultiPath TCP daemon (mptcpd) to configure MultiPath TCP (MPTCP) endpoints without using the iproute2 utility. To make MPTCP subflows and endpoints persistent, use a NetworkManager dispatcher script.”). A true and accurate copy of the release notes for version 9.0 are attached hereto as Exhibit 14.

25. As an example, Red Hat provides the following test setup on its website: “As a simple test setup, we will use two network namespaces, mptcp-client and mptcp-server, to simulate the client and the server in an MPTCP connection. The two namespaces will be connected by two

different virtual Ethernet (veth) paths: from 10.0.0.1 to 10.0.0.2 and from 192.168.0.1 to 192.168.0.2 (Figure 1).”

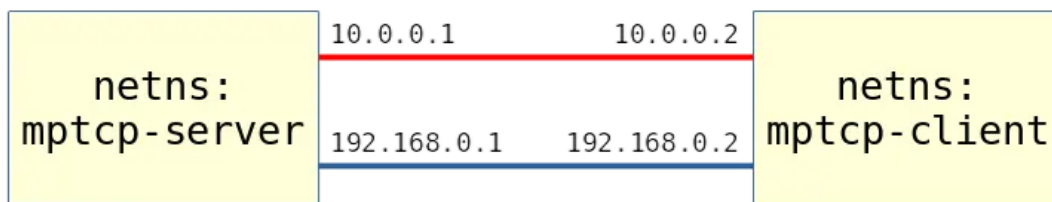


Figure 1: Network topology for two-path MPTCP test.

Exhibit 13, Multipath TCP on RHEL 8: From one to many subflows at 5.

26. RHEL customers use MPTCP functionality in RHEL. This is shown, for example, in the document titled “Using Multipath TCP to enhance bandwidth and withstand outages,” a true and accurate copy of which is attached hereto as Exhibit 15. See, e.g., Exhibit 15, Using Multipath TCP to enhance bandwidth and withstand outages at 4 (“In this part, we’ll utilize MPTCP in a real-world scenario with two RHEL 9 laptops.”).

27. As explained more fully below, CAS asserts that products running RHEL with MPTCP, such as servers and computers, infringe the Asserted Patents (“Accused Instrumentalities” or “Accused Products”). To recover appropriate remedies for past and ongoing infringement, CAS brings this action for patent infringement.

28. The claims in this Counterclaim are for infringement of U.S. Patent Nos. 7,606,156 8,228,801; 8,861,349; 9,350,649; 10,868,908; 11,418,641; and 11,582,343.

The CAS Asserted Patents

A. The ‘801 Patent

29. U.S. Patent No. 8,228,801 is entitled “Broadband Communications Device.” The ‘801 Patent was duly and legally issued on July 24, 2012, by the United States Patent and

Trademark Office. A true and accurate copy of the complete file history of the '801 Patent is attached hereto as Exhibit 25 [CAS_RH0000898 - CAS_RH0001022].

30. CAS is the owner and assignee of the '801 Patent and possesses all rights of recovery under the '801 Patent.

31. The '801 Patent expired on January 22, 2025. This Complaint seeks damages related to infringement of the '801 Patent prior to its expiration.

32. The '801 Patent claims are valid and enforceable.

B. The '649 Patent

33. U.S. Patent No. 9,350,649 is entitled "Multipath Communication Devices and Methods." The '649 Patent was duly and legally issued on May 24, 2016, by the United States Patent and Trademark Office. A true and accurate copy of the complete file history of the '649 Patent is attached hereto as Exhibit 26 [CAS_RH0001297 - CAS_RH0001486].

34. CAS is the owner and assignee of the '649 Patent and possesses all rights of recovery under the '649 Patent.

35. The '649 Patent expired on October 14, 2023. This Complaint seeks damages related to infringement of the '649 Patent prior to its expiration.

36. The '649 Patent claims are valid and enforceable.

C. The '908 Patent

37. U.S. Patent No. 10,868,908 is entitled "Devices and methods for multipath communications." The '908 Patent was duly and legally issued on December 15, 2020, by the United States Patent and Trademark Office. A true and accurate copy of the complete file history of the '908 Patent is attached hereto as Exhibit 27 [CAS_RH0000044 - CAS_RH0000449].

38. CAS is the owner and assignee of the '908 Patent and possesses all rights of recovery under the '908 Patent.

39. The '908 Patent expired on October 14, 2023. This Complaint seeks damages related to infringement of the '908 Patent prior to its expiration.

40. The asserted '908 Patent claims are valid and enforceable. While certain claims were rejected in a reexamination proceeding (and that judgment is currently being disputed), the asserted claims of the '908 Patent have not been challenged.

D. The '343 Patent

41. U.S. Patent No. 11,582,343 is entitled "Devices and Methods for Multipath Communications." The '343 Patent was duly and legally issued on February 14, 2023, by the United States Patent and Trademark Office. A true and accurate copy of the complete file history of the '343 Patent is attached hereto as Exhibit 28 [CAS_RH0000530 - CAS_RH0000716].

42. CAS is the owner and assignee of the '343 Patent and possesses all rights of recovery under the '343 Patent.

43. The '343 Patent expired on October 14, 2023. CAS seeks damages for infringement of the '343 Patent occurring prior to its expiration.

44. The '343 Patent claims are valid and enforceable.

E. The '641 Patent

45. U.S. Patent No. 11,418,641 is entitled "Devices and Methods for Multipath Communications." The '641 Patent was duly and legally issued on August 16, 2022, by the United States Patent and Trademark Office. A true and accurate copy of the complete file history of the '641 Patent is attached hereto as Exhibit 29 [CAS_RH0000450 - CAS_RH0000529].

46. CAS is the owner and assignee of the '641 Patent and possesses all rights of recovery under the '641 Patent.

47. The '641 Patent expired on December 11, 2023. This Complaint seeks damages related to infringement of the '641 Patent prior to its expiration.

48. The '641 Patent claims are valid and enforceable.

F. The '349 Patent

49. U.S. Patent No. 8,861,349 is entitled “Broadband Communications Device.” The '349 Patent was duly and legally issued on October 14, 2014, by the United States Patent and Trademark Office. A true and accurate copy of the complete file history of the '349 Patent is attached hereto as Exhibit 30 [CAS_RH0001023 - CAS_RH0001296].

50. CAS is the owner and assignee of the '349 Patent and possesses all rights of recovery under the '349 Patent.

51. The '349 Patent expired on October 14, 2023. This Complaint seeks damages for infringement of the '349 Patent prior to its expiration.

52. The '349 Patent claims are valid and enforceable.

G. The '156 Patent

53. U.S. Patent No. 7,606,156 is entitled “Residential communications gateway (RCG) for broadband communications over a plurality of standard POTS lines, with dynamic allocation of said bandwidth, that requires no additional equipment or modifications to the associated class 5 offices or the PSTN at large.” The '156 Patent was duly and legally issued on October 20, 2009, by the United States Patent and Trademark Office. A true and accurate copy of the complete file history of the '156 Patent is attached hereto as Exhibit 31 [CAS_RH0000717 - CAS_RH0000897].

54. CAS is the owner and assignee of the ‘156 Patent and possesses all rights of recovery under the ‘156 Patent.

55. The ‘156 Patent has not expired and is in full force and effect.

56. The ‘156 Patent Claims are valid and enforceable.

Additional Information on RHEL’s use of MPTCP

57. Multipath TCP is a protocol that provides the ability to simultaneously use multiple paths between peers.

58. RHEL utilizes the v1 specification of Multipath TCP set forth in RFC 8684. A true and accurate copy of the document titled, “Using Multipath TCP to better survive outages and increase bandwidth” is attached hereto as Exhibit 19. See Exhibit 19 at 3 (“Multipath TCP enables a transport connection to operate across multiple paths simultaneously. It became an experimental standard in 2013, which was later replaced by the Multipath v1 specification in 2020 via RFC 8684” and “RFC 8684” is a link to <https://datatracker.ietf.org/doc/html/rfc8684.html> which is a copy of RFC 8684).

59. A true and accurate copy of RFC 8684 is attached hereto as Exhibit 24.

60. From at least as early as August 19, 2020 to the present, RHEL has complied with the specification of Multipath TCP set forth in RFC 8684.

61. As early as August 19, 2020, Red Hat was advertising, providing instructions for, and encouraging the use of MPTCP in RHEL, and continues to do so.

62. Examples of such advertising, instructions, and encouragement are attached as the following Exhibits: Multipath TCP on Red Hat Enterprise Linux 8.3: From 0 to 1 subflows, dated August 19, 2020, a true and accurate copy of which is attached hereto as Exhibit 17; Understanding Multipath TCP: High availability for endpoints and the networking highway of the future, dated

February 9, 2021, a true and accurate copy of which is attached hereto as Exhibit 18; Using Multipath TCP to better survive outages and increase bandwidth, dated June 9, 2022, a true and accurate copy of which is attached hereto as Exhibit 19; Chapter 24. Getting started with Multipath TCP, a true and accurate copy of which is attached hereto as Exhibit 20; Chapter 35. Getting started with Multipath TCP, a true and accurate copy of which is attached hereto as Exhibit 21; Portions of Configuring and managing networking, a true and accurate copy of which is attached hereto as Exhibit 22; and Chapter 37. Getting started with Multipath TCP, a true and accurate copy of which is attached hereto as Exhibit 23.

63. Red Hat's RHEL version 8 and later products implement MPTCP.

64. Red Hat provides explicit guidance and instructions to RHEL users for enabling MPTCP, teaching them to use RHEL with MPTCP. Furthermore, Red Hat actively promotes the use of MPTCP with RHEL to improve network resilience and increase available bandwidth, directly supporting the provision of broadband communications services.

65. As such, when MPTCP is enabled, RHEL makes decisions based on signal quality to maximize connection speeds. Specifically, users of the RHEL program "can configure MultiPath TCP (MPTCP) using the nmcli command to permanently establish multiple subflows between a source and destination system. The subflows can use different resources, different routes to the destination, and even different networks. Such as Ethernet, cellular, wifi, and so on. As a result, you achieve combined connections, which increase network resilience and throughput." See Exhibit 21, at p.12.

66. Red Hat actively promotes adoption of MPTCP and provides guidance on enabling MPTCP to improve network resilience and increase available bandwidth. For example, Red Hat

has provided the following guidance and direction on its “Red Hat Blog,” teaching users to implement MPTCP, a transmission control protocol designed to maximize throughput redundancy:

- a. “MultiPath TCP (MPTCP) gives you a way to bundle multiple paths between systems to increase bandwidth and resilience from failures.”
- b. “At Red Hat we have recurring requests from customers to enable applications to switch media transparently, possibly also combining the bandwidth of such media. We can use MPTCP as a working solution for such scenarios.”
- c. “MPTCP’s biggest boost is its ability to increase bandwidth by utilizing multiple TCP network connections—like adding lanes to a thruway—as compared to using what we refer to as the least cost route.”
- d. With MPTCP, your commute is faster because it allows increasing the download speed by aggregating the bandwidth of all interfaces.”
- e. “You can configure MultiPath TCP (MPTCP) using the nmcli command to permanently establish multiple subflows between a source and destination system. The subflows can use different resources, different routes to the destination, and even different networks. Such as Ethernet, cellular, wifi, and so on. As a result, you achieve combined connections, which increase network resilience and throughput.”
- f. “The redundancy offered by MPTCP enables inverse multiplexing of resources. Originally, networks were designed a bit like older cities with travel facilitated via single-path surface streets. But MPTCP offers a modern, streamlined multi-lane approach to networking, which increases TCP throughput to the sum of all available link-level channels—just like traffic throughput is increased by adding lanes to a highway.”

67. Red Hat’s implementation of MPTCP enables a transport connection to operate across multiple paths simultaneously, and brings network connection redundancy to user endpoint devices to increase bandwidth and resilience from failures. *See Exhibit 21, at p. 2; Exhibit 19, at p. 2.*

68. Computers that run RHEL have at least one processor.

69. RHEL, when running on a computer, is capable of providing instructions to the computer to implement a Multipath TCP connection.

70. RHEL, when providing instructions to the computer to implement a Multipath TCP connection, complies with some or all of RFC 8684.

71. Computers that run RHEL with an Ethernet port are capable of being connected to an Ethernet router.

72. Computers that run RHEL with a Wi-Fi adapter are capable of being connected to a Wi-Fi router.

73. Computers that run RHEL and are connected to an Ethernet router are capable of requesting data from a server through the Ethernet router.

74. Computers that run RHEL and are connected to a Wi-Fi router are capable of requesting data from a server through the Wi-Fi router.

75. Computers with an Ethernet port and a Wi-Fi adapter that run RHEL with Multipath TCP enabled are capable of connecting concurrently to an Ethernet router and a Wi-Fi router.

76. Computers with an Ethernet port and a Wi-Fi adapter that run RHEL with Multipath TCP enabled are capable of implementing a Multipath TCP connection through an Ethernet router and a Wi-Fi router to a server.

77. Computers with an Ethernet port and a Wi-Fi adapter that run RHEL with Multipath TCP enabled are capable of implementing a Multipath TCP connection through an Ethernet router and a Wi-Fi router to request data from a server.

78. Computers with an Ethernet port and a Wi-Fi adapter that run RHEL with Multipath TCP enabled send the MP_CAPABLE option to the Ethernet router or the Wi-Fi router when implementing a Multipath TCP connection through an Ethernet router and a Wi-Fi router to a server.

79. Computers with an Ethernet port and a Wi-Fi adapter that run RHEL with Multipath TCP enabled receive the MP_CAPABLE option from the Ethernet router or the Wi-Fi router when implementing a Multipath TCP connection through an Ethernet router and a Wi-Fi router to a server.

80. Computers with an Ethernet port and a Wi-Fi adapter that run RHEL with Multipath TCP enabled set up a new subflow at least in part by sending the MP_JOIN option to the Ethernet router or the Wi-Fi router when implementing a Multipath TCP connection through an Ethernet router and a Wi-Fi router to a server.

81. Computers with an Ethernet port and a Wi-Fi adapter that run RHEL with Multipath TCP enabled set up a new subflow at least in part by receiving the MP_JOIN option from the Ethernet router or the Wi-Fi router when implementing a Multipath TCP connection through an Ethernet router and a Wi-Fi router to a server.

82. Computers with an Ethernet port and a Wi-Fi adapter that run RHEL with Multipath TCP enabled receive data from each of the Ethernet router and the Wi-Fi router when utilizing a Multipath TCP connection through an Ethernet router and a Wi-Fi router to a server.

83. A computer with an Ethernet port and a Wi-Fi adapter that runs RHEL with Multipath TCP enabled concurrently receives data from each of the Ethernet router and the Wi-Fi router utilizing a Multipath TCP connection through an Ethernet router and a Wi-Fi router to a server.

84. At least a portion of the data received from the Ethernet router is different from at least a portion of the data received from the Wi-Fi router at the computer running RHEL with Multipath TCP enabled utilizing a Multipath TCP connection through an Ethernet router and a Wi-Fi router to a server.

85. At least a portion of the data received from the Ethernet router is aggregated with at least a portion of the data received from the Wi-Fi router at the computer running RHEL with Multipath TCP enabled utilizing a Multipath TCP connection through an Ethernet router and a Wi-Fi router to a server.

86. Effective bandwidth between the computer and the server is increased during utilization of a Multipath TCP connection from a computer running RHEL with Multipath TCP enabled through an Ethernet router and a Wi-Fi router to a server.

87. Effective throughput between the computer and the server is increased during utilization of a Multipath TCP connection from a computer running RHEL with Multipath TCP enabled through an Ethernet router and a Wi-Fi router to a server.

Red Hat's Knowledge of CAS Patent Rights

88. On October 2, 2023, Clay McGurk, Esq. ("McGurk"), as Licensing Agent for Eric Delangis, founder of CAS and inventor with respect to the Asserted Patents, sent a letter to Red Hat to provide notice of the Asserted Patents. See [D.E. 1-10].

89. Red Hat has had knowledge of the Asserted Patents as early as approximately October 2, 2023.

90. The October 2, 2023 Letter, attached as Exhibit 8 to the Verified Complaint, states the following: "Your company may already be using MPTCP protocol, or a proprietary method, in your Unix products. Using the CAS routing techniques in your devices most likely has increased the speed of your devices by factors of 10x to 100x while substantially increasing your products' reliability and enhancing your consumer's experience."

91. In a November 27, 2023 email, Red Hat's Director of Litigation and Intellectual Property, David Perry, acknowledged receipt of the October 2, 2023 letter, and on November 28, 2023, the parties had a call to discuss the substance of the letter.

92. On June 18, 2024, Clay McGurk sent an email to David Perry at Red Hat that states the following: “Attached are three sets of patent claims for 8,861,349, 9,350,649 and 11,582,343. The claims in these patents cover RFC 8684, especially method claims 13-17 from ‘649 (i.e., covers MP_Join) and method claims 16-19 in ‘349 (i.e., covers MP_Capable). Red Hat’s use of MPTCP as standardized in RFC 8684 in Linux 9 (and other previous versions) looks like what is claimed in these CAS method claims.” The email included the following attachments: “Computer MPTCP Claim Charts 9350649.pdf”; “Computer MPTCP Claim Charts 8861349.pdf”; and “Computer MPTCP Claim Charts 11582343.pdf.”

93. After receiving these notices, Defendant continued to make, use, offer for sale, advertise, encourage use of, provide instructions for, and/or sell infringing products and/or import into the United States its infringing products.

94. After CAS filed its Counterclaim in this case, Defendant still continues to make, use, offer for sale, advertise, encourage use of, provide instructions for, and/or sell infringing products and/or import into the United States its infringing products

95. On information and belief, Red Hat has not made any attempt to redesign, modify, or withdraw any of its infringing products in response to CAS's notices.

96. Defendant knows and at all relevant times has known of its infringement of the Asserted Patents, or at the very least has been willfully blind to its infringement of the Asserted Patents. Upon information and belief, Red Hat has possessed such knowledge as early as around the time that CAS filed suit against Oracle on July 27, 2022 for infringement of the ‘801, ‘649, and ‘908 Patents (Oracle is a featured provider of Red Hat, see Exhibit 11 at 5).

97. Upon information and belief, such infringement has been willful, and upon further belief, Defendant lacks any reasonable invalidity or non-infringement defense making this case

exceptional and entitling CAS to increased damages and reasonable attorneys' fees pursuant to 35 U.S.C. §§ 284 and 285.

The Claims Improve Computer Networking Functioning

98. The claims of the Asserted Patents recite specific configurations and operations of computer network devices for an exchange of data that improves computer network functioning by increasing bandwidth, data throughput, quality of service, and/or connection reliability and reducing costs.

99. As set forth in more detail below, the claims of the Asserted Patents recite meaningful limitations on how to accomplish increasing bandwidth, data throughput, quality of service, and/or connection reliability and reducing costs.

100. The claims of the Asserted Patents recite novel configurations and operations of computer network devices for an exchange of data that improve computer network functionality from a technical perspective and cause the computer network to operate differently than it otherwise would.

101. For example, the inventions recited in the claims of the Asserted Patents increase the capacity, reliability, and quality of service of networks to communicate data by using available bandwidth of multiple links, in a manner that was not done in the prior art. The claims of the asserted patents do not merely recite routing data over multiple links between two directly connected stationary devices, for example (e.g., merely routing data over multiple direct connections between a switch and a server). The claims of the Asserted Patents recite novel configurations and operations of computer network devices including grouping together links of remote computer network devices having additional bandwidth to assist in a data transfer between

two devices (e.g., between a phone and a server), using a session identification, and using a new network protocol, none of which was done prior to the priority date of the Asserted Patents.

102. For example, the specification of the ‘641 Patent states as follows: “Broadband communications devices and methods operate with at least two separate communication paths between the device and the network, such as the Internet.” ‘641 Patent Abstract. The specification of the ‘641 Patent further states as follows: “The bandwidth is increased when the separate communication paths are combined.” *Id.*

103. As a result of using the inventions recited in the claims of the Asserted Patents, the computer network devices involved in an exchange of data are capable of having increased bandwidth, data throughput, quality of service, and/or connection reliability.

104. The Asserted Patents share the same specification. For ease of reference, citations to the specifications will be made to the ‘156 Patent specification, unless otherwise noted.

Prior Art Computer Network Configurations and Operations for Transferring Data

105. The inventions recited in the claims of the Asserted Patents are different from, improve upon, and have benefits over the prior art.

106. As set forth below, the specifications of the Asserted Patents explain how the inventions recited in the claims of the Asserted Patents are different from, improve upon, and have benefits over the prior art.

107. Exemplary prior art configurations and operations of computer network devices involved in an exchange of data included one of the following: a Plain Old Telephone Service (“POTS”) line, cable line, or DSL line to connect two computer network devices.

108. For example, the specifications discuss using one of the following to create a connection between two computer network devices to exchange data: a Plain Old Telephone Service (“POTS”) line, cable line, or DSL line. ‘156 Patent, Col. 2, Lines 11-18 (“CLECs must

be able to offer many more features or services than those that the LEC provides, and they must be able to do this at a lower cost, in order to attract new customers. So, what new services can the CLECs offer? As things stand today there are none, with the exception of DSL or Cable services which require tremendous infrastructure costs on behalf of the CLEC.”); 2:26-50 (“speed or broadband backbones such as DSL and cable modems, over Internet connections via a computer. The high-speed services require expensive infrastructure enhancements to the local telephone companies' facilities and cable plants, as well as expensive modems at the customer's end. These services are also difficult to deploy and too complicated for the average user. Internet based VoIP services suffer from Internet delays caused by a lack of true Quality of Service (QOS) capabilities across the Internet. Existing VoIP services also require access to a computer and a technical knowledge to be able to make it work. Because of these problems, VoIP services are primarily targeted at the corporate market place where private IP networks that can carry VoIP services with a true guaranteed QOS exist, or can be controlled.

(14) The only available alternatives for the residential user for high speed services are DSL and cable modems. DSL and Cable based communications reach only a small segment of the population, and growth has failed to live up to initial expectations. The recent collapse of the internet boom has led to the failure of many DSL service providers and has effectively eliminated DSL as a potential service for most POTS users for the immediate future”); 10:61-11:22 (“One of the primary functions of the RCG is to be able to transfer large files such as video files over the POTS lines to a residence. The ability to do this is limited by the maximum of 56 Kbps due to the design of the digital Class 5 office linecards and network transmission schemes based upon T carriers. Typical Class 5 linecard design samples the POTS lines at a rate of 8,000 samples per second. Typically, each sample is digitized into 12 to 16 bits by a codec device. The digitized

sample is then companded to an 8 bit sample (1 byte) which makes up the PCM data stream that is transferred over the PSTN. Therefore, each POTS line is sampled at an effective rate of 64 Kbps. Since legacy T1 transmission equipment uses robbed-bit signaling, the maximum guaranteed transmission rate for the PSTN as a whole is 56 Kbps. Because of this limitation, standard POTS lines can only guarantee a maximum of 56 Kbps transfer rate under the best conditions. DSL equipment gets around this problem by installing DSL Access Multiplexing (DSLAM) equipment at the Class 5 office end of the POTS line. By routing around the linecard, as well as routing the data directly over the Internet or other private IP based networks, and therefore the 64 Kbps sampling rate, DSL is not bandwidth limited like PSTN traffic is. DSL, however, suffers from the very high costs associated with the purchase, installation, maintenance, floor lease costs, etc. DSL also suffers from very high deployment costs resulting from the labor intensive process to turn up each line. Each DSL "POTS" line must be inspected, conditioned and all load coils removed").

Problems in Prior Art

109. Problems with prior art configurations and methods to the inventions recited in the Claims of the Asserted Patents include low bandwidth, data throughput, quality of service, and reliability and substantial costs.

110. For example, there were problems with prior art configurations and operations of computer network devices involved in an exchange of data that included using one of the following to create a connection between two computer network devices to exchange data: a POTS line, cable line, or DSL line.

111. The specifications of the Asserted Patents discuss these problems.

112. For example, DSL and cable lines require tremendous infrastructure costs, suffer from high costs associated with purchase, installation, and maintenance, require expensive

modems at the customer's end, are difficult to deploy, are too complicated for the average user, and are not available to many customers. '156 Patent, Col. 2: Lines 11-18 ("CLECs must be able to offer many more features or services than those that the LEC provides, and they must be able to do this at a lower cost, in order to attract new customers. So, what new services can the CLECs offer? As things stand today there are none, with the exception of DSL or Cable services which require tremendous infrastructure costs on behalf of the CLEC"); '156 Patent, Col. 2: Lines 26-50 ("Many companies are currently trying to provide VoIP services to residential customers over high-speed or broadband backbones such as DSL and cable modems, over Internet connections via a computer. The high-speed services require expensive infrastructure enhancements to the local telephone companies' facilities and cable plants, as well as expensive modems at the customer's end. These services are also difficult to deploy and too complicated for the average user. Internet based VoIP services suffer from Internet delays caused by a lack of true Quality of Service (QOS) capabilities across the Internet. Existing VoIP services also require access to a computer and a technical knowledge to be able to make it work. Because of these problems, VoIP services are primarily targeted at the corporate market place where private IP networks that can carry VoIP services with a true guaranteed QOS exist, or can be controlled.

(14) The only available alternatives for the residential user for high speed services are DSL and cable modems. DSL and Cable based communications reach only a small segment of the population, and growth has failed to live up to initial expectations. The recent collapse of the internet boom has led to the failure of many DSL service providers and has effectively eliminated DSL as a potential service for most POTS users for the immediate future"); '156 Patent, Col. 10:61-11:22 ("Broadband Over POTS: One of the primary functions of the RCG is to be able to transfer large files such as video files

over the POTS lines to a residence. The ability to do this is limited by the maximum of 56 Kbps due to the design of the digital Class 5 office linecards and network transmission schemes based upon T carriers. Typical Class 5 linecard design samples the POTS lines at a rate of 8,000 samples per second. Typically, each sample is digitized into 12 to 16 bits by a codec device. The digitized sample is then companded to an 8 bit sample (1 byte) which makes up the PCM data stream that is transferred over the PSTN. Therefore, each POTS line is sampled at an effective rate of 64 Kbps. Since legacy T1 transmission equipment uses robbed-bit signaling, the maximum guaranteed transmission rate for the PSTN as a whole is 56 Kbps. Because of this limitation, standard POTS lines can only guarantee a maximum of 56 Kbps transfer rate under the best conditions. DSL equipment gets around this problem by installing DSL Access Multiplexing (DSLAM) equipment at the Class 5 office end of the POTS line. By routing around the linecard, as well as routing the data directly over the Internet or other private IP based networks, and therefore the 64 Kbps sampling rate, DSL is not bandwidth limited like PSTN traffic is. DSL, however, suffers from the very high costs associated with the purchase, installation, maintenance, floor lease costs, etc. DSL also suffers from very high deployment costs resulting from the labor intensive process to turn up each line. Each DSL "POTS" line must be inspected, conditioned and all load coils removed").

113. As another example, POTS lines have very limited bandwidth. ‘156 Patent, Col. 10:61-11:22 (“Broadband Over POTS: One of the primary functions of the RCG is to be able to transfer large files such as video files over the POTS lines to a residence. The ability to do this is limited by the maximum of 56 Kbps due to the design of the digital Class 5 office linecards and network transmission schemes based upon T carriers. Typical Class 5 linecard design samples the POTS lines at a rate of 8,000 samples per second. Typically, each sample is digitized into 12 to 16 bits by a codec device. The digitized

sample is then companded to an 8 bit sample (1 byte) which makes up the PCM data stream that is transferred over the PSTN. Therefore, each POTS line is sampled at an effective rate of 64 Kbps. Since legacy T1 transmission equipment uses robbed-bit signaling, the maximum guaranteed transmission rate for the PSTN as a whole is 56 Kbps. Because of this limitation, standard POTS lines can only guarantee a maximum of 56 Kbps transfer rate under the best conditions. DSL equipment gets around this problem by installing DSL Access Multiplexing (DSLAM) equipment at the Class 5 office end of the POTS line. By routing around the linecard, as well as routing the data directly over the Internet or other private IP based networks, and therefore the 64 Kbps sampling rate, DSL is not bandwidth limited like PSTN traffic is. DSL, however, suffers from the very high costs associated with the purchase, installation, maintenance, floor lease costs, etc. DSL also suffers from very high deployment costs resulting from the labor intensive process to turn up each line. Each DSL "POTS" line must be inspected, conditioned and all load coils removed”).

114. Prior art configurations and methods also suffer from poor quality of service. ‘156 Patent, Col. 2: Lines 34-37 (“Internet based VoIP services suffer from Internet delays caused by a lack of true Quality of Service (QOS) capabilities across the Internet.”).

Claims of Asserted Patents Solve Technological Problems in Prior Art

115. Low bandwidth, throughput, quality of service, and reliability are technological problems specifically arising in the realm of computers and computer networks.

116. Low bandwidth, throughput, quality of service, and reliability are challenges unique to computers and computer networks.

117. The inventions recited in the claims of the Asserted Patents improve the functionality of the computer or network platform itself by increasing bandwidth, throughput, quality of service, and reliability.

118. The specific implementations of the inventions recited in the Claims of the Asserted Patents solve these problems in the prior art that are particular to computer networking to provide new and improved configurations and operations of computer network devices for an exchange of data. See, e.g., '156 Patent, Abstract ("A key consideration to the design of the RCG is that no additional or special transmission equipment must be installed at the Central Office or anywhere else in the network to enable new calling features provided by the RCG as is the case with DSL and Cable systems. By eliminating the requirement for costly infrastructure enhancements, ubiquitous high speed communications and services can be deployed to every POTS subscriber."); Col. 3: Lines 26-51 ("The RCG provides a total telecommunications communications services package for residential and small business customers. With the RCG, a CLEC can offer its customers dialtone for up to three separate telephone numbers per residence (the limit of three telephone numbers is an arbitrary number based upon typical residential usage and is not a limit imposed by the system), all local and long distance services, 24/7 always-on Internet access, a host of custom messaging and calling features, as well as Broadband access and lifeline service. All of these services can be offered over a customer's existing POTS line, and it doesn't require any network infrastructure build out like DSL and Cable services. Because there is no expensive network equipment required, it can be readily deployed throughout the country to expand the CLECs customer base quickly. The RCG is designed to enhance, not replace, the existing telephone line, enabling it to provide new combined packetized voice and data services. Meanwhile, all existing telecommunications infrastructure and equipment will continue to work seamlessly with the RCG. Aside from simply installing the low cost RCG device in the home telephone wiring, no other equipment needs to be purchased by either the home owner or telephone companies. This eliminates the tremendously expensive infrastructure costs for communications

companies that are trying to provide voice services using DSL or cable modems.”); Col. 3: Line 52-Col. 4:Line 17 (“Up to three telephone lines i.e. numbers, over a single POTS line and/or wireless connection. Ethernet, USB and IEEE 1394 computer interfaces. Full G1, G2 and G3 FAX support. Full support for all CLASS services. Broadband networking for home computers and appliances as well as wide area networking using a combination of a plurality POTS lines connected to a plurality of RCGs and/or a direct wireless connection to a wireless access point (These interfaces allow smart devices to communicate to other devices within the home, or over the Internet through the RCG.) Automated, remote upgradability and configuration. (Requires the customer to do nothing.) Transparent user operation. (User doesn't have to know that any new technology is being employed). 100% compatible with existing public telephone system. Video Telephone capabilities. No local or long distance usage charges. No Internet access fees. Lower monthly communication costs. Multiple telephone calls at the same time. Voice messaging, follow me features, call forwarding, automatic call back, conferencing, custom call routing. Home networking capabilities, all CLASS calling features, high speed broadband networking, continuous 24/7 internet access and many others. All of these features are available even while connected to the Internet. Very low cost of entry into the market, especially as compared to broadband alternatives. New calling features that are not currently available to home users.”).

119. Two of the problems of the prior art that can be solved by the inventions recited in the Claims of the Asserted Patents is low bandwidth and data throughput because use of the inventions can increase both available bandwidth and data throughput. ‘156 Patent, Col. 10: Lines 61-64 (“Broadband Over POTS: One of the primary functions of the RCG is to be able to transfer large files such as video files over the POTS lines to a residence.”); Col. 11: Lines 22-27 (“The RCG gets around the 56 Kbps POTS limitation as well as the DSL problems by using the standard

POTS lines as they are, and not requiring any additional equipment to be installed at the Class 5 end of the POTS line. This technique simplifies deployment and drastically cuts costs.”); Col. 11: Lines 29-35 (“Referring to FIG. 7, the RCG implements broadband over POTS by employing an 802.11b/g wireless interface to configure a multilink PPP bundle-87 (per RFC 1990) comprised of the POTS lines connected to up to 32 RCGs. The limitation of 32 RCGs in a multilink PPP bundle is an arbitrary number and can be scaled up or down as required to support changes in network equipment capabilities.”); Col. 11: Lines 50-59 (“An RCG that is transferring a very large file can request the services of 31 (in this embodiment) other RCGs to assist in the file transfer using their respective POTS lines. A single RCG can therefore gain the combined bandwidth of up to 32 POTS lines transferring data at as much as 56 Kbps each to transfer information. This is roughly equivalent to a transfer rate of 1.79 Mbps in the inbound direction (towards the RCG) and approximately 1.075 Mbps in the outbound direction (towards the PSTN).”).

120. The inventions recited in the claims of the Asserted Patents can also solve the problems in the prior art of poor quality of service and reliability. ‘156 Patent, Col. 11: Line 60-Col. 12: Line 3 (“The multilink PPP connection-87 is initiated by an RCG when it determines that the file (or streaming service) that it is to download (receive) is of sufficient size or requires a minimum amount of bandwidth to justify the use of a multilink PPP connection. This determination can be made on many different criteria such as the file size, type of data being transmitted, the type of compression if any, a Quality-of-Service requirement or any other pertinent information. (Since a certain amount of overhead is required to set up a Multilink PPP connection, it doesn't make sense to use it for small or low data rate transfers.)”); Col. 13: Lines 35-37 (“Also, for services that require a minimum Quality of Service (QOS) such as streaming video, the initiating RCG85 needs to control the multilink bundle 87 bandwidth, and it can not do that if

remote RCG 86 drops out of the multilink bundle 87 at will.”); Col. 13: Line 52-Col. 14: Line 1 (“[o]nce a remote RCG-86 has been removed from participating in a multilink bundle-87, the initiating RCG-85 will then look up another remote RCG in its router tables that can be used to participate 55 in the multilink PPP bundle-87, and request that the new remote RCG-86 to join the existing multilink bundle-87. This is necessary to maintain a minimum Quality of Service. Since RCGs prioritize their bandwidth requirements based upon their own "local" service requirements, their participation in any multilink PPP service is available only to bandwidth that is not required for its own current local demands. Therefore, a remote RCG's-86 bandwidth that is available for multilink services can change at any time. The dynamic reassignment of remote RCGs that participate in a multilink bundle is also required to prevent a remote RCG-86 from receiving packets so slowly that the originating RCG-85 interprets this delay as lost packets”).

Claims Solve Prior Art Problems in a Manner that is Different from Prior Art

121. The inventions recited in the claims of the Asserted Patents solve the problems of the prior art configurations and methods in a way that is different from the conventional configurations and methods.

122. For example, a connection is established for a data transfer session using at least two links between two devices, where each link is associated with the same session identification for assisting in the data transfer, and at least one of the links connects the two devices through a remote communications device having additional bandwidth capable of being used to assist with the data transfer. During this connection process, the session identification is sent to one or more remote communications devices so that it can participate in the data transfer session and share its additional bandwidth. This is distinct and different from the prior art configurations and methods described above.

123. The specification of the Asserted Patents describes the inventions recited in the claims of the Asserted Patents in detail and how those inventions can be used to increase bandwidth, data throughput, quality of service, and/or connection reliability and avoid increased costs in a manner that is different from the prior art.

124. The specification describes an embodiment as follows.

125. As shown in the annotated Diagram 1 below, a request is sent from a computer network device (e.g., phone, laptop, server, etc.) over a first link to another computer network device, such as, for example, a remote server computer, for participation in a multilink session.

126. For example, the specifications state: “Referring to FIG. 7, an RCG-85 that decides to initiate a 10 15 20 25 30 35 40 multilink PPP session with a remote computer i.e. internet URL, requests a multilink PPP session with that URL resource via Link Control Protocol (LCP) session management.” ‘156 Patent, Col. 12: Lines 5-9.

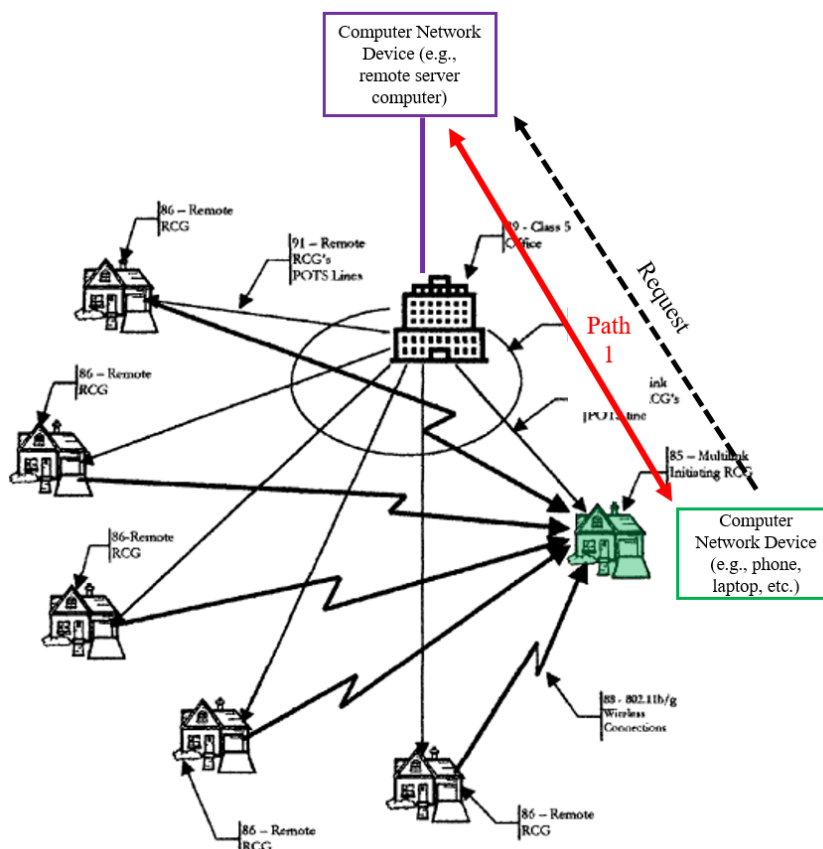


Diagram 1

127. As shown in the annotated Diagram 2 below, the two devices negotiate the pertinent multilink parameters such as compression, packet size, sync/async, link quality monitoring, bit stuffing etc.

128. For example, the specifications state: "The initiating RCG-85 and the remote server computer (not shown) will negotiate the pertinent multilink parameters such as compression, packet size, sync/async, link quality monitoring, bit stuffing etc." '156 Patent, Col. 12: Lines 9-12.

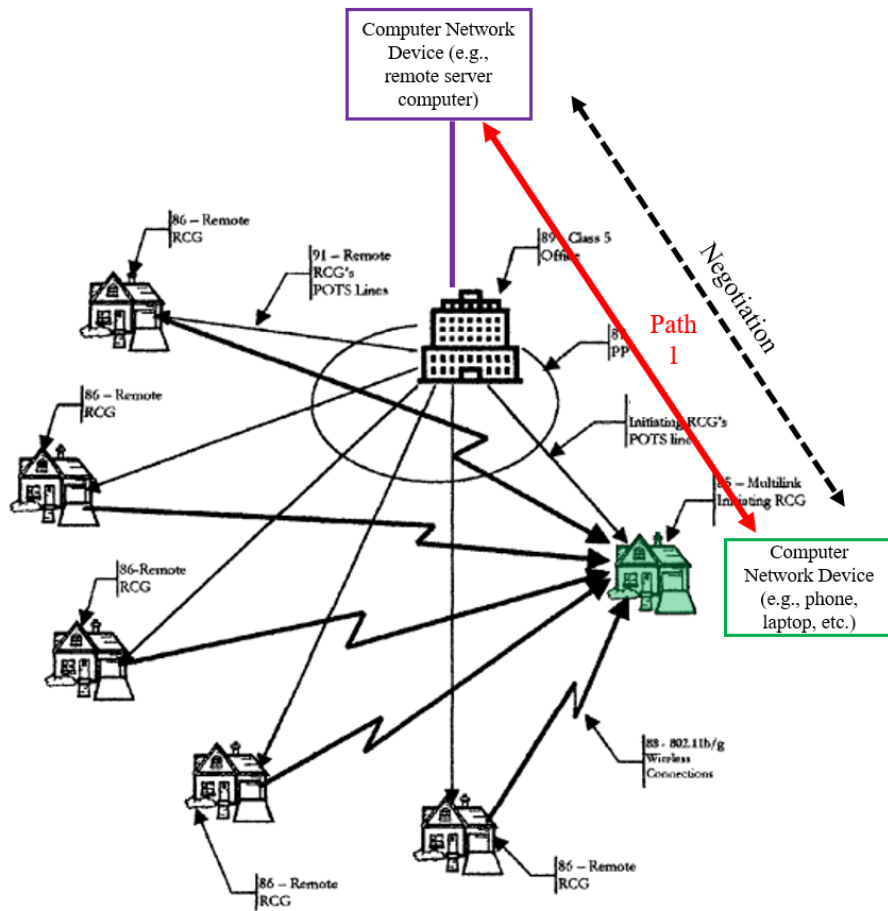


Diagram 2

129. As shown in the annotated Diagram 3 below, the multilink session setup is completed including that the remote server computer sends a multilink session ID to the computer network device (e.g., phone, laptop, etc.), which is used to identify this particular multilink session and is also used for adding or removing links from the multilink session.

130. For example, the specifications state: "As part of a successful multilink PPP session setup, the initiating RCG-85 receives a multilink PPP session ID, or "magic number", which is used to identify this particular multilink PPP session and is also used for adding or removing links from the multilink bundle-87." '156 Patent, Col. 12: Lines 12-16.

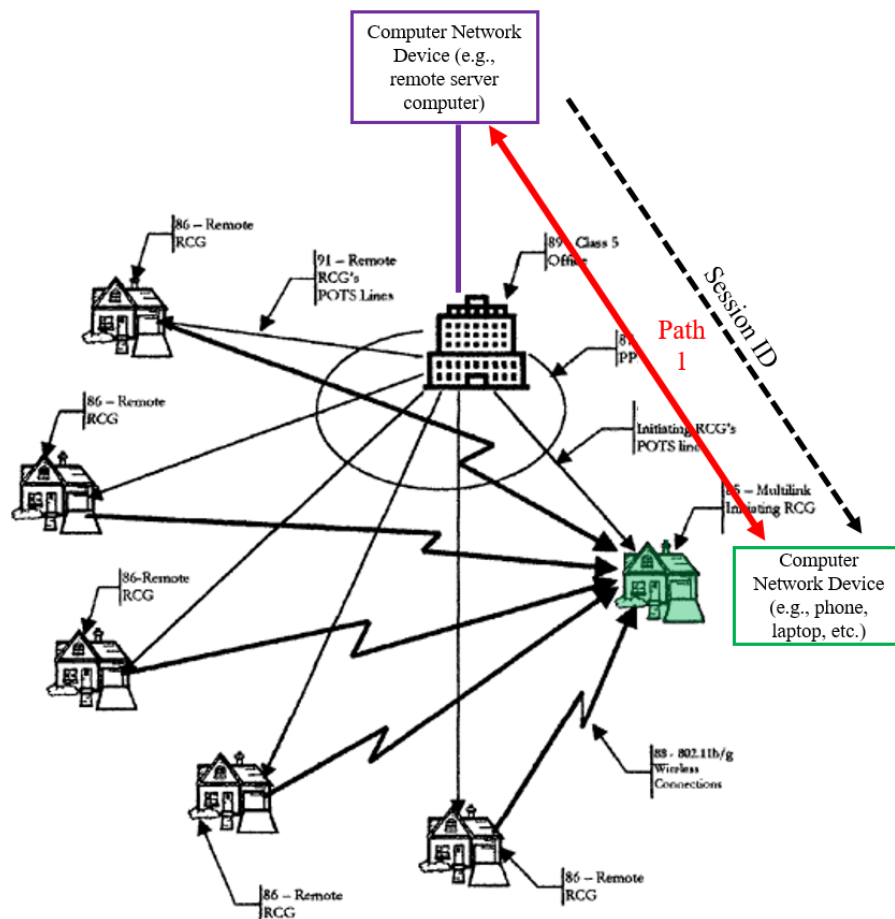


Diagram 3

131. As shown in the annotated Diagram 4 below, the computer network device (e.g., phone, laptop, server etc.) sends a multilink request to one or more remote communications devices, such as, for example a router or base station, to participate in the multilink session.

132. For example, the specifications state: “The initiating RCG-85 then looks up the addresses of up to 31 (in this embodiment) other RCGs in its router tables to use for the multilink PPP transfer. (If a Neighborhood Access Point is available the RCG could request service through it instead of setting up a Multilink PPP connection-see FIG. 8.) The initiating RCG-85 determines the number of remote RCGs-86 that it wants to use to get the desired bandwidth for the transfer

and sends multilink PPP service requests via the 802.11b/g wireless connections-88 to the selected remote RCGs-86.” ‘156 Patent, Col. 12: Lines 19-28.

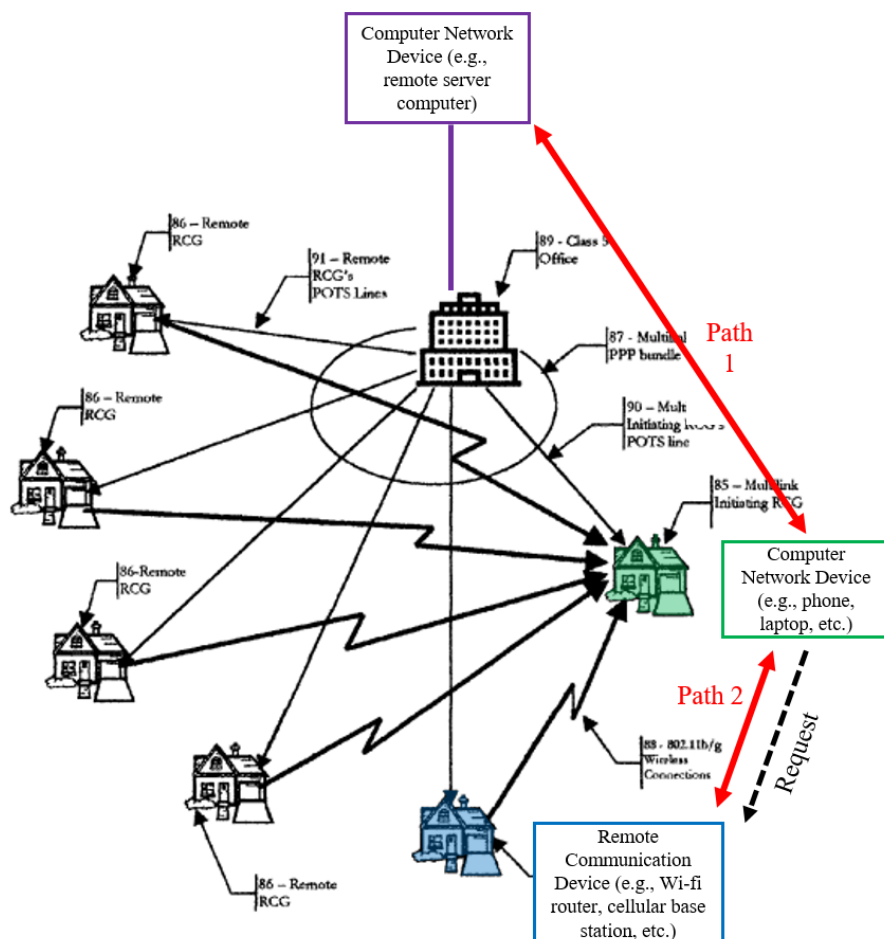


Diagram 4

133. As shown in the annotated Diagram 5 below, the remote communications devices respond back to the computer network device (e.g., phone, laptop, etc.) with acceptance or denial.

134. For example, the specifications state: “The selected remote RCGs-86 respond back to the initiating RCG with either an acceptance or denial of multilink PPP service request. This decision is made based upon the remote RCG's currently available POTS bandwidth and the current local demands for that bandwidth. The remote RCG-86 makes a decision to participate in a multilink PPP service for an initiating RCG if its POTS line-91 has a current average bandwidth

utilization of less than some arbitrary limit such as 8 Kbps to 16 Kbps. This 8 Kbps to 16 Kbps bandwidth utilization represents about two concurrent voice conversations using standard voice compression techniques, or some small amount of data transmission occurring on the remote RCG's POTS interface-91 or a combination thereof. Assuming that the remote RCG-86 has a modem connection speed somewhere between 33 Kbps to 56 Kbps, this would leave approximately 17 Kbps to 40 Kbps of POTS bandwidth that the remote RCG-86 could offer to the initiating RCG-85 for use in its multilink PPP bundle-87. Of course, if there is no activity on the remote RCG-86 POTS line, then the entire bandwidth will be used for the multilink transfer. If the remote RCG-86 accepts the multilink PPP service request from the initiating RCG-85 it also sends its currently available bandwidth on its POTS line-91 that the initiating RCG-85 will have available to it for the multilink PPP transfers.” ‘156 Patent, Col. 12: Lines 28-52.

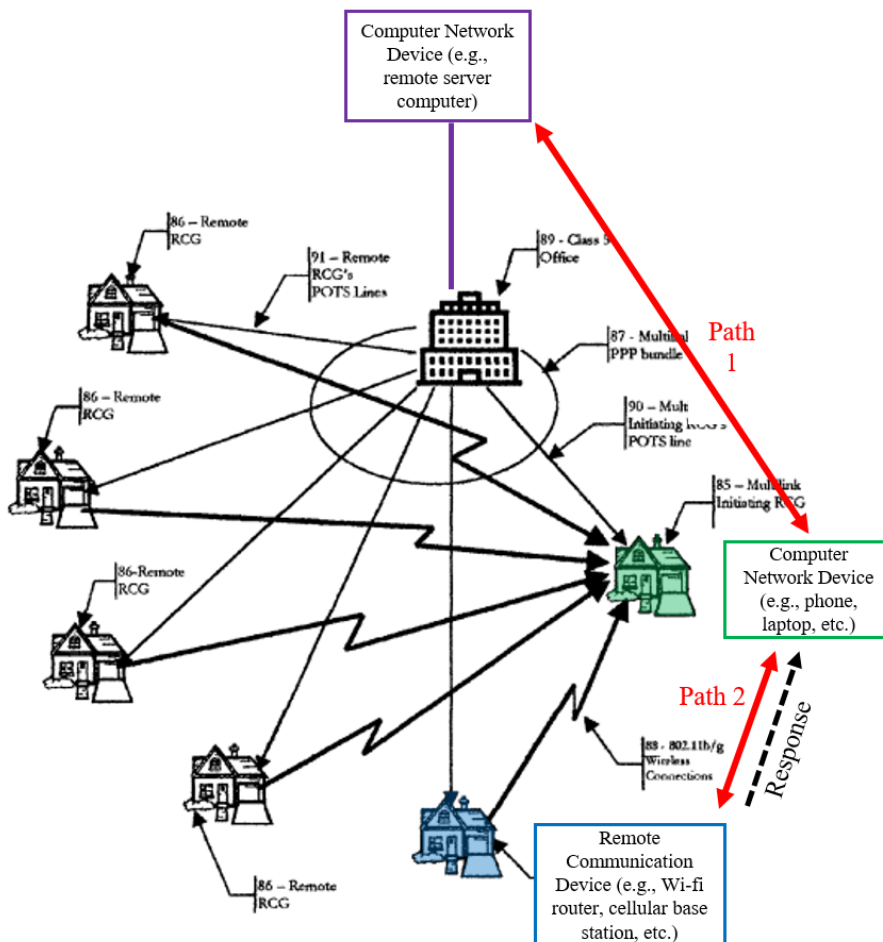


Diagram 5

135. As shown in the annotated Diagram 6 below, the computer network device (e.g., phone, laptop, server, etc.) sends a multilink initialization packet containing the address of the destination as well as the multilink session ID (magic number) and any other pertinent information required for the remote communications device to join in the existing multilink session.

136. For example, the specifications state: "The initiating RCG then selects which of the responding remote RCGs-86 it will use for the multilink PPP bundle-87 and sends them a multilink initialization packet 55 containing the URL of the destination as well as the multilink PPP session ID (magic number) and any other pertinent information required for the remote RCG to join in the

existing multilink PPP bundle-87. Each remote RCG POTS interface-91 participating in a multilink PPP bundle, represents a logical "link" in the initiating RCG's multilink PPP bundle-87."

'156 Patent, Col. 12: Lines 52-60.

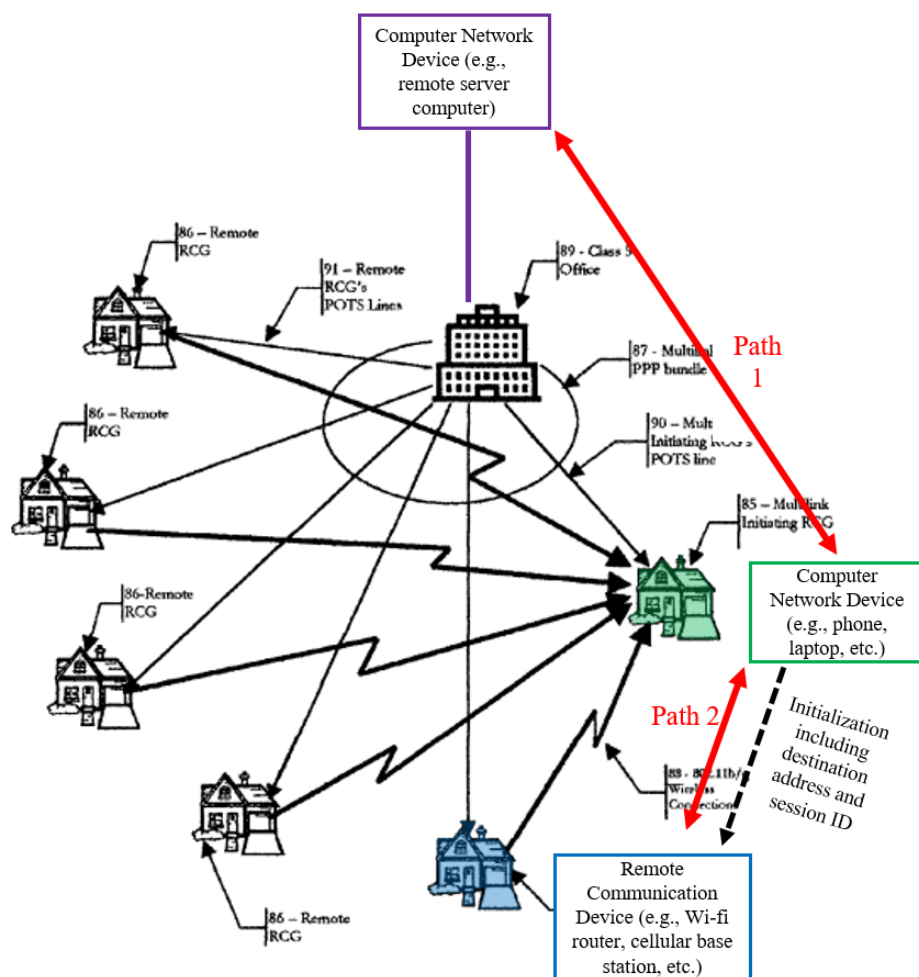


Diagram 6

137. As shown in the annotated Diagram 7 below, each of the participating remote communications devices sends a multilink packet to the remote server computer with the multilink session ID and requests to be added to the multilink session.

138. For example, the specifications state: “The remote RCGs-86 then send a multilink PPP packet (over their respective POTS lines-91) to the destination URL with the multilink PPP session ID and request to be added to that multilink PPP bundle-87.” ‘156 Patent, Col. 12: Lines 61-64.

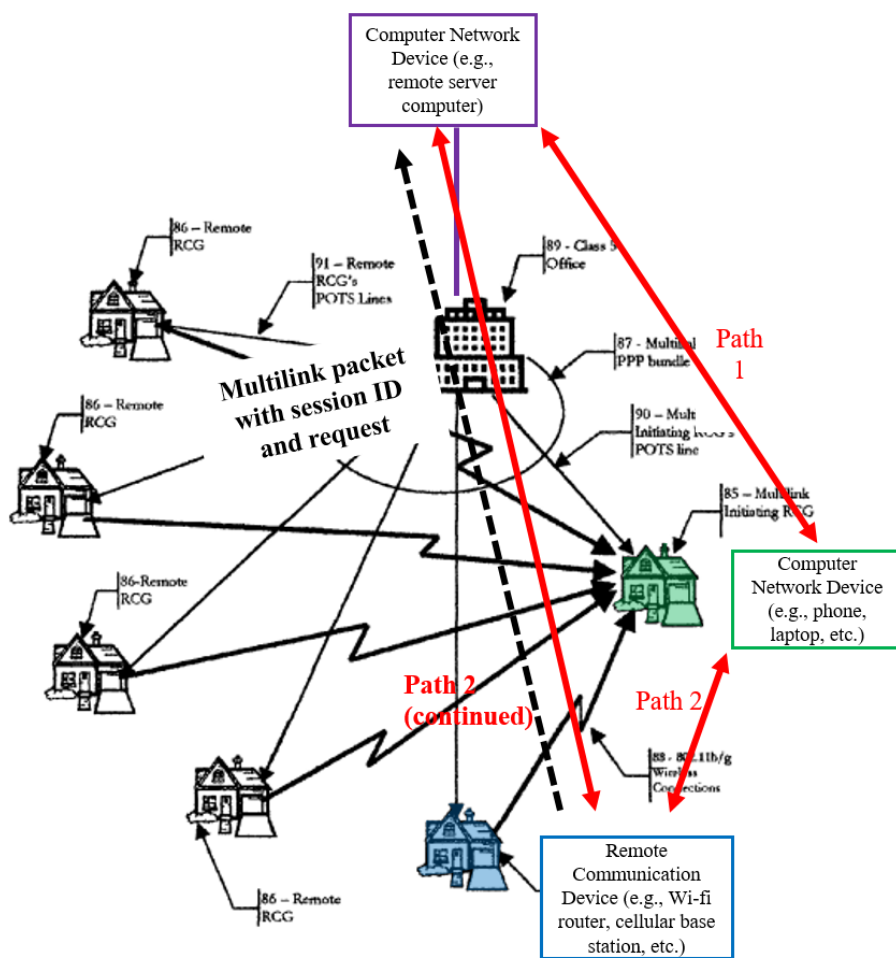


Diagram 7

139. As shown in the annotated Diagram 8 below, the remote server computer accepts the request and begins sending data packets to each of the remote communications devices over their respective paths or links.

140. For example, the specifications state: “The destination URL accepts the request of each of the remote RCGs-86 and begins sending data packets to each over their respective POTS lines-91.” ‘156 Patent, Col. 12: Lines 64-66.

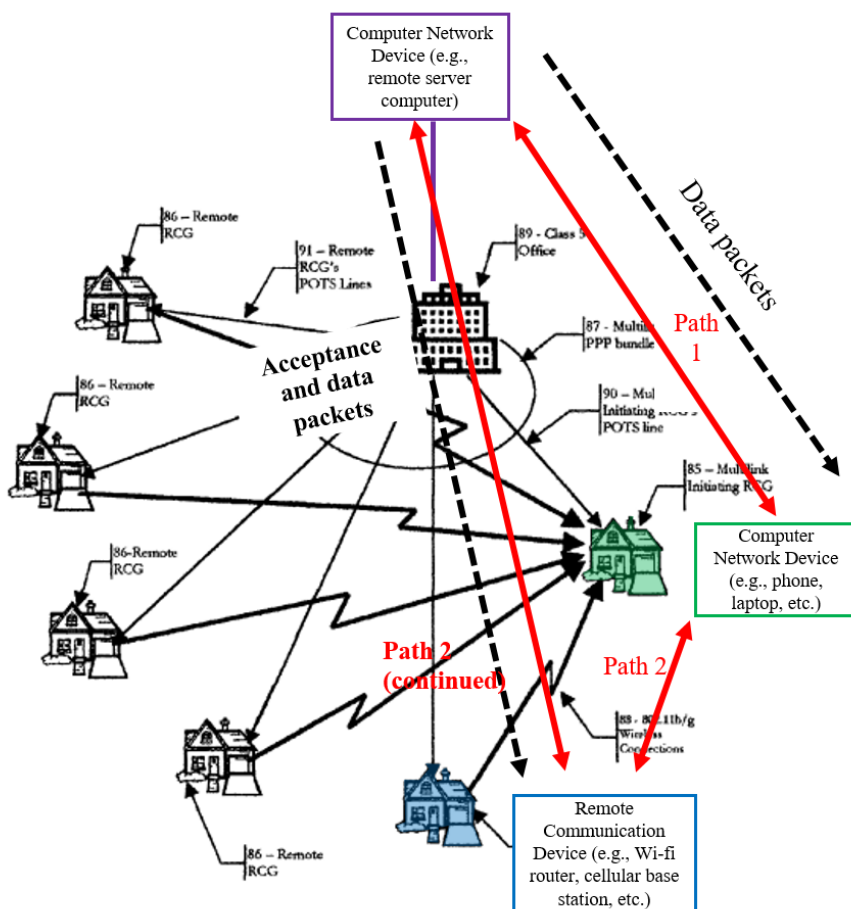


Diagram 8

141. As shown in the annotated Diagram 9 below, the remote communications devices relay the data packets to the computer network device (e.g., phone, laptop, etc.).

142. For example, the specifications state: “When the remote RCGs-86 receive data packets sent over their respective POTS lines-91, that are destined for the multilink PPP bundle-87, they simply relay the data packets over their 802.11b/g interface-88 to the initiating RCG-85.” ‘156 Patent, Col. 12: Line 67-Col. 13: Line 3.

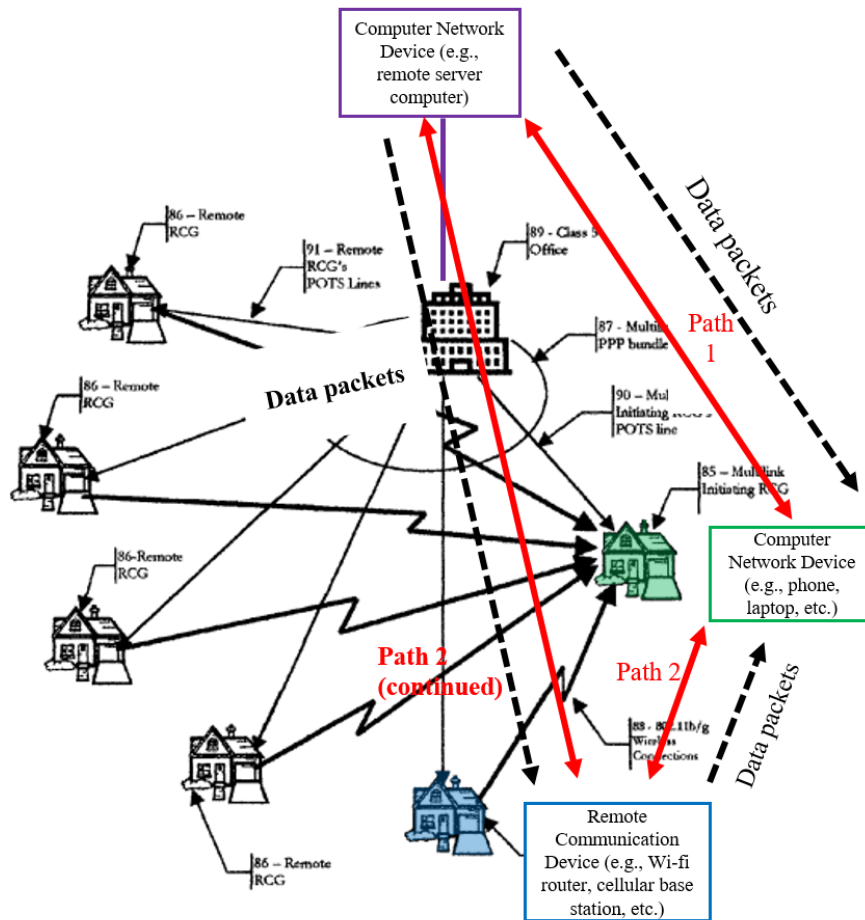


Diagram 9

143. The increase in bandwidth, data throughput, quality of service, and/or connection reliability is the result of the use of the additional links. See, e.g., ‘156 Patent, Col. 11: Lines 50-59 (“An RCG that is transferring a very large file can request the services of 31 (in this embodiment) other RCGs to assist in the file transfer using their respective POTS lines. A single RCG can therefore gain the combined bandwidth of up to 32 POTS lines transferring data at as much as 56 Kbps each to transfer information. This is roughly equivalent to a transfer rate of 1.79 Mbps in the inbound direction (towards the RCG) and approximately 1.075 Mbps in the outbound direction (towards the PSTN).”).

144. The computer network device (e.g., phone, laptop, server, etc.) can also continuously monitor the bandwidth of the links, remove and add links, and dynamically reassign links that are part of the multilink session. Links can be added and removed during the data transfer without starting the data transfer all over again. This also results in improved bandwidth, data throughput, quality of service, and/or connection reliability.

145. The specification states as follows: “The initiating RCG-85 of the multilink PPP bundle-87 continually monitors the bandwidth of each remote RCG's-86 multilink link which together comprise its multilink bundle-87. When the available bandwidth for the multilink PPP link of an individual remote RCG-86 falls below an arbitrary minimum set by the initiating RCG-85, the initiating RCG-85 instructs the offending remote RCG, via its 802.11b/g wireless interface-88, to remove itself from the multilink bundle. The remote RCG-86 will then notify the remote computer (URL) to be removed as a link in the current multilink bundle on which it is participating. Alternatively, a remote RCG-86 can inform the initiating RCG-85 of local demands on its POTS bandwidth, and request that the initiating RCG-85 remove it (the remote RCG-86) from the participation in the initiating RCG's multilink bundle-87. The remote RCG-86 will not unilaterally remove itself from participation in a multilink bundle without prior notification to the Initiating RCG-85. The remote RCG-86 must get authorization from the initiating RCG-85 to remove itself from the bundle, since the initiating RCG-85 will have no way of knowing if the loss of data from that remote RCG is due to some sort of failure or from the remote RCG simply removing itself from participation in the multilink bundle-87. Also, for services that require a minimum Quality of Service (QOS) such as streaming video, the initiating RCG-85 needs to control the multilink bundle-87 bandwidth, and it can not do that if remote RCGs-86 drop out of the multilink bundle-87 at will. When a remote RCG-86 requests to be removed from participation in a multilink bundle-

87, the initiating RCG-85 must immediately grant the request. If the initiating RCG-85 were to not grant the request, then the remote RCG-86 could, in worst case, delay or drop incoming multilink packets destined for the initiating RCG-85. If this were to happen, the initiating RCG-85 will have missing packets and could over run its reassembly buffer (if reassembly is being performed by the RCG) causing catastrophic data loss and potentially have to restart the entire transmission. In the least case, the initiating RCG-85 would have to initiate retransmission of potentially many packets which it assumes to be lost, but may simply be delayed by the remote RCG-86. Once a remote RCG-86 has been removed from participating in a multilink bundle-87, the initiating RCG-85 will then look up another remote RCG in its router tables that can be used to participate in the multilink PPP bundle-87, and request that the new remote RCG-86 to join the existing multilink bundle-87. This is necessary to maintain a minimum Quality of Service. Since RCGs prioritize their bandwidth requirements based upon their own "local" service requirements, their participation in any multilink PPP service is available only to bandwidth that is not required for its own current local demands. Therefore, a remote RCG's-86 bandwidth that is available for multilink services can change at any time. The dynamic reassignment of remote RCGs that participate in a multilink bundle is also required to prevent a remote RCG-86 from receiving packets so slowly that the originating RCG-85 interprets this delay as lost packets.” ‘156 Patent, Col. 13: Line 13-Col. 14: Line 1.

146. In order to remove and add links, the computer network device (e.g., phone, laptop, server, etc.) may use a routing table to store information about the links. ‘156 Patent, Col. 15: Lines 5-50 (“RCG Router Tables: The RCG continually monitors its 802.11b/g wireless interface for transmissions from other RCGs or 802.11a Access Points as well as other 802.11b/g wireless devices within the residence. The

RCG provides a means to identify and store the addresses of other RCGs and Neighborhood Access Points within its local area. The RCG creates routing tables, much like an IP router device, so that it knows which RCGs are local to itself, and how many hops will be needed to reach the maximum of 32 POTS lines or a Neighborhood Access Point. The RCG can then determine how to route its data transfers to gain the most efficient routing and network efficiencies. The router tables in each RCG are continually updated by monitoring the 802.11 frames received from other RCGs or Network Access Points. The number of entries in the router tables can be limited to an arbitrary number of other RCGs but contains room for at least 32 entries. For each RCG listed in the router tables, certain information is kept such as signal strength, if the other device is another RCG or some other 802.11 compatible device, if the other RCG is reachable directly, or if it is accessed via another RCGs by hopping. In the case where RCG hopping is used, the address of each RCG that is hopped is stored in the routing table. When an RCG is first powered up, it monitors its 802.11 interface for a period of time to identify other RCGs or Neighborhood Access Point devices, or other Wi-Fi devices within its transmission area. When first deployed, the RCG will not have any entries in its routing tables. This condition can persist for some time, until another RCG or other 802.11 device is deployed within the former RCG's transmission range. In this state, the RCG can be used for wireless networking within the residence, connecting the local computer to the RCGs always on Internet connection as well as to other wireless devices within the home. When an 802.11 frame is received by an RCG that contains the address of an RCG whose address does not exist in the receiving RCG's router table (as is the case when a new RCG is first installed), the receiving RCG polls the transmitting RCG for its router table information. The received router information is reviewed for other RCG's or other 802.11 compatible devices that are not listed in its own router tables. A decision is made to use some, all,

or none of the new route information in its router tables. There is no real limitation on the number of RCGs that can be "hopped" in order to build a complete router table or to reach many more RCGs, Neighborhood Access Points or Metro Access Points.”).

Claims Are Limited to a Particular Configuration and/or Operation that is Different from Prior Art

147. Considered as a whole, each of the claims of the Asserted Patents is limited to a particular configuration and/or operation of computer network devices involved in an exchange of data designed to enable technological improvements such as increasing bandwidth, data throughput, quality of service, and/or connection reliability. The claimed configurations and operations of computer network devices are inventive, are different from the prior art, and improve upon the prior art.

148. Claim 1 of the ‘156 Patent recites the following: “A method for aggregating, sharing and dynamically routing and allocating bandwidth from a plurality of wired and wireless networks that are geographically disbursed over a wide area, and providing some or all of the aggregated bandwidth to any user on an on-demand basis, the method comprising the steps of: developing and updating a network table that comprises a list of nearby RCGs, their bandwidth capabilities over local, remote and wireless connections, and their location with respect to a requesting RCG; determining an optimum amount of bandwidth needed for an immediate data transfer needs of the requesting RCG; determining which of the nearby RCGs should be contacted for access to unused bandwidth to support a transfer of the requesting RCG, based upon their unused local bandwidth capacity, and a distance and a number of hops between the RCGs and the requesting RCG; sending a request to the supporting RCGs asking for use of a portion of the unused bandwidth; receiving responses from the supporting RCGs with information about how much bandwidth each selected RCG can share; selecting which of the supporting RCGs to use for

optimal use of needed bandwidth; contacting the selected RCGs with control information for sending data to the requesting RCG; sending packets of the data from the selected RCGs to the requesting RCG; reassembling the packets of the data at the requesting RCG; and relinquishing the bandwidth of each of the selected RCGs.”

149. No prior art references describe at least the following operations of computer networks: “developing and updating a network table that comprises a list of nearby RCGs, their bandwidth capabilities over local, remote and wireless connections, and their location with respect to a requesting RCG; determining an optimum amount of bandwidth needed for an immediate data transfer needs of the requesting RCG; determining which of the nearby RCGs should be contacted for access to unused bandwidth to support a transfer of the requesting RCG, based upon their unused local bandwidth capacity, and a distance and a number of hops between the RCGs and the requesting RCG”; “determining which of the nearby RCGs should be contacted for access to unused bandwidth to support a transfer of the requesting RCG, based upon their unused local bandwidth capacity, and a distance and a number of hops between the RCGs and the requesting RCG”; “selecting which of the supporting RCGs to use for optimal use of needed bandwidth”; “contacting the selected RCGs with control information for sending data to the requesting RCG; sending packets of the data from the selected RCGs to the requesting RCG; reassembling the packets of the data at the requesting RCG; and relinquishing the bandwidth of each of the selected RCGs.”

150. Claim 4 of the ‘156 Patent recites the following: “The method of claim 1, further comprising the steps of: dynamically reallocating shared bandwidth of the supporting RCGs during multi-link data transfers as supporting RCGs opt out of bandwidth sharing due to local bandwidth demands; and enlisting additional supporting RCGs to provide additional bandwidth.”

151. No prior art references describe computer networks “dynamically reallocating shared bandwidth of the supporting RCGs during multi-link data transfers as supporting RCGs opt out of bandwidth sharing due to local bandwidth demands; and enlisting additional supporting RCGs to provide additional bandwidth.”

152. Claim 1 of the ‘801 Patent recites the following: “A communications device that is capable of providing broadband communications services, comprising: at least one connection for connecting to a communications network; at least one wireless interface for connecting wirelessly to at least one remote communications device; and a processor that requests the at least one remote communications device to assist in transferring data, sends a request to the at least one remote communications device for requesting use of a portion of unused bandwidth of the at least one remote communications device, receives a response from the at least one remote communications device, the response containing information about the portion of unused bandwidth, selects the at least one remote communications device with unused bandwidth, sends control information to the at least one remote communications device for participating in a multilink connection, receives packets from the at least one remote communications device and aggregates the data from the at least one remote communications device with data transfers from the at least one connection to increase data bandwidth for the communications device.”

153. No prior art references describe computer networks as performing at least the following: sending control information to the at least one remote communications device for participating in a multilink connection, receiving packets from the at least one remote communications device and aggregating the data from the at least one remote communications device with data transfers from the at least one connection to increase data bandwidth for the communications device.

154. Claim 5 of the '801 Patent recites the following: "The communications device of claim 1, wherein the processor creates and updates routing tables with the at least one remote communications device."

155. Claim 6 of the '801 Patent recites the following: "The communications device of claim 5, wherein the processor uses the routing tables to determine routing efficiencies based on at least one of quality of service, total connection speed of the at least one remote communication device, a number of data hops, available unused bandwidth of the at least one remote communication device, wireless transfer speeds and signal strength between the at least one remote communication device and the communication device."

156. No prior art references describe computer networks using routing tables to determine routing efficiencies based on at least one of quality of service, total connection speed of the at least one remote communication device, a number of data hops, available unused bandwidth of the at least one remote communication device, wireless transfer speeds and signal strength between the at least one remote communication device and the communication device.

157. Claim 1 of the '349 Patent recites as follows: "A method for increasing bandwidth and data throughput comprising the steps of: sending a multilink request from a first device to a second device to join a multilink connection, the first device being connected at a first location to a network, the second device being connected at a second location to the network, the second location being geographically separate from the first location, the first device and the second device being configured for accessing the network; and when the multilink request is accepted by the second device, receiving at the first device first data from the network at the first location and during the multilink connection, concurrently receiving second data over a wireless connection from the second device, the second data being received at the second location from the network."

158. No prior art references describe computer networks as performing at least the following: sending a multilink request from a first device to a second device to join a multilink connection, the first device being connected at a first location to a network, the second device being connected at a second location to the network, the second location being geographically separate from the first location, the first device and the second device being configured for accessing the network; and when the multilink request is accepted by the second device, receiving at the first device first data from the network at the first location and during the multilink connection, concurrently receiving second data over a wireless connection from the second device, the second data being received at the second location from the network.

159. Claim 6 of the '349 Patent recites as follows: "The method of claim 1, further comprising the steps of: sending another multilink request from the first device to a third device, the third device being connected at a third location to the network, the third location being geographically different than the first location and the second location; and when the another multilink request is accepted by the third device, concurrently receiving third data during the multilink connection over a second wireless connection between the first device and the third device."

160. No prior art references describe computer networks as performing at least the following: sending another multilink request from the first device to a third device, the third device being connected at a third location to the network, the third location being geographically different than the first location and the second location; and when the another multilink request is accepted by the third device, concurrently receiving third data during the multilink connection over a second wireless connection between the first device and the third device.

161. Claim 7 of the '649 Patent recites the following: "A method for establishing and sending data during a multipath connection, comprising: the data-source device receiving multipath connection requests from a plurality of data-requesting devices, each of the multipath connection requests involving a particular multipath connection to a data-requesting device; the data-source device associating a connection ID to each multipath connection request; the data-source device using multipath information about each of a plurality of network-edge devices that is capable of joining in a particular multipath connection to a particular data-requesting device, the particular multipath connection having a particular connection ID; the data-source device notifying each of the network-edge devices that is participating in the particular multipath connection associated with the particular connection ID; and the data-source device sending data associated with the particular connection ID to the network-edge devices participating in the particular multipath connection associated with the particular connection ID."

162. No prior art references describe computer networks as performing at least the following: the data-source device receiving multipath connection requests from a plurality of data-requesting devices, each of the multipath connection requests involving a particular multipath connection to a data-requesting device; the data-source device associating a connection ID to each multipath connection request; the data-source device using multipath information about each of a plurality of network-edge devices that is capable of joining in a particular multipath connection to a particular data-requesting device, the particular multipath connection having a particular connection ID; the data-source device notifying each of the network-edge devices that is participating in the particular multipath connection associated with the particular connection ID; and the data-source device sending data associated with the particular connection ID to the

network-edge devices participating in the particular multipath connection associated with the particular connection ID.

163. Claim 9 of the '649 Patent recites the following: "The method of claim 7, further comprising: the data-source device receiving identification of the network-edge devices to be removed from the particular multipath connection; and the data-source device removing the identified network-edge devices from the particular multipath connection."

164. No prior art references describe computer networks as performing the following: the data-source device receiving identification of the network-edge devices to be removed from the particular multipath connection; and the data-source device removing the identified network-edge devices from the particular multipath connection.

165. Claim 17 of the '908 Patent recites as follows: "A client device for multilink communication, the client device comprising: a first network interface having a first data transfer rate associated therewith; a second network interface having a second data transfer rate associated therewith; and at least one processor and configured to: transmit a first message through the first network interface to at least one server, wherein the first message includes a multilink request and a destination URL; transmit a second message through the second network interface to the at least one server, wherein the second message includes a multilink session identification that is unique to the multilink session and the destination URL; and receive concurrently the different data packets from the server through the first network interface and the second network interface of the client device during the multilink session, wherein the first data transfer rate and the second data transfer rate provide an increase in the data transfer rate of the client device"

166. No prior art references describe computer networks as performing at least the following: transmitting a first message through the first network interface to at least one server,

wherein the first message includes a multilink request and a destination URL; transmitting a second message through the second network interface to the at least one server, wherein the second message includes a multilink session identification that is unique to the multilink session and the destination URL; and receiving concurrently the different data packets from the server through the first network interface and the second network interface of the client device during the multilink session, wherein the first data transfer rate and the second data transfer rate provide an increase in the data transfer rate of the client device.

167. Claim 1 of the '641 Patent recites the following: "A communications device that is capable of providing broadband communications services, comprising: at least one connection for connecting to a communications network; at least one wireless interface for connecting wirelessly to at least one remote communications device; and a processor that requests the at least one remote communications device to assist in transferring data, sends a request to the at least one remote communications device for availability for participating in a multilink communication, if available, sends control information through the at least one remote communications device for participating in a multilink connection, receives packets from the at least one remote communications device, and aggregates the data from the at least one remote communications device with data transfers from the at least one connection to increase data bandwidth for the communications device."

168. No prior art references describe computer networks as performing at least the following: sending a request to the at least one remote communications device for availability for participating in a multilink communication, if available, sending control information through the at least one remote communications device for participating in a multilink connection, receiving packets from the at least one remote communications device, and aggregating the data from the at

least one remote communications device with data transfers from the at least one connection to increase data bandwidth for the communications device.

169. Claim 1 of the '343 Patent recites the following: "A computer-implemented method for a first device to communicate via a wide area network, comprising the steps of: connecting the first device to a first network having a first bandwidth via a second device; connecting the first device to a second network having a second bandwidth via a third device; establishing a connection through which data may be transferred between the first device and a fourth device by concurrently using a first portion of the first bandwidth and a second portion of the second bandwidth, the connection having an effective bandwidth including the first portion of the first bandwidth and the second portion of the second bandwidth; and receiving by the first device a data set from the fourth device via the connection, wherein a portion of the data set is received through the first network and a portion of the data is received through the second network."

170. No prior art references describe computer networks as performing connecting the first device to a second network having a second bandwidth via a third device; establishing a connection through which data may be transferred between the first device and a fourth device by concurrently using a first portion of the first bandwidth and a second portion of the second bandwidth, the connection having an effective bandwidth including the first portion of the first bandwidth and the second portion of the second bandwidth; and receiving by the first device a data set from the fourth device via the connection, wherein a portion of the data set is received through the first network and a portion of the data is received through the second network.

171. Claim 11 of the '343 Patent recites the following: "The computer-implemented method of claim 1, further comprising the step of assigning a session identifier to the connection."

172. No prior art references describe computer networks as performing assigning a session identifier to the connection.

173. The claims of the Asserted Patents require a specific technological means or combination of steps, that in turn provides a technological improvement to computer networking, including at least the following limitations and inventive concepts in the claims: “developing and updating a network table that comprises a list of nearby RCGs, their bandwidth capabilities over local, remote and wireless connections, and their location with respect to a requesting RCG; determining an optimum amount of bandwidth needed for an immediate data transfer needs of the requesting RCG; determining which of the nearby RCGs should be contacted for access to unused bandwidth to support a transfer of the requesting RCG, based upon their unused local bandwidth capacity, and a distance and a number of hops between the RCGs and the requesting RCG”; “determining which of the nearby RCGs should be contacted for access to unused bandwidth to support a transfer of the requesting RCG, based upon their unused local bandwidth capacity, and a distance and a number of hops between the RCGs and the requesting RCG”; “selecting which of the supporting RCGs to use for optimal use of needed bandwidth”; “contacting the selected RCGs with control information for sending data to the requesting RCG”; “sends control information to the at least one remote communications device for participating in a multilink connection”; “sending a multilink request from a first device to a second device to join a multilink connection, the first device being connected at a first location to a network, the second device being connected at a second location to the network, the second location being geographically separate from the first location . . . when the multilink request is accepted by the second device”; “the data-source device associating a connection ID to each multipath connection request; the data-source device using multipath information about each of a plurality of network-edge devices that is capable of

joining in a particular multipath connection to a particular data-requesting device, the particular multipath connection having a particular connection ID; the data-source device notifying each of the network-edge devices that is participating in the particular multipath connection associated with the particular connection ID; and the data-source device sending data associated with the particular connection ID to the network-edge devices participating in the particular multipath connection associated with the particular connection ID”; “transmit a first message through the first network interface to at least one server, wherein the first message includes a multilink request and a destination URL; transmit a second message through the second network interface to the at least one server, wherein the second message includes a multilink session identification that is unique to the multilink session and the destination URL”; “sends a request to the at least one remote communications device for availability for participating in a multilink communication, if available, sends control information through the at least one remote communications device for participating in a multilink connection”; “establishing a connection through which data may be transferred between the first device and a fourth device by concurrently using a first portion of the first bandwidth and a second portion of the second bandwidth, the connection having an effective bandwidth including the first portion of the first bandwidth and the second portion of the second bandwidth”; “assigning a session identifier to the connection”; “dynamically reallocating shared bandwidth of the supporting RCGs during multi-link data transfers as supporting RCGs opt out of bandwidth sharing due to local bandwidth demands; and enlisting additional supporting RCGs to provide additional bandwidth”; “processor creates and updates routing tables with the at least one remote communications device”; “the processor uses the routing tables to determine routing efficiencies based on at least one of quality of service, total connection speed of the at least one remote communication device, a number of data hops, available unused bandwidth of the at least

one remote communication device, wireless transfer speeds and signal strength between the at least one remote communication device and the communication device”; “the data-source device receiving identification of the network-edge devices to be removed from the particular multipath connection; and the data-source device removing the identified network-edge devices from the particular multipath connection”;” sending another multilink request from the first device to a third device, the third device being connected at a third location to the network, the third location being geographically different than the first location and the second location; and when the another multilink request is accepted by the third device, concurrently receiving third data during the multilink connection over a second wireless connection between the first device and the third device.” These limitations were not well-understood, routine, or conventional configurations and operations of computer network devices prior to the priority date of the Asserted Patents, but instead recite a specific technique for improving computer network functioning. These limitations provide novel configurations and novel protocols to enable the novel configurations.

174. The use in the claims of the Asserted Patents of the steps and/or configurations listed in the above Paragraph 210 is different from and improves upon the prior art.

175. Thus, the claims of the Asserted Patents specify how the configuration and operation of a computer network is modified to achieve the desired results of reducing costs, increasing bandwidth, data throughput, quality of service, and/or connection reliability. The claims recite a specific technical solution that is an inventive concept that improves the performance of the data delivery network with reductions in cost.

176. The claims of the Asserted Patents do not cover all ways of computer networking that increase bandwidth, data throughput, quality of service, and/or connection reliability, such as

a single DSL or cable line. The specific limitations recited in the claims of the Asserted Patents do not preempt approaches that use different structures or configurations.

177. The claims of the Asserted Patents do not monopolize merely routing data over multiple links, but instead capture an inventive concept in the form of a specific technique to improve computer networking by increasing bandwidth, data throughput, quality of service, and/or connection reliability.

178. The configurations and operations of computer network devices as recited in the claims of the Asserted Patents did not exist in the prior art.

179. Thus, the configurations and operations of the inventions recited in the claims of the Asserted Patents were not well-understood, routine, or conventional prior to the Asserted Patents' priority date of October 15, 2002.

180. None of the claims of the Asserted Patents seek to automate pen and paper methodologies or long-standing practices to conserve human resources and minimize errors by merely performing the methodology or long-standing practice on a computer. For example, none of the claims merely organize existing information into a new form or carry out a fundamental economic practice on a computer.

181. Instead, the claims of the Asserted Patents are directed to technological solutions to the technological problems discussed above. The claims of the Asserted Patents, understood in light of their specific limitations, are unambiguously directed to an improvement in computer capabilities and not an abstract idea.

182. The intrinsic record, including the specification and file histories, discloses improving the functionality of computer networks through a specific means recited in the claims of the Asserted Patents and listed above. Thus, the claims of the Asserted Patents are directed to

improvements to the ways computers operate and the functionality of a computer or network platform itself. The claims are necessarily rooted in computer technology in order to solve specific problems in the realm of computer networks.

183. As noted above, the claims of the Asserted Patents reflect this improvement and therefore recite patent eligible subject matter.

File Histories Confirm that Inventions Recited in the Claims of the Asserted Patents Were Not Well-Understood, Routine, or Conventional

184. In the file history of the ‘156 Patent, on February 25, 2009, the examiner issued a final office action rejecting the pending claims under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement and the Examiner stated that pending “Claims 10-14 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, set forth in this Office Action.” CAS_RH0000760-0000763.

185. The February 25, 2009 Office Action also listed three prior art references. CAS_RH0000765.

186. Patent Owner responded with an explanation regarding how the pending claims are adequately and fully described in the specification. CAS_RH0000736-0000741, 0000752-0000755.

187. After Patent Owner’s explanation, the pending claims were allowed and issued. CAS_RH0000717-0000726.

188. Thus, the Examiner found that the limitations recited in the claims of the ‘156 Patent were not disclosed in the prior art.

189. In the file history of the ‘801 Patent, on March 20, 2012, Patent Owner submitted preliminary amendments to the claims. CAS_RH0000923-0000927.

190. On March 29, 2012, the Examiner issued a notice of allowance, allowing the claims

as amended. CAS_RH0000908-0000915.

191. The notice of allowance listed four prior art references. CAS_RH0000916.

192. The Examiner stated the following:

The following is an examiner's statement of reasons for allowance:

Claims 1 and 26 are allowable over the prior art of record since the cited reference taken individually or in combination fails to particularly disclose sending a request to the at least one cellular phone for requesting use of a portion of unused bandwidth of the at least one cellular phone, receiving a response containing information about the portion of unused bandwidth from the at least one cellular phone, selecting the at least one cellular phone with unused bandwidth, sending control information to the at least one cellular phone for participating in a multilink connection, receiving packets from the at least one cellular phone and aggregating the data from the at least one cellular phone with data transfers from the at least one connection to increase data bandwidth for the communications device.

Claim 20 is allowable over the prior art of record since the cited reference taken individually or in combination fails to particularly disclose sending a request to the remote communications devices for requesting use of a portion of unused bandwidth of each of the remote communications devices, receiving a response containing information about the portion of unused bandwidth for each of the remote communications devices, selecting a group of the remote communications devices with a larger, combined, unused bandwidth, sending control information to the selected remote communications devices

CAS_RH0000913-0000914.

193. Thus, the Examiner found that the limitations recited in the claims of the '801 Patent were not disclosed in the prior art.

194. In the file history of the '349 Patent, on July 21, 2014, Patent Owner amended claims in response to an office action rejecting claims as obvious in view of prior art references including adding the following limitations to certain claims: "sending a multilink request from a

first device to a second device to joint a multilink connection”; “when the multilink request is accepted by the second device. . . during the multilink connection, concurrently receiving”; “sending another multilink request from the first device to a third device”; “when the another multilink request is accepted by the third device. . . during the multilink connection . . . between the first device and the third device”; “sends a multilink request over the wireless interface to the remote communications device to join the multilink connection”; “when the multilink request is accepted by the remote communications device”; “sending to a remote host an inquiry in whether the remote host is able to support a multilink connection”; “when the remote host indicates that the multilink connection is supported”; “sending a multilink request from a first device to a second device to join a multilink connection . . . when the multilink request is accepted by the second device . . . during the multilink connection, concurrently receiving.” CAS_RH0001072-0001082.

195. On July 23, 2014, the Examiner signed an information disclosure statement indicating that he considered prior art references listed in the statement. CAS_RH0001063-0001065.

196. On August 21, 2014, the Examiner issued a final office action rejecting all claims under 35 U.S.C. § 112, first paragraph, for containing new subject matter. CAS_RH0001058-0001062.

197. On August 25, 2014, Patent Owner filed a response to an August 21, 2014 Office Action rejecting the pending claims under 35 U.S.C. § 112, first paragraph, as allegedly containing new matter and explained why new matter was not added without amending the claims. CAS_RH0001041-0001049.

198. On September 8, 2014, the Examiner issued a notice of allowance in response to Patent Owner’s August 25, 2014 filing. CAS_RH0001029-0001033.

199. Thus, the Examiner found that the limitations recited in the claims of the ‘349 Patent were not disclosed in the prior art.

200. In the file history of the ‘649 Patent, on March 30, 2016, Patent Owner responded to an office action rejecting the pending claims as obvious in light of prior art and explained why the limitations of the claims were not disclosed in the prior art. CAS_RH0001327-0001336.

201. On April 6, 2016, the Examiner signed an information disclosure statement indicating that he considered prior art references in the statement. CAS_RH0001319-0001320.

202. On April 13, 2016, the Examiner issued a notice of allowance for the claims of the ‘649 Patent. CAS_RH0001311-0001315.

203. Thus, the Examiner found that the limitations recited in the claims of the ‘649 Patent were not disclosed in the prior art.

204. In the file history of the ‘908 Patent, on June 10, 2020, Patent Owner filed an amendment in response to a final Office Action dated March 10, 2020 rejecting claims as obvious in light of prior art references. CAS_RH0000077-0000088.

205. On August 12, 2020, the Examiner issued a notice of allowance for the claims of the ‘908 Patent. CAS_RH0000062-0000066.

206. Thus, the Examiner found that the limitations recited in the claims of the ‘908 Patent were not disclosed in the prior art.

207. In the file history of the ‘641 Patent, on April 13, 2022, the Examiner issued a notice of allowance for the claims of the ‘641 Patent. CAS_RH0000456-000463.

208. On April 13, 2022, a Notice of References Cited was filed listing prior art references. CAS_RH0000464.

209. The April 13, 2022 Notice of Allowance stated the following:

Claims 1-3 are allowed.

The following is an examiner's statement for reasons for allowance.

Claim 1 is allowable over the prior art of record since the cited references taken individually or in combination fail to particularly teach or fairly suggest requesting one remote communications device to assist in transferring data, sending a request to the remote communications device for availability for participating in a multilink communication, if available, sending control information through the remote communications device for participating in a multilink connection.

CAS_RH0000461-0000462.

210. Thus, the Examiner found that the limitations recited in the claims of the '641 Patent were not disclosed in the prior art.

211. In the file history of the '343 Patent, on December 15, 2022, the Examiner issued a notice of allowance for the claims of the '343 Patent. CAS_RH0000536-0000543.

212. On December 15, 2022, a Notice of References Cited was filed listing prior art references. CAS_RH0000544.

213. The notice of allowance stated the following:

Claim 1 is allowable over the prior art of record since the cited references taken individually or in combination fail to particularly teach or fairly suggest establishing a connection between a first device and a fourth device by concurrently using a first portion of a first bandwidth and a second portion of a second bandwidth, and receiving a portion of the data set through a first network and a portion of the data through a second network.

Claim 12 is allowable over the prior art of record since the cited references taken individually or in combination fail to particularly teach or fairly suggest receiving a portion of a response via a first network and a second network in response to transmitting a request to a remote device via the third connection, the third connection to the remote device via the first network and the second network having an effective bandwidth including the allocated first portion of the first bandwidth and the allocated second portion of the second bandwidth.

CAS_RH0000541.

214. Thus, the Examiner found that the limitations recited in the claims of the ‘343 Patent were not disclosed in the prior art.

The Western District of Texas Has Already Held that Claims of the '649 Patent Are Not Directed to an Abstract Idea

215. In *Competitive Access Systems, Inc. v. Oracle Corp.*, Case No. 1:23-CV-286-DII (W.D. Tex.), the Western District of Texas issued an order on June 7, 2023 that Claims 1 and 7 of the ‘649 Patent are “not directed to an abstract idea.” See Exhibit 32 at 6.

216. In that case, Oracle moved to dismiss the complaint arguing that Claim 1 and 7 of the ‘649 Patent fail to recite patent-eligible subject matter under 35 U.S.C. § 101. Oracle did not

challenge any other asserted patents in that case, which included the '801 Patent and the '908 Patent, as patent ineligible. *Id.* at 1, 3.

217. The Court stated the following: “the claim language recites sending and receiving information over an improved means of network functionality that includes a data-source device and a multipath connection.” *Id.* at 7.

218. The Court stated: “The Court agrees with CAS that the Asserted Claims recite a specific solution to a technological problem, not an abstract idea.” *Id.*

The Court therefore denied “Oracle’s motion to dismiss with respect to the eligibility of the Asserted Claims in the ‘649 Patent.” *Id.*

Claims for Relief

219. CAS’s averments of infringement against Red Hat that follow in Counts One – Seven are exemplary of, and without prejudice to, CAS's ultimate infringement contentions. In providing these averments, CAS does not convey or imply any particular claim constructions or purport to describe the precise scope of the claims. CAS's claim constructions, as necessary, regarding any particularized meaning of the claim terms for the Asserted Patents' claims will be provided in accordance with the Court's scheduling order and any applicable local rules or standards.

COUNT I

(Infringement of U.S. Patent No. 8,228,801)

220. CAS repeats, re-alleges, and incorporates by reference the averments of paragraphs 1 - 219 of this Amended Counterclaim as though fully set forth herein.

221. Red Hat’s Accused Products have infringed at least claim 1 of the '801 Patent.

222. By way of illustrative infringement, claim 1 of the ‘801 patent recites as follows:

1. A communications device that is capable of providing broadband communications services, comprising:

at least one connection for connecting to a communications network;

at least one wireless interface for connecting wirelessly to at least one remote communications device; and

a processor that requests the at least one remote communications device to assist in transferring data, sends a request to the at least one remote communications device for requesting use of a portion of unused bandwidth of the at least one remote communications device, receives a response from the at least one remote communications device, the response containing information about the portion of unused bandwidth, selects the at least one remote communications device with unused bandwidth, sends control information to the at least one remote communications device for participating in a multilink connection, receives packets from the at least one remote communications device and aggregates the data from the at least one remote communications device with data transfers from the at least one connection to increase data bandwidth for the communications device.

223. The Accused Instrumentalities are communications devices that are “capable of providing broadband communications services.” For example, Red Hat provides a computer program (e.g., RHEL) for installation on a communications device (e.g., a computer). Red Hat teaches and provides explicit guidance on enabling and configuring Multipath TCP (MPTCP), a protocol that allows a transport connection to operate across multiple paths or “subflows” simultaneously, within RHEL. Red Hat actively promotes the use of MPTCP to improve network resilience and increase available bandwidth, directly supporting the provision of broadband communications services.

224. The Accused Instrumentalities contain “at least one connection for connecting to a communications network.” For example, Red Hat instructs users to enable the MPTCP protocol in the kernel, allow applications to open MPTCP sockets, and establish multiple subflows within an MPTCP connection. To demonstrate this functionality, Red Hat presents a test setup using two

network namespaces connected via an MPTCP connection that includes two virtual Ethernet (veth) paths, represented by the red and blue lines in the figure below.

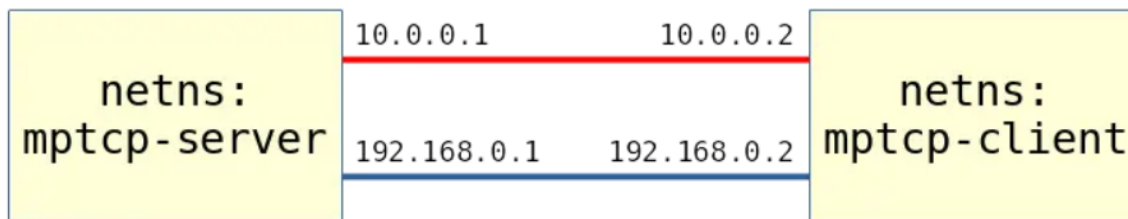
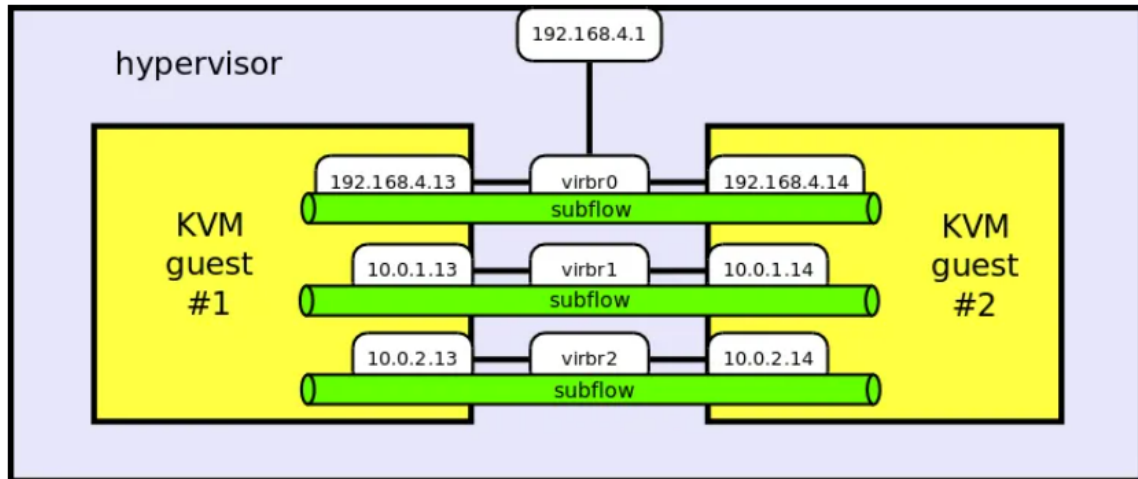


Figure 1: Network topology for two-path MPTCP test.

Each subflow is defined as "[a] flow of TCP segments operating over an individual path, which forms part of a larger MPTCP connection." Red Hat acknowledges that MPTCP subflows serve as “separate channels our system can use to communicate with the destination,” and can utilize different resources, routes, and media types, including both wired and wireless connections.

225. The Accused Instrumentalities contain “at least one wireless interface for connecting wirelessly to at least one remote communications device.” For example, as described above, Red Hat instructs users to enable the MPTCP protocol in the kernel, allow applications to open MPTCP sockets, and establish multiple subflows within an MPTCP connection. To demonstrate this functionality, Red Hat presents a virtualized example using two KVM guests, each with three network interfaces, as shown in the figure below.



226. Each subflow, represented by the green lines, operates over a respective network interface on KVM guest #1 and its corresponding network interface on KVM guest #2. While the network interfaces in this example are not explicitly identified as wireless, Red Hat acknowledges that MPTCP subflows “can use different resources, different routes to the destination system and even different media such as ethernet, 5G and so on.” This explicit reference to 5G, a wireless communication technology, indicates that at least one of the network interfaces may be a wireless interface. Red Hat provides additional guidance on the types of connections available as “subflows can use different resources, different routes to the destination, and even different networks. Such as Ethernet, cellular, wifi, and so on.” In addition to cellular, Wi-Fi serves as another example of a wireless interface. Red Hat also describes a real-world scenario demonstrating MPTCP’s ability to facilitate communication across both wired and wireless connections. In this scenario, “One laptop has a wired connection – 1 Gbit Ethernet, low latency. The second connection is wireless — higher latency, but it makes the laptop portable so it can be used anywhere in the house[.] MPTCP allows us to establish subflows over both of these connections.” By explicitly providing an MPTCP implementation utilizing both wired and wireless connections, Red Hat confirms that one or more of these network interfaces may be a wireless interface.

227. Red Hat provides explicit guidance on configuring wireless connectivity in RHEL. For example, Red Hat instructs users on creating a network bond to enable switching between an Ethernet and wireless connection without interrupting a VPN connection. This configuration inherently requires the presence of both wired and wireless interfaces, confirming that Red Hat anticipates and supports wireless networking within RHEL.

228. The Accused Instrumentalities have “a processor that requests the at least one remote communications device to assist in transferring data.” For example, the Accused Instrumentalities initiate an MPTCP connection using the MP_CAPABLE option. Red Hat provides explicit guidance on enabling and configuring MPTCP within RHEL, operations that necessarily require execution by a processor. As shown in the snippet below, Red Hat also specifies hardware requirements for RHEL-based systems, including the necessary processor capabilities to support MPTCP-related functions.

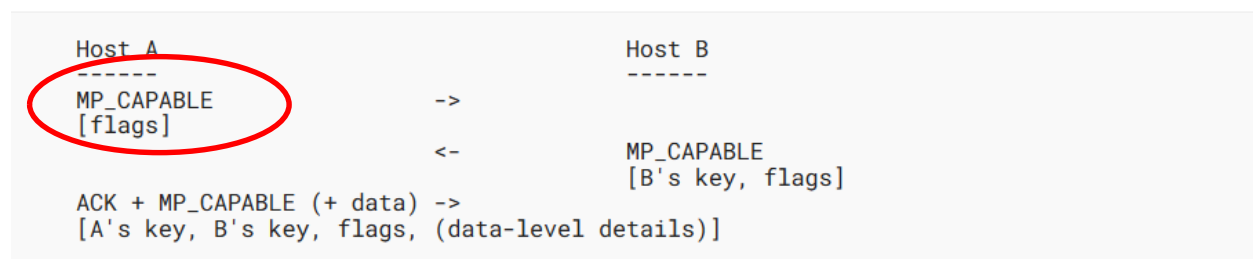
Maximum logical CPUs

Red Hat defines a logical CPU as any schedulable entity. So every core/thread in a multicore/thread processor is a logical CPU.

Architecture	RHEL 6	RHEL 7	RHEL 8	RHEL 9
x86	32	N/A ¹	N/A ¹	N/A ¹
x86_64	448 [4096] ²	768 [5120] ³	768 [8192]	1792 [8192]
Power	128	768 [2048] ⁴	POWER8: 768 [2048] POWER9: 1536 [2048] ⁵ Power10: 1920 [2048] ⁶	POWER9: 1536 [2048] Power10: 1920 [2048] ¹⁹
IBM Z	z13: 64	z13: 256	z13: 256 z14: 340 z15: 380 z16: 400	z14: 340 z15: 380 z16: 400
ARM	N/A	N/A	256	512 [4096]

229. RFC 8684 specifies that MPTCP connections are initiated through a SYN, SYN/ACK, ACK handshake, as shown in the snippet below, during which the MP_CAPABLE

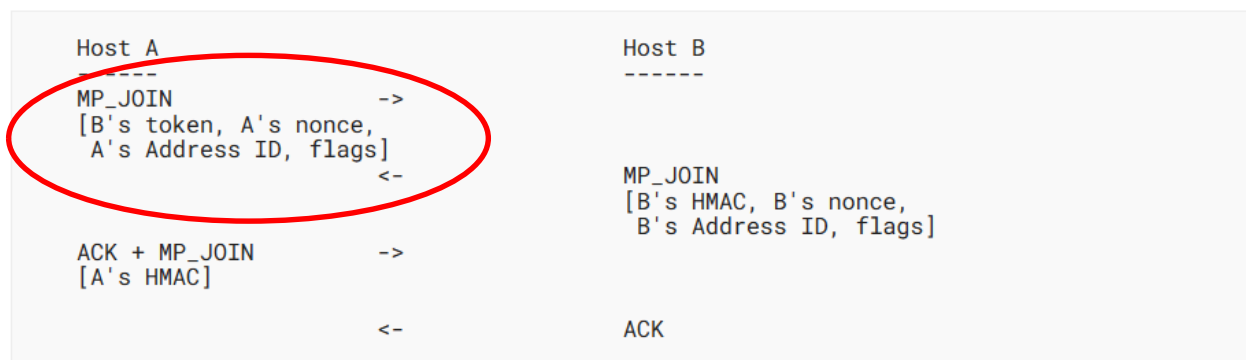
option is used. The MP_CAPABLE option is used in the first subflow of an MPTCP connection to confirm that both devices are MPTCP-capable and can transfer data across multiple paths. Specifically, the initial SYN packet (circled below) declares Host A (e.g., a communications device) as MPTCP-capable and requests participation in the MPTCP connection from Host B (e.g., a remote communications device) to assist in transferring data. In response, Host B may reply with a SYN/ACK packet confirming its ability to participate in the MPTCP connection and assist in transferring data.



230. Accordingly, the MP_CAPABLE option is transmitted in the initial SYN packet, thereby requesting a remote communications device to assist in transferring data. Section 35.2 of the Red Hat Enterprise Linux 8 documentation enumerates MPTCP-specific kernel counters that confirm the use of the MP_CAPABLE option for performing the claimed operation, including “MPTcpExtMPCapableSYNRX” and “MPTcpExtMPCapableSYNTAX”, which track the number of received and transmitted SYN packets with the MP_CAPABLE option, respectively.

231. The Accused Instrumentalities have a processor that “sends a request to the at least one remote communications device for requesting use of a portion of unused bandwidth of the at least one remote communications device.” For example, the Accused Instrumentalities configure the MPTCP connection to enable additional subflows using the MP_JOIN option. Red Hat provides detailed instructions for configuring the MPTCP connection to enable additional subflows. For example, Red Hat instructs users to execute the **ip mptcp endpoint add** command to add new endpoints that can accommodate such subflows.

232. RFC 8684 specifies that each additional subflow is initiated through a SYN, SYN/ACK, ACK handshake, as shown in the snippet below, during which the MP_JOIN option is used. Unlike the MP_CAPABLE option, which is used in the first subflow of an MPTCP connection, the MP_JOIN option is used in each subsequent subflow to join the existing MPTCP connection. Specifically, the first use of the MP_JOIN option occurs in the SYN packet (circled below), which is sent to Host B (e.g., a remote communications device) to request participation in an additional subflow. In response, Host B may reply with a SYN/ACK packet confirming its ability to participate in the additional subflow, enabling Host A to utilize bandwidth that would otherwise be unused.

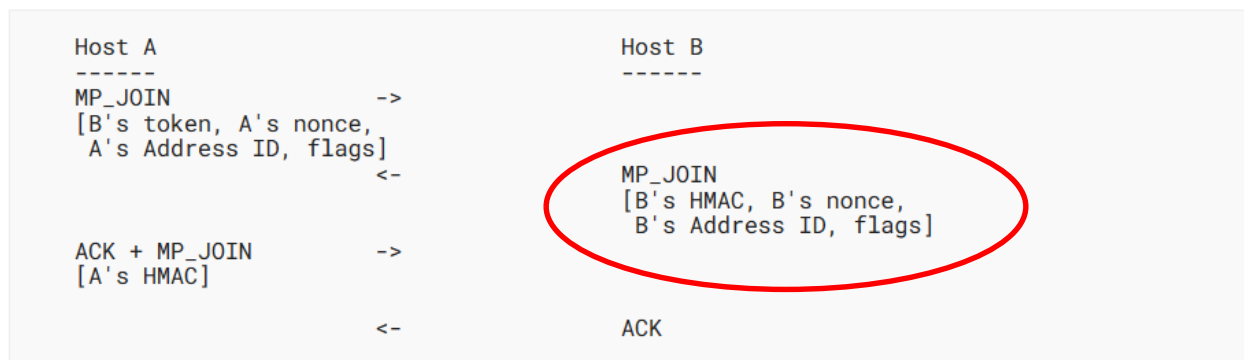


233. Accordingly, the MP_JOIN option is transmitted in the SYN packet of each additional subflow, thereby sending a request to a remote communications device for requesting use of a portion of its unused bandwidth. For example, Section 35.3 of the Red Hat Enterprise Linux 8 documentation enumerates MPTCP-specific kernel counters that confirm the use of the MP_JOIN option for performing the claimed operation, including “MPTcpExtMPJoinSynRx”, which tracks the number of received SYN packets with the MP_JOIN option.

234. The Accused Instrumentalities have a processor that “receives a response from the at least one remote communications device, the response containing information about the portion of unused bandwidth.” For example, the MPTCP connection is configured to enable additional

subflows using the MP_JOIN option. Red Hat provides detailed instructions for configuring the MPTCP connection to enable additional subflows. For example, Red Hat instructs users to execute the **ip mptcp endpoint add** command to add new endpoints that can accommodate such subflows.

235. RFC 8684 specifies that each additional subflow is initiated through a SYN, SYN/ACK, ACK handshake, as shown in the snippet below, during which the MP_JOIN option is used. After sending the SYN packet, Host A (e.g., a communications device) receives a SYN/ACK packet from Host B confirming Host B's ability to participate in the additional subflow. Specifically, the SYN/ACK packet (circled below) is received with the MP_JOIN option and Host B's Hash-based Message Authentication Code (HMAC), which allows Host A to authenticate Host B and verify its ability to provide bandwidth that would otherwise be unused via the additional subflow.



236. Accordingly, the MP_JOIN option is received in the SYN/ACK packet of each additional subflow, thereby receiving a response from a remote communications device containing information about a portion of unused bandwidth.

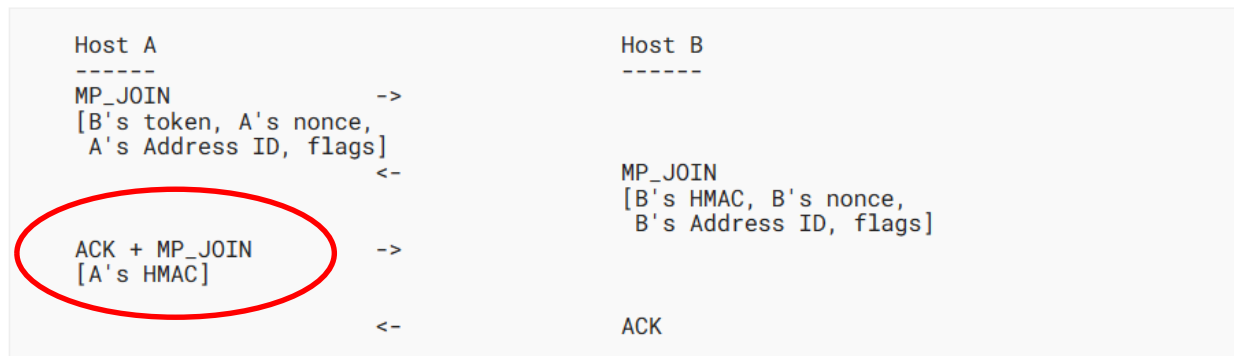
237. The Accused Instrumentalities have a processor that “selects the at least one remote communications device with unused bandwidth.” For example, the Accused Instrumentalities configure an MPTCP connection to enable additional subflows based on network conditions. Red Hat provides detailed instructions to facilitate path discovery and bandwidth evaluation for

identifying opportunities for subflow creation. For example, Red Hat instructs users to use **pmrep** to monitor network interface activity and **iperf3** to perform bandwidth measurements. Red Hat also explains that remote communications devices can actively announce their available endpoints using commands like **ip mptcp endpoint add <address> dev <interface> signal**, which makes the endpoints discoverable and allows a communication device to identify opportunities for subflow creation while monitoring network interface activity. Moreover, Red Hat provides detailed instructions for configuring the MPTCP connection to enable additional subflows. For example, Red Hat instructs users to execute commands like **ip mptcp limits set subflow <number of additional subflows>** and **ip mptcp endpoint add** to configure additional subflows within the MPTCP connection. Accordingly, following Red Hat's instructions results in the selection of a remote communications device with unused bandwidth.

238. The Accused Instrumentalities have a processor that "sends control information to the at least one remote communications device for participating in a multilink connection." For example, the Accused Instrumentalities configure the MPTCP connection to enable additional subflows using the MP_JOIN option. Red Hat provides detailed instructions for configuring the MPTCP connection to enable additional subflows. For example, Red Hat instructs users to execute the **ip mptcp endpoint add** command to add new endpoints that can accommodate such subflows.

239. RFC 8684 specifies that each additional subflow is initiated through a SYN, SYN/ACK, ACK handshake, as shown in the snippet below, during which the MP_JOIN option is used. After receiving the SYN/ACK packet, Host A (e.g., a communications device) sends an ACK packet to Host B (e.g., a remote communications device) confirming its participation in the additional subflow. Specifically, the ACK packet (circled below) is sent with the MP_JOIN option and Host A's HMAC, completing the HMAC exchange for participation in a multilink MPTCP

connection. The MPTCP connection is a multilink connection in that it allows the use of multiple subflows over multiple paths, providing greater bandwidth and network resilience. The HMACs act as control information for participating in this multilink connection: if they are verified as correct, the devices can verify each other and agree on which MPTCP connection the additional subflow will join; otherwise, the subflow is closed.



240. RFC 8684 states, “MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to the recipient application.” In addition to the HMACs, additional data fields such as Address ID, ADD_ADDR, Token, Hash-based Message Authentication Code (HMAC), Data Sequence Number (DSN), and Data Sequence Signal (DSS) also serve as control information.

a. **Address ID:** “The MP_JOIN option includes an “Address ID”. This is an identifier generated by the sender of the option, used to identify the source address of this packet, even if the IP header has been changed in transit by a middlebox.”

b. **ADD_ADDR:** “The ADD_ADDR option contains an HMAC to authenticate the address as having been sent from the originator of the connection. The receiver of this option echoes it back to the client to indicate successful receipt.”

c. **Token:** “A locally unique identifier given to a multipath connection by a host.”

d. **DSN:** “To ensure reliable, in-order delivery of data over subflows that may appear and disappear at any time, MPTCP uses a 64-bit Data Sequence Number (DSN) to number all data sent over the MPTCP connection.”

e. **DSS:** “The Data Sequence Signal (DSS) carries the Data Sequence Mapping. The Data Sequence Mapping consists of the subflow sequence number, data sequence number, and length for which this mapping is valid. This option can also carry a connection-level acknowledgment (the "Data ACK") for the received DSN.”

241. Accordingly, a communications device’s HMAC, Address ID, ADD_ADDR, Token, DSN, and DSS establish sending control information to a remote communications device for participating in a multilink connection.

242. The Accused Instrumentalities have a processor that “receives packets from the at least one remote communications device and aggregates the data from the at least one remote communications device with data transfers from the at least one connection to increase data bandwidth for the communications device.” For example, the Accused Instrumentalities configure the MPTCP connection to enable additional subflows and aggregating the data from the subflows to enhance bandwidth and network resilience. Red Hat provides detailed instructions for configuring the MPTCP connection to enable additional subflows. For example, Red Hat instructs users to execute the **ip mptcp endpoint add** command to add new endpoints that can accommodate such subflows. Red Hat describes that the throughput of multiple subflows can be combined into a single MPTCP connection. As explained by RFC 8684: “At a high level, an MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to the recipient application.” Red Hat’s own documentation states, “[w]ith MPTCP, your commute is faster because it allows increasing the download speed by aggregating the bandwidth of all interfaces.”

243. Accordingly, data is received and aggregated from a remote communications device with data transfers from the MPTCP connection to increase data bandwidth.

244. Attached as Exhibit 33 and incorporated herein by reference is a claim chart that identifies specifically where and how each limitation of each asserted claim of the '801 Patent, specifically claims 1-17, is found in or performed by the Accused Products. As set forth in Exhibit 33, the Accused Products, which include RHEL software that includes MPTCP operations (such as those discussed in RFC 6824 and RFC 8684) and servers and other computer and network devices running this software, such as smartphones, laptops, tablets, routers, base stations, etc., literally meet, or under the doctrine of equivalents meet, each limitation of claims 1-17 of the '801 Patent.

245. As such, Defendant Red Hat, without license or authorization to do so, has directly infringed one or more claims of the '801 Patent, literally or under the doctrine of equivalents, by making, using, offering for sale and/or selling the Accused Products within this District and elsewhere in the United States, and/or importing into the United States its Accused Products in violation of 35 U.S.C. § 271(a).

246. On information and belief, Red Hat has also indirectly infringed, literally or under the doctrine of equivalents, one or more claims of the '801 Patent by actively, knowingly, and intentionally inducing infringement by its customers and/or others of the '801 Patent in violation of 35 U.S.C. § 271(b).

247. Red Hat has been aware of the '801 Patent at least as early as approximately October 2, 2023.

248. As noted above, Red Hat actively advertised, instructed, and encouraged users and/or developers to use RHEL with MPTCP in a manner that infringes one or more claims of the '801 Patent.

249. CAS is entitled to damages for past infringement in an amount to be determined by the Court but in no event less than a reasonable royalty

COUNT II

(Infringement of U.S. Patent No. 9,350,649)

250. CAS repeats, re-alleges, and incorporates by reference the averments of paragraphs 1 - 249 of this Amended Counterclaim as though fully set forth herein.

251. Red Hat's Accused Products have infringed at least claim 18 of the '649 Patent.

252. By way of further illustrative infringement, claim 18 of the '649 patent recites as follows:

18. A data-requesting device comprising:

at least one interface capable of connecting concurrently to a plurality of network-edge devices during a multipath connection, the multipath connection comprising the connections between the data-requesting device and each of the network-edge devices; and

at least one processor coupled to the at least one interface that

sends multipath information to each of the network-edge devices that is capable of joining the multipath connection; and

receives different data at the data-requesting device from different ones of the network-edge devices that are able to join the multipath connection.

253. The Accused Instrumentalities are "a data-requesting device." For example, Red Hat provides a computer program (e.g., RHEL) for installation on a communications device (e.g., a computer, a server). Red Hat teaches and provides explicit guidance on enabling and configuring Multipath TCP (MPTCP), a protocol that allows a transport connection to operate across multiple paths or "subflows" simultaneously, within RHEL.

254. The Accused Instrumentalities have "at least one interface capable of connecting concurrently to a plurality of network-edge devices during a multipath connection, the multipath

connection comprising the connections between the data-requesting device and each of the network-edge devices.” Examples of such Accused Instrumentalities include a device running RHEL with MPTCP with “at least one interface” such as an Ethernet port, fiber connection, cellular modem, or Wi-fi connection. That interface is connected to a “plurality of network-edge devices” such as an Ethernet router, fiber optic router, cellular gateway, or Wi-Fi router, etc.

255. As a further example, the screenshot below from Red Hat demonstrates a multipath connection using three Ethernet network interfaces (enp1s0, enp2s0, enp3s0) highlighted in red. Each of these interfaces establishes connectivity through a network-edge device such as an Ethernet router.

n.i.i.bytes	n.i.i.bytes	n.i.i.bytes	n.i.i.bytes
lo	enp1s0	enp2s0	enp3s0
byte/s	byte/s	byte/s	byte/s
N/A	N/A	N/A	N/A
0.000	91.858	1194.155	25.960
[..]			
0.000	92.010	26.003	26.003
0.000	91364.627	97349.484	93799.789
0.000	1521881.761	1400594.700	1319123.660
0.000	1440797.789	1305233.465	1310615.121
0.000	1220597.939	1201782.379	1149378.747
0.000	1221377.909	1252225.282	1229209.781
0.000	1232520.776	1244593.380	1280007.121
0.000	671.831	727.317	337.415
0.000	59.001	377.005	26.000

Congrats! Here we see traffic of one channel of the application layer getting distributed over multiple subflows. Note that our two VMs are spinning on the same hypervisor, so our throughput is most likely limited by the CPU. With multiple subflows, we will probably not see increased throughput here, but we can see multiple channels being used.

256. Red Hat’s product literature further provides that the user “can configure MultiPath TCP (MPTCP) using the nmcli command to permanently establish multiple subflows between a source and destination system. The subflows can use different resources, different routes to the destination, and even different networks. Such as Ethernet, cellular, wifi, and so on. As a result, you achieve combined connections, which increase network resilience and throughput.”

257. The Accused Instrumentalities have “at least one processor coupled to the at least one interface[.]” For example, Red Hat advertises that the features and benefits of RHEL Server include “[a]ccess to the latest Linux innovations developed by Red Hat and the open source community. It supports Intel/AMD (x86_64), IBM Systems (s390x), IBM Power, and ARM architectures, as well as all the leading workloads and apps like Oracle Database, SAP HANA, and Microsoft SQL Server.”

258. The Accused Instrumentalities have a processor that “sends multipath information to each of the network-edge devices that is capable of joining the multipath connection[.]” For example, the process for sending a multilink request is described in RFC 8684 which is a specification for MPTCP. Red Hat explicitly references RFC 8684 in its materials on MPTCP. As the figure below demonstrates, RFC 8684 defines how to initiate a MPTCP connection which uses “the same signaling as for initiating a normal TCP connection, but the SYN, SYN/ACK, and initial ACK (and data) packets also carry the MP_CAPABLE option. This option has a variable length and serves multiple purposes. Firstly, it verifies whether the remote host supports Multipath TCP; secondly, this option allows the hosts to exchange some information to authenticate the establishment of additional subflows.”

Host A		Host B
-----		-----
MP_CAPABLE	->	
[flags]		
	<-	MP_CAPABLE
		[B's key, flags]
ACK + MP_CAPABLE (+ data) ->		
[A's key, B's key, flags, (data-level details)]		

259. In describing a specific MPTCP example, Red Hat states, “a first three-way handshake takes place with packets 1-3 on the 10.0.0.* path, while a second handshake kicks in

with packets 6-8 on the 192.168.0.* path (note the S flag for SYN and the S. for SYN/ACK).” Red Hat also states, “During a three-way-handshake, the client and server exchange a 64-bit key using the MP_CAPABLE suboption, which is visible in the output of tcpdump in the braces ({}) after mptcp capable. These keys are then used later to compute the DSN/DACK and token. The MP_CAPABLE suboption that originates in the client is also present following a successful connection setup. It will be present until the server explicitly acknowledges it using a data sequence signal (DSS) suboption.”

260. As another example, RFC 8684 explains the process for adding additional subflows, as shown below, which satisfies the limitation of sending “multipath information to *each* of the network-edge devices.”

2.2. Associating a New Subflow with an Existing MPTCP Connection

The exchange of keys in the MP_CAPABLE handshake provides material that can be used to authenticate the endpoints when new subflows will be set up. Additional subflows begin in the same way as initiating a normal TCP connection, but the SYN, SYN/ACK, and ACK packets also carry the MP_JOIN option.

Host A initiates a new subflow between one of its addresses and one of Host B’s addresses. The token -- generated from the key -- is used to identify which MPTCP connection it is joining, and the Hash-based Message Authentication Code (HMAC) is used for authentication. The HMAC uses the keys exchanged in the MP_CAPABLE handshake and the random numbers (nonces) exchanged in these MP_JOIN options. MP_JOIN also contains flags and an Address ID that can be used to refer to the source address without the sender needing to know if it has been changed by a NAT. Further details are given in [Section 3.2](#).



261. The Accused Instrumentalities have a processor that receives “different data at the data-requesting device from different ones of the network-edge devices that are able to join the

multipath connection.” For example, Red Hat product documentation and blog post guidance provides that MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to the recipient application. It further provides that “MPTCP also brings performance benefits in datacenter environments. In contrast to Ethernet channel bonding using 802.3ad link aggregation that bonds up to eight ports of the same type and speed, MPTCP can balance a single socket across multiple interfaces of varying port and transport types to reach very high throughput.”

262. The screenshot below is from a Red Hat article showing a MPTCP session simultaneously using Ethernet (yellow) and wireless WLAN (blue) connections.



263. Red Hat explains that “[s]plitting allows for multiple networks to be aggregated in a manner similar to the large super highways that aggregate both express lanes and local or collector lanes.” This example fully illustrates receiving different data from different network-edge devices (Ethernet interface and WLAN (Wi-Fi) interface) through a multipath connection.

264. Attached as Exhibit 34 and incorporated herein by reference is a claim chart that identifies specifically where and how each limitation of each asserted claim of the '649 Patent, specifically claims 1-23, is found in or performed by the Accused Products. As set forth in Exhibit 34, the Accused Products, which include RHEL software that includes MPTCP operations (such as those discussed in RFC 6824 and RFC 8684) and servers and other computer and network devices running this software, such as smartphones, laptops, tablets, routers, base stations, etc., literally meet, or under the doctrine of equivalents meet, each limitation of claims 1-23 of the '649 Patent.

265. Defendant Red Hat, without license or authorization to do so, has directly infringed one or more claims of the '649 Patent, literally or under the doctrine of equivalents, by making, using, offering for sale and/or selling the Accused Products within this District and elsewhere in the United States, and/or importing into the United States the Accused Products, in violation of 35 U.S.C. § 271(a).

266. On information and belief, Red has also indirectly infringed, literally or under the doctrine of equivalents, one or more claims of the '649 Patent by actively, knowingly, and intentionally inducing infringement by its customers and/or others of the '649 Patent in violation of 35 U.S.C. § 271(b).

267. Red Hat has been aware of the '649 Patent at least as early as approximately October 2, 2023.

268. As discussed above, Red Hat actively advertised, instructed, and encouraged users and/or developers to use RHEL with MPTCP in a manner that infringes one or more claims of the '649 Patent.

269. CAS is entitled to damages for past infringement in an amount to be determined by the Court but in no event less than a reasonable royalty.

COUNT III

(Infringement of U.S. Patent No. 10,868,908)

270. CAS repeats, re-alleges, and incorporates by reference the averments of paragraphs 1 - 269 of this Amended Counterclaim as though fully set forth herein.

271. For example, Red Hat's Accused Products have infringed at least claim 8 of the '908 Patent.

272. By way of further illustrative infringement, claim 8 of the '908 patent recites as follows:

8. A server for multilink communication with a device, the server comprising:

at least one server network interface; and

one or more processors coupled to the at least one server network interface and configured to:

receive a first multilink packet over the at least one server network interface, the first multilink packet comprised of a request for a multilink communication and first information associated with first network communication interface of the device that is capable of being used by the device to receive data packets;

sending a data packet including the multilink session identification to the first network communication interface of the device;

receive a second multilink packet over the at least one server network interface, the second multilink packet comprised of the multilink session identification and second information associated with a second network communication interface of the device that is capable of being used by the device to receive data packets; and

send different groups of data packets over the at least one server network interface to the first network communication interface of the device and to the second network communication interface of the device, wherein each of the different groups of data packets includes the multilink session identification.

273. Any server running RHEL that communicates with a device using MPTCP is “[a] server for multilink communication with a device[.]”

274. The Accused Instrumentalities contain “at least one server network interface.” For example, on information and belief, nearly all servers running RHEL are capable of connecting to a network interface such as an Ethernet router, fiber optic router, cellular gateway, Wi-Fi router, etc. In providing guidance on MPTCP sessions, Red Hat demonstrates an example specifically using a server with a network interface, identified by the IP address 192.0.2.1, as, shown below.

This procedure demonstrates how to monitor MPTCP events. For that, it simulates a MPTCP server application, and a client connects to this service. The involved clients in this example use the following interfaces and IP addresses:

- Server: 192.0.2.1
- Client (Ethernet connection): 192.0.2.2
- Client (WiFi connection): 192.0.2.3

To simplify this example, all interfaces are within the same subnet. This is not a requirement. However, it is important that routing has been configured correctly, and the client can reach the server via both interfaces.

Prerequisites

- A RHEL client with two network interfaces, such as a laptop with Ethernet and WiFi
- The client can connect to the server via both interfaces
- A RHEL server
- Both the client and the server run RHEL 8.6 or later

275. The Accused Instrumentalities contain “one or more processors coupled to the at least one server network interface.” For example, on information and belief, as noted previously, servers running RHEL have a processor coupled to them.

276. The Accused Instrumentalities contain one or more processors that are configured to “receive a first multilink packet over the at least one server network interface, the first multilink packet comprised of a request for a multilink communication and first information associated with first network communication interface of the device that is capable of being used by the device to receive data packets.” For example, Red Hat explicitly references RFC 8684 in its materials on

MPTCP which explains the process for the three-way handshake (SYN, SYN/ACK, ACK) used to request and establish a MPTCP connection.

277. As the figure below demonstrates, RFC 8684 defines how to initiate a MPTCP connection which uses “the same signaling as for initiating a normal TCP connection, but the SYN, SYN/ACK, and initial ACK (and data) packets also carry the MP_CAPABLE option. This option has a variable length and serves multiple purposes. Firstly, it verifies whether the remote host supports Multipath TCP; secondly, this option allows the hosts to exchange some information to authenticate the establishment of additional subflows.”

Host A		Host B
-----		-----
MP_CAPABLE	->	
[flags]		
	<-	MP_CAPABLE
		[B's key, flags]
ACK + MP_CAPABLE (+ data)	->	
[A's key, B's key, flags, (data-level details)]		

278. Red Hat developer guidance explains that “[d]uring a three-way-handshake, the client and server exchange a 64-bit key using the MP_CAPABLE suboption, which is visible in the output of tcpdump in the braces ({}) after mptcp capable. These keys are then used later to compute the DSN/DACK and token. The MP_CAPABLE suboption that originates in the client is also present following a successful connection setup. It will be present until the server explicitly acknowledges it using a data sequence signal (DSS) suboption.” In describing a specific MPTCP example, Red Hat states, “a first three-way handshake takes place with packets 1-3 on the 10.0.0.* path, while a second handshake kicks in with packets 6-8 on the 192.168.0.* path (note the S flag for SYN and the S. for SYN/ACK).”

279. A “request for a multilink communication” is satisfied through the “SYN + MP_CAPABLE” packet described above. This request includes “first information associated with first network communication interface” such as the IP address and port number of the first subflow, both of which are exchanged through the SYN + MP_CAPABLE packet.

280. The Accused Instrumentalities contain one or more processors configured for “sending a data packet including the multilink session identification to the first network communication interface of the device.” Once again, “sending a data packet” is satisfied through the MPTCP three-way handshake. This specifically occurs in step two of the handshake when the server sends the SYN/ACK packet to the device. The three-way handshake is further illustrated below with two subflows being established between Host A and Host B.

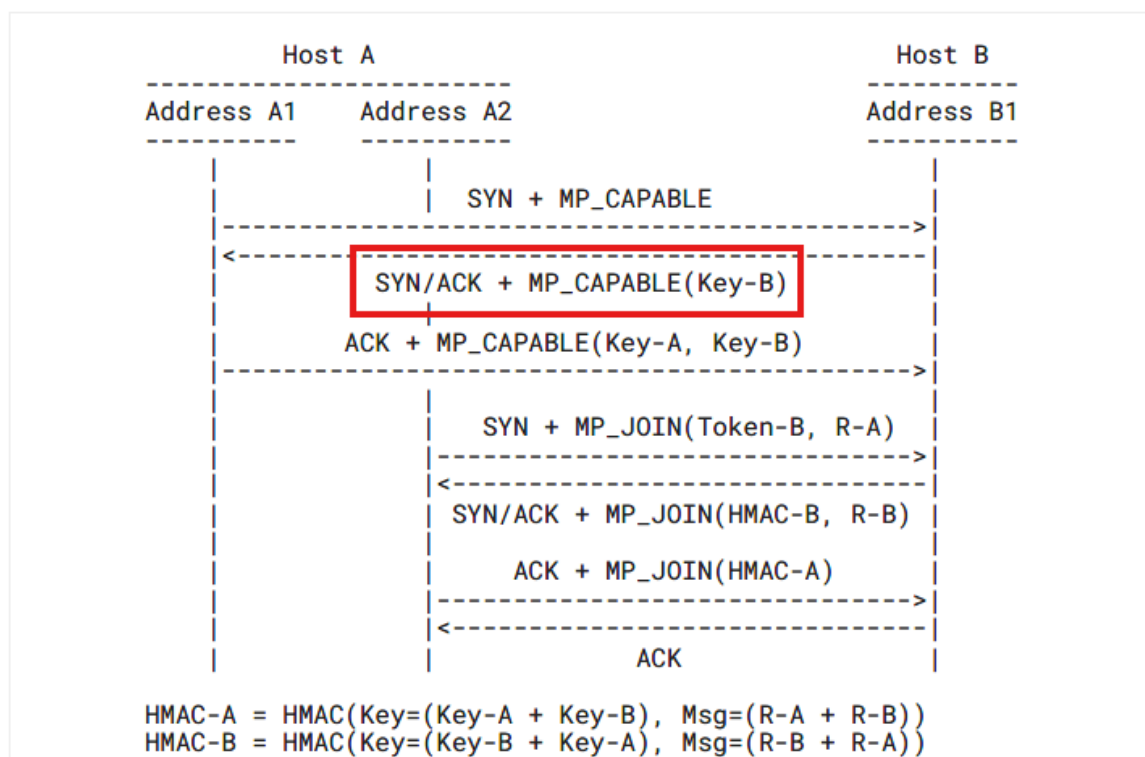


Figure 8: Example Use of MPTCP Authentication

281. A “multilink session identification” includes but is not limited to the following data fields exchanged through a MPTCP session: MP_CAPABLE, MP_JOIN, Address ID,

ADD_ADDR, Token, Hash-based Message Authentication Code (HMAC), Data Sequence Number (DSN), and Data Sequence Signal (DSS).

a. **MP_CAPABLE**: “The exchange of keys in the MP_CAPABLE handshake provides material that can be used to authenticate the endpoints when new subflows will be set up.”

b. **MP_JOIN**: “Additional subflows begin in the same way as initiating a normal TCP connection, but the SYN, SYN/ACK, and ACK packets also carry the MP_JOIN option.” “MP_JOIN also contains flags and an Address ID that can be used to refer to the source address without the sender needing to know if it has been changed by a NAT.”

c. **Address ID**: “The MP_JOIN option includes an “Address ID”. This is an identifier generated by the sender of the option, used to identify the source address of this packet, even if the IP header has been changed in transit by a middlebox.”

d. **ADD_ADDR**: “The ADD_ADDR option contains an HMAC to authenticate the address as having been sent from the originator of the connection. The receiver of this option echoes it back to the client to indicate successful receipt.”

e. **Token**: “A locally unique identifier given to a multipath connection by a host.”

f. **HMAC**: “Hash-based Message Authentication Code (HMAC) is used for authentication. The HMAC uses the keys exchanged in the MP_CAPABLE handshake and the random numbers (nonces) exchanged in these MP_JOIN options.”

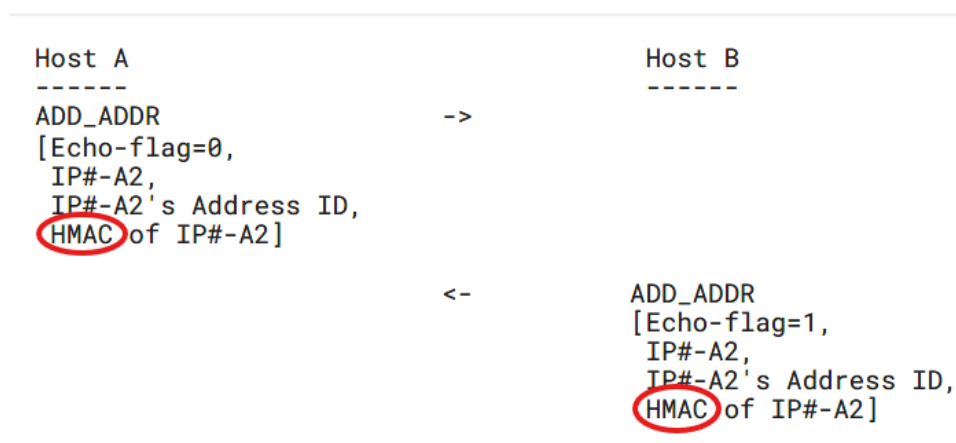
g. **DSN**: “To ensure reliable, in-order delivery of data over subflows that may appear and disappear at any time, MPTCP uses a 64-bit Data Sequence Number (DSN) to number all data sent over the MPTCP connection.”

h. **DSS**: “The Data Sequence Signal (DSS) carries the Data Sequence Mapping. The Data Sequence Mapping consists of the subflow sequence number, data sequence number, and length for which this mapping is valid. This option can also carry a connection-level acknowledgment (the “Data ACK”) for the received DSN.”

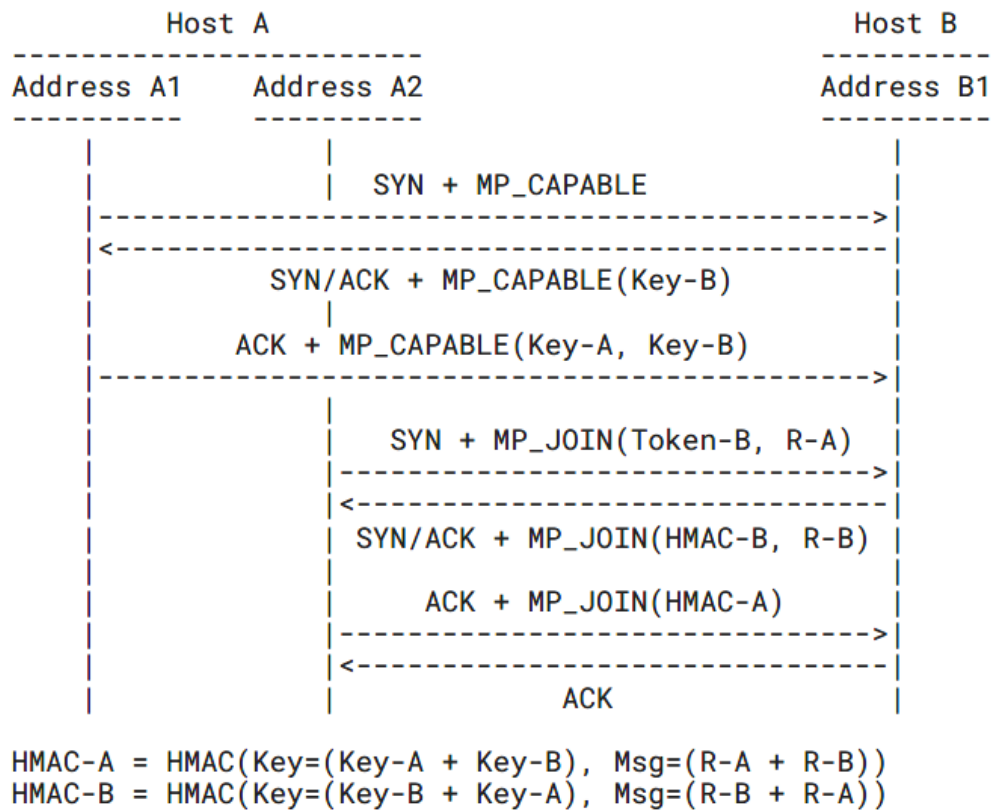
282. The Accused Instrumentalities contain one or more processors that are configured to “receive a second multilink packet over the at least one server network interface, the second multilink packet comprised of the multilink session identification and second information associated with a second network communication interface of the device that is capable of being used by the device to receive data packets.” For example, RFC 8684 describes the process for adding additional subflows as follows: “The exchange of keys in the MP_CAPABLE handshake

provides material that can be used to authenticate the endpoints when new subflows will be set up. Additional subflows begin in the same way as initiating a normal TCP connection, but the SYN, SYN/ACK, and ACK packets also carry the MP_JOIN option.” RFC 8684 further states, “Once an MPTCP connection has begun with the MP_CAPABLE exchange, further subflows can be added to the connection. Hosts have knowledge of their own address(es) and can become aware of the other host's addresses through signaling exchanges.”

283. RFC 8684 provides the following additional information on HMAC: “The ADD_ADDR option contains an HMAC to authenticate the address as having been sent from the originator of the connection.”



284. The figure below demonstrates the HMAC being used to establish an additional subflow between Host A and Host B.



285. The Accused Instrumentalities contain one or more processors that are configured to “send different groups of data packets over the at least one server network interface to the first network communication interface of the device and to the second network communication interface of the device, wherein each of the different groups of data packets includes the multilink session identification.” For example, Red Hat’s own documentation demonstrates how MPTCP can be used to establish multiple subflows, as follows: “Multipath TCP (MPTCP) is an extension to the Transmission Control Protocol (TCP) to use multiple paths between peers simultaneously.” The figure below from Red Hat illustrates two network paths in red and blue between two devices, a client and server.

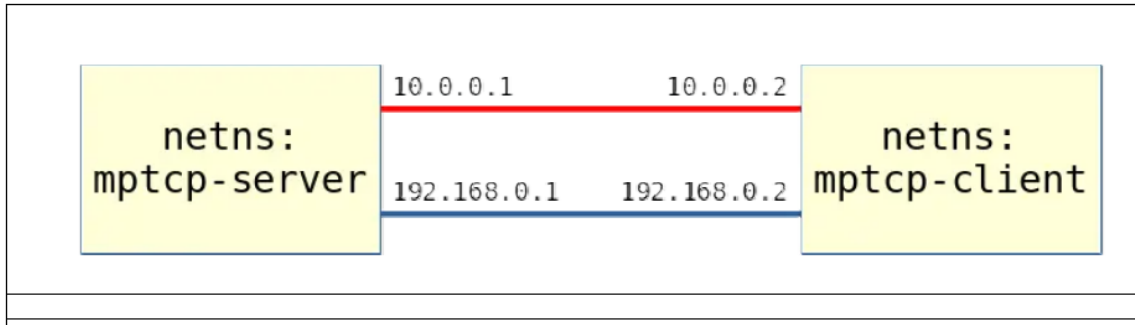
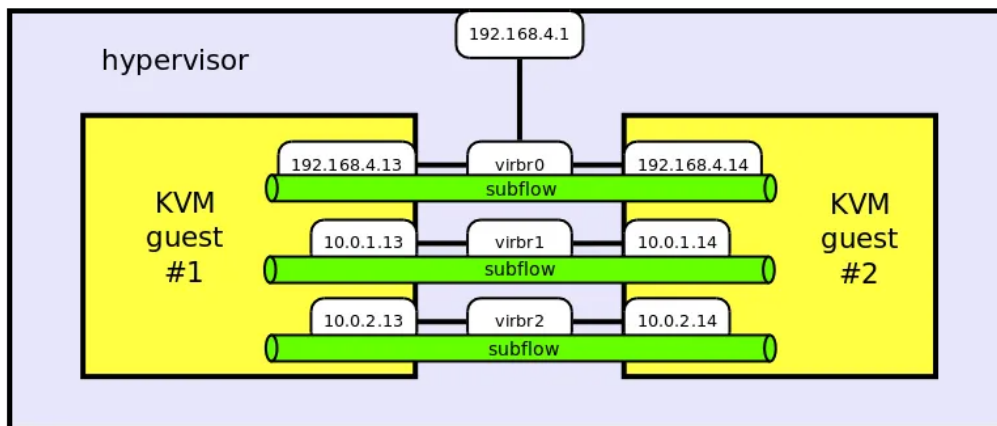


Figure 1: Network topology for two-path MPTCP test.

286. Red Hat product documentation provides that “MPTCP enables a transport connection to operate across multiple paths simultaneously, and brings network connection redundancy to user endpoint devices.” It further teaches that “[t]he Multipath TCP (MPTCP) protocol allows for simultaneous usage of multiple paths between connection endpoints. The protocol design improves connection stability and also brings other benefits compared to the single-path TCP.”

287. Another figure from Red Hat illustrates a MPTCP session with three subflows.



288. As explained by Red Hat, “[u]sing MPTCP, we will establish a MPTCP socket between client and server, instead of a TCP socket. This allows additional MPTCP ‘subflows’ to be established. These subflows can be thought of as separate channels our system can use to

communicate with the destination. These can use different resources, different routes to the destination system and even different media such as ethernet, 5G and so on.”

289. RFC 8684 states, “MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to the recipient application.”

290. Red Hat’s own documentation further describes RHEL’s use of MPTCP:

- a. “The MPTCP solution allows simultaneous use of multiple network connections for a single data-stream, while still presenting a standard TCP socket application programming interface (API) to the application.”
- b. “Aggregating many relatively cheap links MPTCP can reach more than 58.1 Gbps on a single data-stream.”
- c. “In addition to improving resilience, MPTCP can also help us to combine the throughput of multiple subflows into a single MPTCP connection.”
- d. The screenshot below is from a Red Hat article showing a MPTCP session simultaneously using Ethernet (yellow) and WLAN (blue) connections. Even when the Ethernet cable was disconnected, MPTCP maintained connectivity by automatically shifting all traffic to the WLAN connection.



291. Red Hat explains that “[s]plitting allows for multiple networks to be aggregated in a manner similar to the large super highways that aggregate both express lanes and local or

collector lanes,” and “[o]ne MPTCP connection manages a set subflows, each of them is a TCP socket carrying some synchronization metadata. At any given time, the MPTCP connection can use one or more of the available subflows.” Red Hat further teaches that “MPTCP also brings performance benefits in datacenter environments. In contrast to Ethernet channel bonding using 802.3ad link aggregation that bonds up to eight ports of the same type and speed, MPTCP can balance a single socket across multiple interfaces of varying port and transport types to reach very high throughput.”

292. Red Hat’s documentation provides, “[t]o ensure reliable, in-order delivery of data over subflows that may appear and disappear at any time, MPTCP uses a 64-bit Data Sequence Number (DSN) to number all data sent over the MPTCP connection. Each subflow has its own 32-bit sequence number space, utilizing the regular TCP sequence number header, and an MPTCP option maps the subflow sequence space to the data sequence space. In this way, data can be retransmitted on different subflows (mapped to the same DSN) in the event of failure.”

293. Attached as Exhibit 35 and incorporated herein by reference is a claim chart that identifies specifically where and how each limitation of each asserted claim of the '908 Patent, specifically claims 8-12 and 16-17, is found in or performed by the Accused Products. As set forth in Exhibit 35, the Accused Products, which include RHEL software that includes MPTCP operations (such as those discussed in RFC 6824 and RFC 8684) and servers and other computer and network devices running this software, such as smartphones, laptops, tablets, routers, base stations, etc., literally meet, or under the doctrine of equivalents meet, each limitation of claims 8-12 and 16-17 of the '908 Patent.

294. Defendant Red Hat, without license or authorization to do so, has directly infringed one or more claims of the '908 Patent, literally or under the doctrine of equivalents, by making,

using, offering for sale and/or selling the Accused Products within this District and elsewhere in the United States, and/or importing into the United States the Accused Products, in violation of 35 U.S.C. § 271(a).

295. On information and belief, Red Hat has also indirectly infringed, literally or under the doctrine of equivalents, one or more claims of the '908 Patent by actively, knowingly, and intentionally inducing infringement by its customers and/or others of the '908 Patent in violation of 35 U.S.C. § 271(b).

296. Red Hat has been aware of the '908 Patent at least as early as approximately October 2, 2023.

297. As noted above, Red Hat actively advertised, instructed, and encouraged users and/or developers to use the Accused Instrumentalities in a manner that infringes one or more claims of the '908 Patent.

298. CAS is entitled to damages for past infringement in an amount to be determined by the Court but in no event less than a reasonable royalty.

COUNT IV

(Infringement of U.S. Patent No. 11,582,343)

299. CAS repeats, re-alleges, and incorporates by reference the averments of paragraphs 1-298 of this Amended Counterclaim as though fully set forth herein.

300. For example, Red Hat has infringed at least claim 1 of the '343 Patent.

301. By way of further illustrative infringement, claim 1 of the '343 patent recites as follows:

1. A computer-implemented method for a first device to communicate via a wide area network, comprising the steps of:

connecting the first device to a first network having a first bandwidth via a second device;

connecting the first device to a second network having a second bandwidth via a third device;

establishing a connection through which data may be transferred between the first device and a fourth device by concurrently using a first portion of the first bandwidth and a second portion of the second bandwidth, the connection having an effective bandwidth including the first portion of the first bandwidth and the second portion of the second bandwidth; and

receiving by the first device a data set from the fourth device via the connection, wherein a portion of the data set is received through the first network and a portion of the data is received through the second network.

302. The Accused Instrumentalities perform a “computer-implemented method for a first device to communicate via a wide area network.” For example, a device running RHEL is a first device. The first network could be any network such as Ethernet, fiber, Wi-Fi, or cellular network. The second device is a network interface or access point connected to the first network (e.g., Ethernet router, fiber router, Wi-Fi access point, or cellular modem depending on which network is used for the “first network.”). The Accused Instrumentalities perform the step of “connecting the first device to a first network having a first bandwidth via a second device.”

303. The second network could be any network such as Ethernet, fiber, Wi-Fi, or cellular network. The third device is a network interface or access point connected to the second network (e.g., Ethernet router, fiber router, Wi-Fi access point, or cellular modem depending on which network is used for the “second network.”). The Accused Instrumentalities perform the step of “connecting the first device to a second network having a second bandwidth via a third device.”

304. The fourth device could be any device, such as another server, a cell phone, a computer, etc., communicating with the first device. The Accused Instrumentalities perform the step of “establishing a connection through which data may be transferred between the first device and a fourth device by concurrently using a first portion of the first bandwidth and a second portion of the second bandwidth, the connection having an effective bandwidth including the first portion

of the first bandwidth and the second portion of the second bandwidth.” For example, Red Hat explicitly references RFC 8684 which explains that a “Multipath TCP connection provides a bidirectional bytestream between two hosts communicating like normal TCP and thus does not require any change to the applications. However, Multipath TCP enables the hosts to use different paths with different IP addresses to exchange packets belonging to the MPTCP connection.”

305. Red Hat product documentation explicitly teaches that RHEL users “can configure MultiPath TCP (MPTCP) using the nmcli command to permanently establish multiple subflows between a source and destination system. The subflows can use different resources, different routes to the destination, and even different networks. Such as Ethernet, cellular, wifi, and so on. As a result, you achieve combined connections, which increase network resilience and throughput.” Further, Red Hat explains that “[t]he Multipath TCP (MPTCP) protocol allows for simultaneous usage of multiple paths between connection endpoints” and “MPTCP can effectively use multiple paths within a single transport connection and keep a logical connection established when the endpoint’s address changes.”

306. Red Hat teaches users that “MPTCP’s biggest boost is its ability to increase bandwidth by utilizing multiple TCP network connections—like adding lanes to a thruway—as compared to using what we refer to as the least cost route.” Red Hat states, “[w]ith MPTCP, your commute is faster because it allows increasing the download speed by aggregating the bandwidth of all interfaces.” Red Hat proclaims that “MPTCP is the turbo charger for your network and applications that you have been looking for as it provides resiliency for your applications and unlocks more bandwidth as it is available to us.” Red Hat explains that “MultiPath TCP (MPTCP) gives you a way to bundle multiple paths between systems to increase bandwidth and resilience from failures.”

307. The Accused Instrumentalities perform the step of “receiving by the first device a data set from the fourth device via the connection, wherein a portion of the data set is received through the first network and a portion of the data is received through the second network.” For example, Red Hat teaches users that “Transmission Control Protocol (TCP) ensures reliable delivery of the data through the internet and automatically adjusts its bandwidth in response to network load. Multipath TCP (MPTCP) is an extension to the original TCP protocol (single-path). MPTCP enables a transport connection to operate across multiple paths simultaneously, and brings network connection redundancy to user endpoint devices.” Red Hat further states that “[t]he redundancy offered by MPTCP enables inverse multiplexing of resources. Originally, networks were designed a bit like older cities with travel facilitated via single-path surface streets. But MPTCP offers a modern, streamlined multi-lane approach to networking, which increases TCP throughput to the sum of all available link-level channels—just like traffic throughput is increased by adding lanes to a highway.”

308. RFC 8684 demonstrates that “MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to the recipient application.” Section 2.4 of RFC 8684, titled “Data Transfer Using MPTCP,” provides additional technical details on how the data is received through two networks or subflows: “To ensure reliable, in-order delivery of data over subflows that may appear and disappear at any time, MPTCP uses a 64-bit Data Sequence Number (DSN) to number all data sent over the MPTCP connection. Each subflow has its own 32-bit sequence number space, utilizing the regular TCP sequence number header, and an MPTCP option maps the subflow sequence space to the data

sequence space. In this way, data can be retransmitted on different subflows (mapped to the same DSN) in the event of failure.”

309. Attached as Exhibit 36 and incorporated herein by reference is a claim chart that identifies specifically where and how each limitation of each asserted claim of the '343 Patent, specifically claims 1-20, is found in or performed by the Accused Products. As set forth in Exhibit 36, the Accused Products, which include RHEL software that includes MPTCP operations (such as those discussed in RFC 6824 and RFC 8684) and servers and other computer and network devices running this software, such as smartphones, laptops, tablets, routers, base stations, etc., literally meet, or under the doctrine of equivalents meet, each limitation of claims 1-20 of the '343 Patent.

310. Defendant Red Hat, without license or authorization to do so, has directly infringed one or more claims of the '343 Patent, literally or under the doctrine of equivalents, by making, using, offering for sale and/or selling the Accused Products within this District and elsewhere in the United States, and/or importing into the United States the Accused Products, in violation of 35 U.S.C. § 271(a).

311. On information and belief, Red Hat has also indirectly infringed, literally or under the doctrine of equivalents, one or more claims of the '343 Patent by actively, knowingly, and intentionally inducing infringement by its customers and/or others of the '343 Patent in violation of 35 U.S.C. § 271(b).

312. Red Hat has been aware of the '343 Patent at least as early as approximately October 2, 2023.

313. As noted above, Red Hat actively advertised, instructed, and encouraged users and/or developers to use the Accused Products in a manner that infringes one or more claims of the '343 Patent.

314. CAS is entitled to damages for past infringement in an amount to be determined by the Court but in no event less than a reasonable royalty.

COUNT V

(Infringement of U.S. Patent No. 11,418,641)

315. CAS repeats, re-alleges, and incorporates by reference the averments of paragraphs 1-314 of this Amended Counterclaim as though fully set forth herein.

316. For example, Red Hat's Accused Products have infringed at least claim 1 of the '641 Patent.

317. By way of further illustrative infringement, claim 1 of the '641 patent recites as follows:

1. A communications device that is capable of providing broadband communications services, comprising:

at least one connection for connecting to a communications network;

at least one wireless interface for connecting wirelessly to at least one remote communications device; and

a processor that

requests the at least one remote communications device to assist in transferring data,

sends a request to the at least one remote communications device for availability for participating in a multilink communication,

if available, sends control information through the at least one remote communications device for participating in a multilink connection,

receives packets from the at least one remote communications device, and

aggregates the data from the at least one remote communications device with data transfers from the at least one connection to increase data bandwidth for the communications device.

318. The Accused Instrumentalities are a “communications device that is capable of providing broadband communications services.” For example, Red Hat provides a computer program (e.g., RHEL) for installation on a communications device (e.g., a computer, a server). Red Hat teaches and provides explicit guidance on enabling and configuring MPTCP, a protocol that allows a transport connection to operate across multiple paths or “subflows” simultaneously, within RHEL. Red Hat actively promotes the use of MPTCP to improve network resilience and increase available bandwidth, directly supporting the provision of broadband communications services.

319. The Accused Instrumentalities contain “at least one connection for connecting to a communications network.” For example, the Accused Instrumentalities include an MPTCP connection for connecting to a communications network. Red Hat provides explicit guidance on enabling and configuring MPTCP within RHEL. For example, Red Hat instructs users to enable the MPTCP protocol in the kernel, allow applications to open MPTCP sockets, and establish multiple subflows within an MPTCP connection. To demonstrate this functionality, Red Hat presents a test setup using two network namespaces connected via an MPTCP connection that includes two virtual Ethernet (veth) paths, represented by the red and blue lines in the figure below.

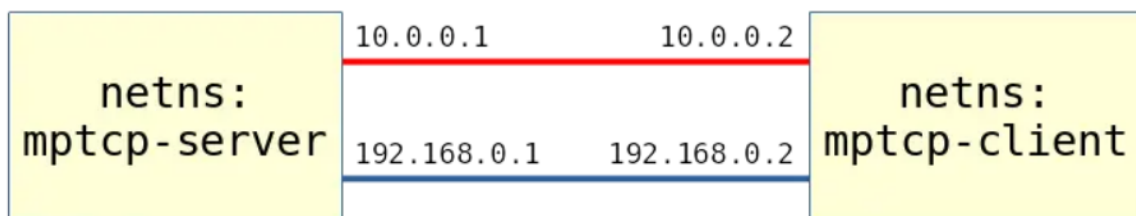
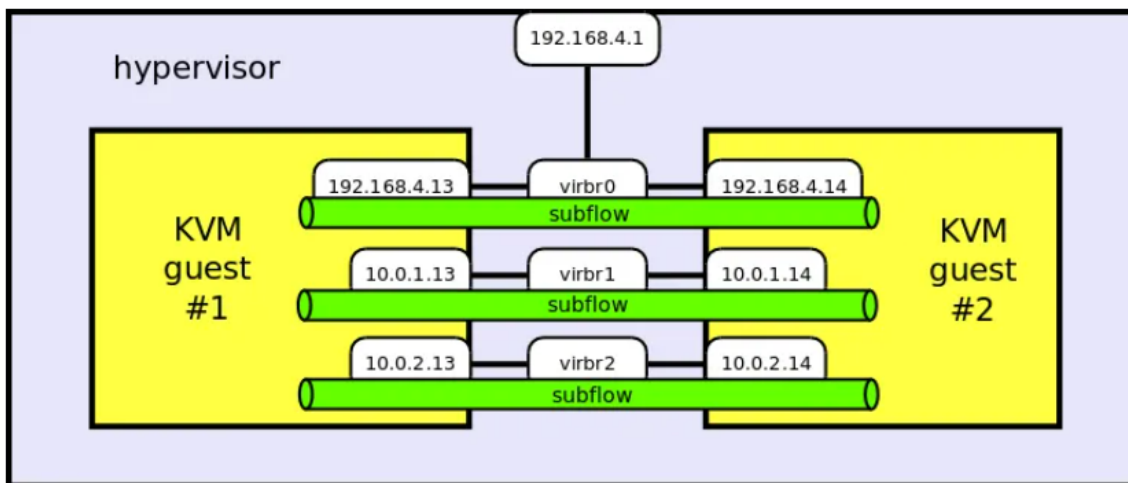


Figure 1: Network topology for two-path MPTCP test.

Each subflow is defined as "[a] flow of TCP segments operating over an individual path, which forms part of a larger MPTCP connection." Red Hat acknowledges that MPTCP subflows serve as "separate channels our system can use to communicate with the destination," and can utilize different resources, routes, and media types, including both wired and wireless connections.

320. The Accused Instrumentalities contain "at least one wireless interface for connecting wirelessly to at least one remote communications device." Red Hat provides explicit guidance on enabling and configuring MPTCP within RHEL. For example, Red Hat instructs users to enable the MPTCP protocol in the kernel, allow applications to open MPTCP sockets, and establish multiple subflows within an MPTCP connection. To demonstrate this functionality, Red Hat presents a virtualized example using two KVM guests, each with three network interfaces, as shown in the figure below.



321. Each subflow, represented by the green lines, operates over a respective network interface on KVM guest #1 and its corresponding network interface on KVM guest #2. While the network interfaces in this example are not explicitly identified as wireless, Red Hat acknowledges that MPTCP subflows "can use different resources, different routes to the destination system and even different media such as ethernet, 5G and so on." This explicit reference to 5G, a wireless

communication technology, indicates that at least one of the network interfaces may be a wireless interface. Red Hat provides additional guidance on the types of connections available as “subflows can use different resources, different routes to the destination, and even different networks. Such as Ethernet, cellular, wifi, and so on.” In addition to cellular, Wi-Fi serves as another example of a wireless interface.

322. Red Hat also describes a real-world scenario demonstrating MPTCP’s ability to facilitate communication across both wired and wireless connections. In this scenario, "One laptop has a wired connection – 1 Gbit Ethernet, low latency. The second connection is wireless — higher latency, but it makes the laptop portable so it can be used anywhere in the house[.] MPTCP allows us to establish subflows over both of these connections." By explicitly providing an MPTCP implementation utilizing both wired and wireless connections, Red Hat confirms that one or more of these network interfaces may be a wireless interface.

323. Further reinforcing this point, Red Hat provides explicit guidance on configuring wireless connectivity in RHEL. For example, Red Hat instructs users on creating a network bond to enable switching between an Ethernet and wireless connection without interrupting a VPN connection. This configuration inherently requires the presence of both wired and wireless interfaces, confirming that Red Hat anticipates and supports wireless networking within RHEL.

324. The Accused Instrumentalities have “a processor that requests the at least one remote communications device to assist in transferring data.” For example, the Accused Instrumentalities initiate an MPTCP connection using the MP_CAPABLE option. Red Hat provides explicit guidance on enabling and configuring MPTCP within RHEL, operations that necessarily require execution by a processor. As shown in the snippet below, Red Hat also

specifies hardware requirements for RHEL-based systems, including the necessary processor capabilities to support MPTCP-related functions.

Maximum logical CPUs

Red Hat defines a logical CPU as any schedulable entity. So every core/thread in a multicore/thread processor is a logical CPU.

Architecture	RHEL 6	RHEL 7	RHEL 8	RHEL 9
x86	32	N/A ¹	N/A ¹	N/A ¹
x86_64	448 [4096] ²	768 [5120] ³	768 [8192]	1792 [8192]
Power	128	768 [2048] ⁴	POWER8: 768 [2048] POWER9: 1536 [2048] ⁵ Power10: 1920 [2048] ⁶	POWER9: 1536 [2048] Power10: 1920 [2048] ¹⁹
IBM Z	z13: 64	z13: 256	z13: 256 z14: 340 z15: 380 z16: 400	z14: 340 z15: 380 z16: 400
ARM	N/A	N/A	256	512 [4096]

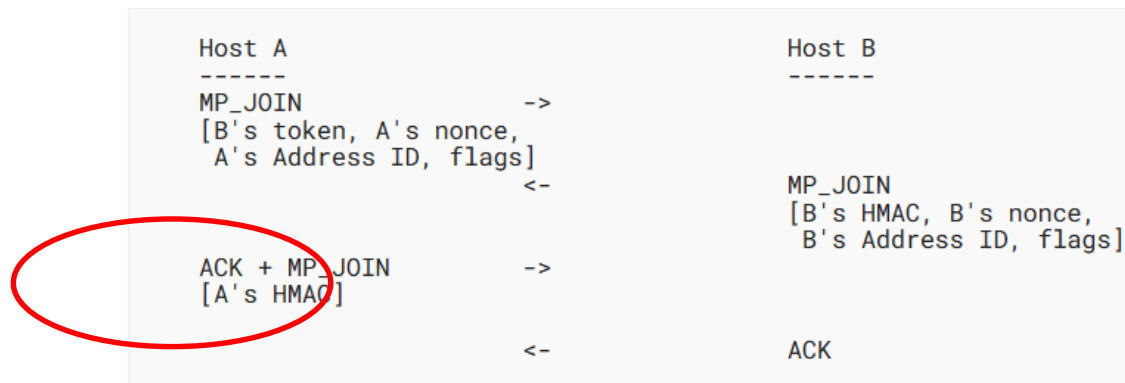
325. The Accused Instrumentalities have a processor that “sends a request to the at least one remote communications device for availability for participating in a multilink communication.” For example, the Accused Instrumentalities configure the MPTCP connection to enable additional subflows using the MP_JOIN option. Red Hat provides detailed instructions for configuring the MPTCP connection to enable additional subflows. For example, Red Hat instructs users to execute the **ip mptcp endpoint add** command to add new endpoints that can accommodate such subflows. RFC 8684, a specification for MPTCP that Red Hat cites in its product materials, states that “MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to the recipient application.”

326. The first use of the MP_JOIN option occurs in the SYN packet, which is sent to Host B (e.g., a remote communications device), to request availability for participating in an additional subflow of the MPTCP connection. Each additional subflow of the MPTCP connection

is a multilink communication, as MPTCP enables the use of multiple subflows over multiple paths, allowing data to be transmitted concurrently across those paths.

327. The Accused Instrumentalities contain a processor that, if the remote communications device is available, “sends control information through the at least one remote communications device for participating in a multilink connection.” For example, the Accused Instrumentalities configure the MPTCP connection to enable additional subflows using the MP_JOIN option.

328. Red Hat provides detailed instructions for configuring the MPTCP connection to enable additional subflows. After sending the SYN packet to request availability for participating in an additional subflow, Host A (e.g., a communications device) may receive a SYN/ACK packet from Host B (e.g., a remote communications device) confirming its availability for participating in the additional subflow. If available, Host A sends an ACK packet to Host B confirming its participation in the additional subflow. Specifically, the ACK packet (circled below) is sent with the MP_JOIN option and Host A’s HMAC, completing the HMAC exchange for participation in the MPTCP connection. The MPTCP connection is a multilink connection in that it enables the use of multiple subflows over multiple paths, allowing data to be transmitted concurrently across those paths. The HMACs act as control information for participating in this multilink connection: if they are verified as correct, the devices can verify each other and agree on which MPTCP connection the additional subflow will join; otherwise, the subflow is closed.



329. RFC 8684 states, “MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to the recipient application.” In addition to the HMACs, additional data fields such as Address ID, ADD_ADDR, Token, Hash-based Message Authentication Code (HMAC), Data Sequence Number (DSN), and Data Sequence Signal (DSS) also serve as control information.

a. **Address ID:** “The MP_JOIN option includes an “Address ID”. This is an identifier generated by the sender of the option, used to identify the source address of this packet, even if the IP header has been changed in transit by a middlebox.”

b. **ADD_ADDR:** “The ADD_ADDR option contains an HMAC to authenticate the address as having been sent from the originator of the connection. The receiver of this option echoes it back to the client to indicate successful receipt.”

c. **Token:** “A locally unique identifier given to a multipath connection by a host.”

d. **DSN:** “To ensure reliable, in-order delivery of data over subflows that may appear and disappear at any time, MPTCP uses a 64-bit Data Sequence Number (DSN) to number all data sent over the MPTCP connection.”

e. **DSS:** “The Data Sequence Signal (DSS) carries the Data Sequence Mapping. The Data Sequence Mapping consists of the subflow sequence number, data sequence number, and length for which this mapping is valid. This option can also carry a connection-level acknowledgment (the “Data ACK”) for the received DSN.”

330. Accordingly, a communications device's HMAC, Address ID, ADD_ADDR, Token, DSN, and DSS establish sending control information to a remote communications device for participating in a multilink connection.

331. The Accused Instrumentalities contain a processor that "receives packets from the at least one remote communications device." For example, the Accused Instrumentalities configure the MPTCP connection to establish multiple subflows. Red Hat further provides detailed instructions for preparing RHEL to enable MPTCP support and configuring an MPTCP connection. For example, Red Hat instructs users to enable the MPTCP protocol in the kernel, allow applications to open MPTCP sockets, and establish multiple subflows within an MPTCP connection. By configuring the kernel to support MPTCP, Red Hat enables a device (e.g., a communications device) to receive packets from a remote communications device over multiple subflows.

332. The Accused Instrumentalities contain a processor that "aggregates the data from the at least one remote communications device with data transfers from the at least one connection to increase data bandwidth for the communications device." For example, the Accused Instrumentalities configure the MPTCP connection to establish multiple subflows. Red Hat instructs users to enable the MPTCP protocol in the kernel, allow applications to open MPTCP sockets, and establish multiple subflows within an MPTCP connection. Red Hat describes that the throughput of multiple subflows can be combined into a single MPTCP connection. As explained by RFC 8684: "At a high level, an MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to the recipient application."

333. Red Hat's own documentation states, "[w]ith MPTCP, your commute is faster because it allows increasing the download speed by aggregating the bandwidth of all interfaces." Red Hat additionally describes MPTCP as "a way to bundle multiple paths between systems to increase bandwidth and resilience from failures."

334. Attached as Exhibit 37 and incorporated herein by reference is a claim chart that identifies specifically where and how each limitation of each asserted claim of the '641 Patent, specifically claims 1-3, is found in or performed by the Accused Products. As set forth in Exhibit 37, the Accused Products, which include RHEL software that includes MPTCP operations (such as those discussed in RFC 6824 and RFC 8684) and servers and other computer and network devices running this software, such as smartphones, laptops, tablets, routers, base stations, etc., literally meet, or under the doctrine of equivalents meet, each limitation of claims 1-3 of the '641 Patent.

335. Defendant Red Hat, without license or authorization to do so, has directly infringed one or more claims of the '641 Patent, literally or under the doctrine of equivalents, by making, using, offering for sale and/or selling the Accused Products within this District and elsewhere in the United States, and/or importing into the United States the Accused Products, in violation of 35 U.S.C. § 271(a).

336. On information and belief, Red Hat has also indirectly infringed, literally or under the doctrine of equivalents, one or more claims of the '641 Patent by actively, knowingly, and intentionally inducing infringement by its customers and/or others of the '641 Patent in violation of 35 U.S.C. § 271(b).

337. Red Hat has been aware of the '641 Patent at least as early as approximately October 2, 2023.

338. As noted above, Red Hat actively advertised, instructed, and encouraged users and/or developers to use the Accused Products in a manner that infringes one or more claims of the '641 Patent.

339. CAS is entitled to damages for past infringement in an amount to be determined by the Court but in no event less than a reasonable royalty.

COUNT VI

(Infringement of U.S. Patent No. 8,861,349)

340. CAS repeats, re-alleges, and incorporates by reference the averments of paragraphs 1-339 of this Amended Counterclaim as though fully set forth herein.

341. Red Hat has infringed at least claim 1 of the '349 Patent.

342. By way of further illustrative infringement, claim 1 of the '349 patent recites as follows:

1. A method for increasing bandwidth and data throughput comprising the steps of:

sending a multilink request from a **first device** to a **second device** to join a multilink connection, the first device being connected at a **first location** to a network, the second device being connected at a **second location** to the network, the second location being geographically separate from the first location, the first device and the second device being configured for accessing the network; and

when the multilink request is accepted by the second device, receiving at the first device first data from the network at the first location and during the multilink connection, concurrently receiving second data via a wireless connection from the second device, the second data being received at the second location from the network.

343. The Accused Instrumentalities perform a “method for increasing bandwidth and data throughput.” For example, as described above, Red Hat actively promotes use of MPTCP and provides guidance on enabling MPTCP to improve network resilience and increase available bandwidth.

344. The Accused Instrumentalities perform the step of “sending a multilink request from a first device to a second device to join a multilink connection, the first device being connected at a first location to a network, the second device being connected at a second location to the network, the second location being geographically separate from the first location, the first device and the second device being configured for accessing the network.” Red Hat explicitly references RFC 8684 in its materials on MPTCP which explains the process for the three-way handshake (SYN, SYN/ACK, ACK) used to request and establish a MPTCP connection. For example, as Red Hat explains in teaching users how to enable MPTCP, “[d]uring a three-way-handshake, the client and server exchange a 64-bit key using the MP_CAPABLE suboption, which is visible in the output of tcpdump in the braces ({ }) after mptcp capable. These keys are then used later to compute the DSN/DACK and token. The MP_CAPABLE suboption that originates in the client is also present following a successful connection setup. It will be present until the server explicitly acknowledges it using a data sequence signal (DSS) suboption.”

345. RFC 8684 defines how to initiate a MPTCP connection which uses “the same signaling as for initiating a normal TCP connection, but the SYN, SYN/ACK, and initial ACK (and data) packets also carry the MP_CAPABLE option. This option has a variable length and serves multiple purposes. Firstly, it verifies whether the remote host supports Multipath TCP; secondly, this option allows the hosts to exchange some information to authenticate the establishment of additional subflows.”

```

Host A                                Host B
-----                                -----
MP_CAPABLE                            ->
[flags]

                                   <-
                                   MP_CAPABLE
                                   [B's key, flags]

ACK + MP_CAPABLE (+ data) ->
[A's key, B's key, flags, (data-level details)]

```

346. In describing a specific MPTCP example, Red Hat states, “a first three-way handshake takes place with packets 1-3 on the 10.0.0.* path, while a second handshake kicks in with packets 6-8 on the 192.168.0.* path (note the S flag for SYN and the S. for SYN/ACK).”

347. The figure below from Red Hat illustrates two network paths in red and blue between two devices, a client and server.

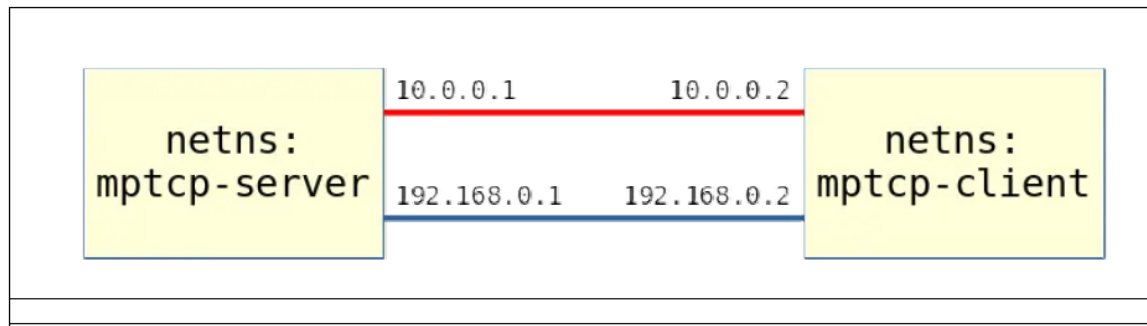


Figure 1: Network topology for two-path MPTCP test.

348. Red Hat product documentation provides that “MPTCP enables a transport connection to operate across multiple paths simultaneously, and brings network connection redundancy to user endpoint devices.” It further teaches that “[t]he Multipath TCP (MPTCP) protocol allows for simultaneous usage of multiple paths between connection endpoints. The protocol design improves connection stability and also brings other benefits compared to the single-path TCP.”

349. Red Hat explicitly teaches users how to optimize MPTCP's benefits: "To get the MPTCP benefits, specify a higher limit for maximum number of subflows for each MPTCP connection." Red Hat explains that "MPTCP really pulls ahead of the pack in the context of wireless networks; with both Wi-Fi and mobile networks being typical use cases. In addition to the throughput gains from inverse multiplexing, links may be added or dropped as the user moves in or out of coverage without disrupting the end-to-end TCP connection."

350. The Accused Instrumentalities perform the step of "when the multilink request is accepted by the second device, receiving at the first device first data from the network at the first location and during the multilink connection, concurrently receiving second data over a wireless connection from the second device, the second data being received at the second location from the network." For example, Red Hat explains that "after the application creates a socket, the kernel will operate one or more TCP subflows that will use the standard MPTCP option (IANA number = 30). Client and server semantics are the same as those used by a regular TCP socket (meaning that they will use bind() , listen() , connect() , and accept())." Using MPTCP, Red Hat users "will establish a MPTCP socket between client and server, instead of a TCP socket. This allows additional MPTCP 'subflows' to be established. These subflows can be thought of as separate channels our system can use to communicate with the destination. These can use different resources, different routes to the destination system and even different media such as ethernet, 5G and so on."

351. Red Hat further states, "The MPTCP solution allows simultaneous use of multiple network connections for a single data-stream, while still presenting a standard TCP socket application programming interface (API) to the application. The MPTCP protocol defines how

these flows are established and how the data-loading side is synchronized for each of these flows so that the presence of many sub-flows is completely transparent to the end user application.”

352. Red Hat’s own product documentation explains that MPTCP is an extension to the Transmission Control Protocol (TCP) to use multiple paths between peers simultaneously. In describing the technical details of a MPTCP session, Red Hat states, “ssnoff is the current difference between the TCP sequence number and the MPTCP sequence number for this subflow. If you are using a single subflow, this value will not change during the connection. If you are using more than one subflow to simultaneously carry data segments, then this value can increase or decrease depending on the path capacity.”

353. Red Hat product literature specifically highlights for RHEL users the following benefits associated with enabling MPTCP:

- a. “MPTCP also brings performance benefits in datacenter environments. In contrast to Ethernet channel bonding using 802.3ad link aggregation that bonds up to eight ports of the same type and speed, MPTCP can balance a single socket across multiple interfaces of varying port and transport types to reach very high throughput.”
- b. “Aggregating many relatively cheap links MPTCP can reach more than 58.1 Gbps on a single data-stream.”
- c. “In addition to improving resilience, MPTCP can also help us to combine the throughput of multiple subflows into a single MPTCP connection.”

354. The screenshot below is from a Red Hat article showing a MPTCP session simultaneously using Ethernet (yellow) and wireless WLAN (blue) connections. Even when the Ethernet cable was disconnected, MPTCP maintained connectivity by automatically shifting all traffic to the WLAN connection.



355. RFC 8684, which Red Hat cites in its product materials states, “MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to the recipient application.”

356. Attached as Exhibit 38 and incorporated herein by reference is a claim chart that identifies specifically where and how each limitation of each asserted claim of the '349 Patent, specifically claims 1-20, is found in or performed by the Accused Products. As set forth in Exhibit 38, the Accused Products, which include RHEL software that includes MPTCP operations (such as those discussed in RFC 6824 and RFC 8684) and servers and other computer and network devices running this software, such as smartphones, laptops, tablets, routers, base stations, etc., literally meet, or under the doctrine of equivalents meet, each limitation of claims 1-20 of the '349 Patent.

357. Defendant Red Hat, without license or authorization to do so, has directly infringed one or more claims of the '349 Patent, literally or under the doctrine of equivalents, by making, using, offering for sale and/or selling its Accused Products within this District and elsewhere in

the United States, and/or importing into the United States its Accused Products, in violation of 35 U.S.C. § 271(a).

358. On information and belief, Red Hat has also indirectly infringed, literally or under the doctrine of equivalents, one or more claims of the '349 Patent by actively, knowingly, and intentionally inducing infringement by its customers and/or others of the '349 Patent in violation of 35 U.S.C. § 271(b).

359. Red Hat has been aware of the '349 Patent at least as early as approximately October 2, 2023.

360. As noted above, Red Hat actively advertised, instructed, and encouraged users and/or developers to use the Accused Products in a manner that infringes one or more claims of the '349 Patent.

361. CAS is entitled to damages for past infringement in an amount to be determined by the Court but in no event less than a reasonable royalty.

COUNT VII

(Infringement of U.S. Patent No. 7,606,156)

362. CAS repeats, re-alleges, and incorporates by reference the averments of paragraphs 1 - 361 of this Amended Counterclaim as though fully set forth herein.

363. Red Hat has infringed and continues to infringe at least claim 1 of the '156 Patent.

364. By way of further illustrative infringement, claim 1 of the '156 patent recites as follows:

1. A method for aggregating, sharing and dynamically routing and allocating bandwidth from a plurality of wired and wireless networks that are geographically disbursed over a wide area, and providing some or all of the aggregated bandwidth to any user on an on-demand basis, the method comprising the steps of:

developing and updating a network table that comprises a list of nearby RCGs, their bandwidth capabilities over local, remote and wireless connections, and their location with respect to a requesting RCG;

determining an optimum amount of bandwidth needed for an immediate data transfer needs of the requesting RCG;

determining which of the nearby RCGs should be contacted for access to unused bandwidth to support a transfer of the requesting RCG, based upon their unused local bandwidth capacity, and a distance and a number of hops between the RCGs and the requesting RCG;

sending a request to the supporting RCGs asking for use of a portion of the unused bandwidth;

receiving responses from the supporting RCGs with information about how much bandwidth each selected RCG can share;

selecting which of the supporting RCGs to use for optimal use of needed bandwidth;

contacting the selected RCGs with control information for sending data to the requesting RCG;

sending packets of the data from the selected RCGs to the requesting RCG;

reassembling the packets of the data at the requesting RCG; and

relinquishing the bandwidth of each of the selected RCGs.

365. The Accused Instrumentalities perform a “method for aggregating, sharing and dynamically routing and allocating bandwidth from a plurality of wired and wireless networks that are geographically disbursed over a wide area, and providing some or all of the aggregated bandwidth to any user on an on-demand basis.” For example, RHEL is a software that Red Hat distributes to customers who then use it on their own platforms or on the platforms of third parties, such as cloud service providers. Red Hat actively promotes the adoption of MPTCP and provides guidance on enabling MPTCP to improve network resilience and increase available bandwidth. For example, Red Hat explains that one of the benefits and purposes of MPTCP is to aggregate and share bandwidth such as aggregating a local Ethernet or fiber connection with a remote cellular connection. Red Hat product documentation further discloses to customers:

- a. “MultiPath TCP (MPTCP) gives you a way to bundle multiple paths between systems to increase bandwidth and resilience from failures.”
- b. “At Red Hat we have recurring requests from customers to enable applications to switch media transparently, possibly also combining the bandwidth of such media. We can use MPTCP as a working solution for such scenarios.”
- c. “MPTCP’s biggest boost is its ability to increase bandwidth by utilizing multiple TCP network connections—like adding lanes to a thruway—as compared to using what we refer to as the least cost route.”
- d. With MPTCP, your commute is faster because it allows increasing the download speed by aggregating the bandwidth of all interfaces.”
- e. “You can configure MultiPath TCP (MPTCP) using the nmcli command to permanently establish multiple subflows between a source and destination system. The subflows can use different resources, different routes to the destination, and even different networks. Such as Ethernet, cellular, wifi, and so on. As a result, you achieve combined connections, which increase network resilience and throughput.”

366. The Accused Instrumentalities perform the step of “developing and updating a network table that comprises a list of nearby RCGs, their bandwidth capabilities over local, remote and wireless connections, and their location with respect to a requesting RCG.” For example, on information and belief, Red Hat devices running RHEL with a Wi-Fi connection use the 802.11 Wi-Fi standards and protocols from the Institute of Electrical and Electronics Engineers (IEEE). The same is true for devices with a Wi-Fi connection that communicate with devices running RHEL such as a cell phone or laptop communicating with a server running RHEL.

367. Devices with a Wi-Fi connection create a network table in the form of a list of Wi-Fi networks. In 802.11 terminology, these Wi-Fi networks are referred to as Service Set Identifiers (SSIDs), and devices are called stations (STAs). 802.11 states, “Upon receipt of the MLME-SCAN.request primitive, a STA [station or device] shall perform scanning procedures according to the parameters given in the primitive.” The SSID parameter indicates the SSID for which to scan. The SSID List parameter indicates one or more SSIDs for which to scan.

368. These devices use signal strength to determine the location and bandwidth capabilities of nearby Wi-Fi networks. A “STA measures the received signal strength of the Beacon frame and may store the result in dot11BeaconRssi” which can be used to measure the distance of a Wi-Fi network. The BeaconRSSI is described as the “received signal strength in dBm of received Data frames from the network.” The MLME-SCAN.request includes a parameter called ChannelList indicates the bandwidth capabilities.

369. The Accused Instrumentalities perform the step of “determining an optimum amount of bandwidth needed for an immediate data transfer needs of the requesting RCG.” For example, devices with a Wi-Fi connection follow the Quality of Service (QoS) standards from 802.11 that indicates the bandwidth needed for a data transfer, giving higher priority to certain forms of data such as voice. The Traffic Specification (TSPEC) element is a component of the QoS standard that communicates a device’s bandwidth needs. The TSPEC element contains fields such as Minimum Data Rate, Mean Data Rate, and Peak Data Rate that allow devices to specify their bandwidth needs.

370. The Accused Instrumentalities perform the step of “determining which of the nearby RCGs should be contacted for access to unused bandwidth to support a transfer of the requesting RCG, based upon their unused local bandwidth capacity, and a distance and a number of hops between the RCGs and the requesting RCG.” Devices with a Wi-Fi connection make this determination through the “MLME-SCAN.request primitive.” “Upon receipt of the MLME-SCAN.request primitive, a STA shall perform scanning procedures according to the parameters given in the primitive.” These parameters provide the device with information, such as ChannelList, about a Wi-Fi network’s unused bandwidth and distance.

371. As for determining the number of hops, as an example, devices with a Wi-Fi connection perform this through mesh networks. 802.11 provides further details when discussing the Multihop Action frames used in mesh networks. For example, when Mesh Management Protocol Data Units (MMPDUs) forward data frames across multiple hops, individually addressed Multihop Action frames are used. The screenshot below lists Addresses 1-4 which identify the next-hop mesh STA, the transmitting STA, the final destination STA, and the original source STA, respectively, as required for proper multihop forwarding in a mesh network. As the frame moves from Address 1 to Address 2 and so on, the Mesh Time to Live (TTL) is decremented, meaning an STA can compare the original Mesh TTL value to the current value to determine the number of hops the frame has traveled. The four address fields and the Mesh TTL can then be used to determine the frame's path which is indicative of the "number of hops between the RCGs and the requesting RCG."

10.38.5.2 MMPDU forwarding using individually addressed Multihop Action frames

MMPDUs sent by a mesh STA and destined to another mesh STA in the MBSS using individually addressed Multihop Action frames (see 9.6.17) shall be transmitted using a Management frame with the three-address MAC header format [with the Address Extension Mode subfield in the Mesh Control field set to “Address4” (see Table 9-26)], where the four address fields are set as follows [see row “Multihop Action (individually addressed)” in Table 9-47]:

- **Address 1**: The address of the next-hop mesh STA (toward the destination mesh STA according to the forwarding information; see 10.38.2).
- **Address 2**: The address of the transmitter mesh STA.
- **Address 3**: The address of the destination mesh STA.
- **Address 4**: The address of the source mesh STA.

The source mesh STA shall set the **Mesh TTL** subfield in the Mesh Control field to dot11MeshTTL, and set the Mesh Sequence Number subfield in the Mesh Control field to a value from a modulo 2^{32} counter that is incremented by 1 for each new MSDU transmitted with a Mesh Control field and for each new MMPDU transmitted using a Multihop Action frame.

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IEEE Std 802.11-2020

IEEE Standard for Information Technology—Local and Metropolitan Area Networks—Specific Requirements
Part 11: Wireless LAN MAC and PHY Specifications

At intermediate and destination mesh STAs, on receipt of an individually addressed Multihop Action frame, the address matching, the reception procedures, the forwarding information update, and the Mesh TTL **decrement** are performed as described in 10.38.3.2, and the MMPDU is forwarded according to the forwarding information and the procedures in 10.38.3.2.

372. The Accused Instrumentalities perform the step of “sending a request to the supporting RCGs asking for use of a portion of the unused bandwidth.” For example, as the figure below demonstrates, RFC 8684 defines how to initiate a MPTCP connection which uses “the same signaling as for initiating a normal TCP connection, but the SYN, SYN/ACK, and initial ACK (and data) packets also carry the MP_CAPABLE option. This option has a variable length and serves multiple purposes. Firstly, it verifies whether the remote host supports Multipath TCP; secondly, this option allows the hosts to exchange some information to authenticate the establishment of additional subflows.”

Host A		Host B
-----		-----
MP_CAPABLE	->	
[flags]		
	<-	MP_CAPABLE
		[B's key, flags]
ACK + MP_CAPABLE (+ data)	->	
[A's key, B's key, flags, (data-level details)]		

373. In describing a specific MPTCP example, Red Hat states, “a first three-way handshake takes place with packets 1-3 on the 10.0.0.* path, while a second handshake kicks in with packets 6-8 on the 192.168.0.* path (note the S flag for SYN and the S. for SYN/ACK).” In addition to RFC 8684, QoS components of the 802.11 standard allows devices to request and negotiate for bandwidth to support different types of traffic, such as voice and video. Specific QoS mechanisms like Enhanced Distributed Channel Access (EDCA) and Hybrid Coordination Function Controlled Channel Access (HCCA) define how traffic is prioritized and how bandwidth is allocated.

374. The Accused Instrumentalities perform the step of “receiving responses from the supporting RCGs with information about how much bandwidth each selected RCG can share.” For example, as described above, a “SYN, SYN/ACK, and initial ACK” are exchanged between two hosts. The ACK message is used to confirm receipt of the SYN/ACK and complete the establishment of the MPTCP connection. As another example, the “information about how much bandwidth each selected RCG can share” is satisfied through the 802.11 standard. ChannelWidth is a data field used to indicate the bandwidth of the wireless channel being used such as “20 MHz, 40 MHz, 80 MHz, 160 MHz, and 80+80 MHz channels.”

375. The Accused Instrumentalities perform the step of “selecting which of the supporting RCGs to use for optimal use of needed bandwidth.” For example, the QoS components

of the 802.11 standard satisfies this limitation. Specific QoS mechanisms like Enhanced Distributed Channel Access (EDCA) and Hybrid Coordination Function Controlled Channel Access (HCCA) define how traffic is prioritized and how bandwidth is allocated. For example, the screenshot below shows how voice and video are given the highest priority; whereas, background data is the lowest.

Table 20i—UP-to-AC mappings

Priority	UP (Same as 802.1D user priority)	802.1D designation	AC	Designation (informative)
Lowest ↓ Highest	1	BK	AC_BK	Background
	2	—	AC_BK	Background
	0	BE	AC_BE	Best Effort
	3	EE	AC_BE	Best Effort
	4	CL	AC_VI	Video
	5	VI	AC_VI	Video
	6	VO	AC_VO	Voice
	7	NC	AC_VO	Voice

376. The Accused Instrumentalities perform the step of “contacting the selected RCGs with control information for sending data to the requesting RCG.” For example, the Hybrid Coordination Function (HCF) is a set of medium access control (MAC) procedures within a QoS Access Point (QAP) that includes the Hybrid Coordinator (HC). The HC controls when and how data can be sent.

377. As another example, the information exchanged during a MPTCP session, as described in RFC 8684, further satisfies this limitation. RFC 8684 states, “MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to

the recipient application.” “Control information” includes but is not limited to the following data fields exchanged through a MPTCP session: MP_CAPABLE, MP_JOIN, ADD_ADDR, Token, Hash-based Message Authentication Code (HMAC), Data Sequence Number (DSN), and Data Sequence Signal (DSS), as described below and above in Counts I and V..

a. **MP_CAPABLE:** “The exchange of keys in the MP_CAPABLE handshake provides material that can be used to authenticate the endpoints when new subflows will be set up.”

b. **MP_JOIN:** “Additional subflows begin in the same way as initiating a normal TCP connection, but the SYN, SYN/ACK, and ACK packets also carry the MP_JOIN option.” “MP_JOIN also contains flags and an Address ID that can be used to refer to the source address without the sender needing to know if it has been changed by a NAT.”

c. **ADD_ADDR:** “The ADD_ADDR option contains an HMAC to authenticate the address as having been sent from the originator of the connection. The receiver of this option echoes it back to the client to indicate successful receipt.”

d. **Token:** “A locally unique identifier given to a multipath connection by a host.”

e. **HMAC:** “Hash-based Message Authentication Code (HMAC) is used for authentication. The HMAC uses the keys exchanged in the MP_CAPABLE handshake and the random numbers (nonces) exchanged in these MP_JOIN options.”

f. **DSN:** “To ensure reliable, in-order delivery of data over subflows that may appear and disappear at any time, MPTCP uses a 64-bit Data Sequence Number (DSN) to number all data sent over the MPTCP connection.”

g. **DSS:** “The Data Sequence Signal (DSS) carries the Data Sequence Mapping. The Data Sequence Mapping consists of the subflow sequence number, data sequence number, and length for which this mapping is valid. This option can also carry a connection-level acknowledgment (the “Data ACK”) for the received DSN.”

378. The Accused Instrumentalities perform the step of “sending packets of the data from the selected RCGs to the requesting RCG.” For example, Red Hat explains that “Multipath TCP manages the creation, removal, and utilization of these subflows to send data” and the “MPTCP solution allows simultaneous use of multiple network connections for a single data-stream, while still presenting a standard TCP socket application programming interface (API) to the application.” Red Hat’s documentation provides that “[u]sing MPTCP, we will establish a

MPTCP socket between client and server, instead of a TCP socket. This allows additional MPTCP ‘subflows’ to be established. These subflows can be thought of as separate channels our system can use to communicate with the destination. These can use different resources, different routes to the destination system and even different media such as ethernet, 5G and so on.”

379. The Accused Instrumentalities perform the step of “reassembling the packets of the data at the requesting RCG[.]” For example, Red Hat explains that “[t]he MPTCP implementation will take one input data stream from an application and split it into one or more subflows, with sufficient control information to allow it to be reassembled and delivered reliably and in order to the recipient application.” The DSN and DSS described above are specific tools used to reassemble packets. Red Hat further acknowledges that the “MPTCP is an extension to the Transmission Control Protocol (TCP) to use multiple paths between peers simultaneously.”

380. The Accused Instrumentalities perform the step of “relinquishing the bandwidth of each of the selected RCGs.” For example, in describing the process for closing a connection, RFC 8694, cited by Red Hat in its product materials, states: “When an application calls close() on a socket, this indicates that it has no more data to send; for regular TCP, this would result in a FIN on the connection. For MPTCP, an equivalent mechanism is needed; this is referred to as the DATA_FIN. A DATA_FIN is an indication that the sender has no more data to send, and as such it can be used to verify that all data has been successfully received.”

381. Attached as Exhibit 39 and incorporated herein by reference is a claim chart that identifies specifically where and how each limitation of each asserted claim of the '156 Patent, specifically claims 1-5, is found in or performed by the Accused Products. As set forth in Exhibit 39, the Accused Products, which include RHEL software that includes MPTCP operations (such as those discussed in RFC 6824 and RFC 8684) and servers and other computer and network

devices running this software, such as smartphones, laptops, tablets, routers, base stations, etc., literally meet, or under the doctrine of equivalents meet, each limitation of claims 1-5 of the '156 Patent.

382. Defendant Red Hat, without license or authorization to do so, has directly infringed one or more claims of the '156 Patent, currently infringes, and will continue to infringe, literally or under the doctrine of equivalents, one or more claims of the '156 Patent by making, using, offering for sale and/or selling the Accused Products within this District and elsewhere in the United States, and/or importing into the United States its Accused Products, in violation of 35 U.S.C. § 271(a).

383. On information and belief, Red Hat has also indirectly infringed, currently indirectly infringes, and will continue to indirectly infringe, literally or under the doctrine of equivalents, one or more claims of the '156 Patent by actively, knowingly, and intentionally inducing infringement by its customers and/or others of the '156 Patent in violation of 35 U.S.C. § 271(b).

384. Red Hat has been aware of the '156 Patent at least as early as approximately October 2, 2023.

385. As noted above, Red Hat actively advertises, instructs, and encourages users and/or developers to use the Accused Products in a manner that infringes one or more claims of the '156 Patent.

386. Defendant's past and continuing infringement of the '156 Patent by its sales and offers for sale of the Accused Products are causing economic harm to CAS, for which CAS is entitled to damages for past and continued infringement, in an amount to be determined by the Court but in no event less than a reasonable royalty.

PRAYER FOR RELIEF

WHEREFORE, CAS respectfully requests that the Court find in its favor and against Counterdefendant Red Hat, Inc., and that the Court grant CAS the following relief:

- A. A judgment in favor of CAS that Red Hat has infringed one or more claims of the following Asserted Patents of CAS: 7,606,156; 8,228,801; 8,861,349; 9,350,649; 10,868,908; 11,418,641; and 11,582,343;
- B. An accounting of and an award to CAS of damages adequate to compensate CAS for Red Hat's acts of infringement, including a reasonable royalty, and also including supplemental damages for any post-verdict infringement up until entry of final judgment with an accounting as needed, together with pre-judgment and post-judgment interest pursuant to 35 U.S.C. § 284;
- C. Finding Red Hat's infringement to be willful and an award to CAS of enhanced damages in an amount up to treble the amount of compensatory damages as justified under 35 U.S.C. § 284 for Red Hat's willful infringement;
- D. A declaration that this is an exceptional case, including, an award to CAS of its costs, expenses, and reasonable attorneys' fees under 35 U.S.C. § 285 and all other applicable statutes and rules in common law as may apply;
- E. An award to CAS of its costs pursuant to 35 U.S.C. § 284 and/or Fed. R. Civ. P. 54(d); and
- F. An award of any such further relief that the Court deems just and proper.

JURY DEMAND

CAS hereby demands a jury trial on all issues so triable.

Respectfully submitted this the 31st day of October, 2025.

WARD AND SMITH, P.A.

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CERTIFICATE OF SERVICE

I hereby certify that I electronically filed the foregoing **DEFENDANT COMPETITIVE ACCESS SYSTEMS, INC.'S AMENDED ANSWER AND COUNTERCLAIM** with the Clerk of Court using CM/ECF, which will give notice of such filing to all attorneys currently of record in the above-captioned case.

This 31st day of October, 2025.

WARD AND SMITH, P.A.

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