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# Threats to Copyrighted Code: Bots, Mods, and Reverse Engineering

*Sydney Johnson\**

## ABSTRACT

Computer code is subject to copyright protection as a literary work, while video games have added protection as both a literary work and as an audiovisual work. Through the enactment of the Digital Millennium Copyright Act, the Computer Fraud and Abuse Act, and various case precedents, copyright law is beginning to accommodate 21st century concerns. However, the creation of technological advancements inevitably leads to threats against intellectual property and security. Computer software is constantly under attack from malicious software and techniques, including “bots,” “mods,” and reverse engineering. Therefore, the need for stronger copyright protection for code is crucial. Protection could be enhanced through more frequent litigation, amendments to copyright law, and more efficient construction of licensing agreements.

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## I. INTRODUCTION

Code is everywhere. In this new age of technology, nearly everything is comprised of a combination of ones and zeroes through binary—the “language of computers.”<sup>1</sup> Computer programming, or coding, is when a programmer enters a series of commands that direct the computer to perform certain functions.<sup>2</sup> More specifically, code is “a sequence of instructions that the computer executes.”<sup>3</sup> Lines of code can be written in a variety of coding languages which act as a bridge between binary and natural languages, such as English.<sup>4</sup> In fact, code can be referred to as a “literary work”—expressed in numbers, words, or symbols—and literary works are subject to copyright protection.<sup>5</sup> Unfortunately, this does not stop people from infringing on copyrighted code, also known as software piracy.<sup>6</sup> This is a problem because the infringement often causes computer programmers and their companies to suffer a financial loss, and it undermines the value of their products. For example, in *Blizzard Entertainment v. James Enright*, the defendant’s hacking of a popular online game allegedly lost the company millions of dollars as well as the loyalty of their consumers, all while the hacker made a profit.<sup>7</sup> Therefore, resolution of this problem requires stronger enforcement and regulation on copyright infringements for code.

This article outlines the issues regarding copyright infringement in the world of computer software by arguing the need for stronger intellectual property protection. Part II gives a brief background on computer software, while Part III discusses the basics surrounding copyright law. Part IV then narrows the discussion to video games and their code, focusing on crucial case precedent. Finally, Part V discusses possible solutions to further defend computer software’s copyright protections, such as more frequent enforcement through litigation, establishing new protections for computer software under copyright law, and more thoughtful drafting of licensing agreements. This article ultimately advocates for additional copyright protections for computer software. Stronger enforcement of existing law, creation of a new class of protection under law, and more thoughtful license agreements could offer such protection. The objective of this article is to bring attention to the issue and encourage lawmakers and software developers to take the necessary steps to solve the problem.

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1. Piers Linney, *How the World Came to Be Run by Computer Code*, BRIT. BROADCASTING CORP.: IWONDER, <https://www.bbc.com/timelines/zxsrdm> (last visited Oct. 15, 2018).

2. Matt Adesanya, *A Gentler Introduction to Programming*, FREE CODE CAMP (Oct. 12, 2017), <https://medium.freecodecamp.org/a-gentler-introduction-to-programming-1f57383a1b2c>.

3. *Id.*

4. *Id.*

5. Oracle Am., Inc. v. Google Inc., 750 F.3d 1339, 1354 (Fed. Cir. 2014).

6. *Copyright Infringement of Software*, IT@CORNELL, <https://it.cornell.edu/copyright-infringement-software> (last updated Jan. 11, 2017, 11:24 PM).

7. Ernesto Van der Sar, *Blizzard Sues Bot Maker for Copyright Infringement*, TORRENTFREAK (Nov. 11, 2015), <https://torrentfreak.com/blizzard-sues-bot-maker-for-copyright-infringement-151111/>.

## II. CODE BACKGROUND

### A. Programs and Servers

There are several terms related to computer software that are pertinent to understand before a discussion on copyright issues. First, a computer program is a series of commands instructing a computer to execute a function.<sup>8</sup> Servers are types of computer programs that connect with another computer to provide information and services.<sup>9</sup> Game servers are used in most online games.<sup>10</sup> This type of local server works by connecting to a game client, which is a program that helps connect the player to the server.<sup>11</sup> The server then sends the information “packets”—the game’s code—over to the player on her personal computer.<sup>12</sup>

Private servers are a breeding ground for intellectual property infringement. A private server allows an individual to host their own version of a game, including a modified or otherwise infringed version.<sup>13</sup> Some gaming companies have referred to these servers as “pirate” servers due to the issue of legality in the servers’ actions.<sup>14</sup> Pirating in the context of computer software is often called “software piracy.”<sup>15</sup> It occurs when copyrighted software has been used in a way that violates licensing agreements or other copyright law—including modification, sale, and distribution.<sup>16</sup> Further, software piracy and, therefore, the creation of pirate servers are “considered direct copyright infringement when it denies copyright holders due compensation for use of their creative works.”<sup>17</sup> The questionable conduct actions of private servers include the use of “mods” or “bots,” which are the subject of such copyright infringement discussions.<sup>18</sup>

### B. “Bots”

The second key concept necessary to understand is a “bot.” Bots can be described as the software equivalent of robots.<sup>19</sup> They are a type of “automation

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8. 17 U.S.C. § 101 (2010).

9. Margaret Rouse, *Definition: Server*, TECH TARGET, <https://whatis.techtarget.com/definition/server> (last updated Feb. 2019).

10. Santosh, *What is a Game Server*, EUKHOST (Dec. 10, 2009), <https://www.eukhost.com/blog/webhosting/what-is-a-game-server/>.

11. *Id.*

12. *Id.*

13. Aidan Chard, *4 Things to Consider When Hosting a Gaming Server*, UK HOST4U (Oct. 17, 2017), <https://www.ukhost4u.com/community/blog/4-things-to-consider-when-hosting-a-private-gaming-server/>.

14. Evan Conaway, *Privacy and Piracy: Investigating Unauthorized Online Gaming*, PLATYPUS (Feb. 8, 2018), <http://blog.castac.org/2018/02/privacy-and-piracy/>.

15. *Software Piracy*, TECHOPEDIA, <https://www.techopedia.com/definition/4361/software-piracy> (last visited Feb. 2, 2019).

16. *Id.*

17. *Id.*

18. Bill Hinsee, *Wrath of the EULA: Can the Use of Bots Lead to Copyright Infringement?*, 17 B.U. J. SCI. & TECH. L. 160, 167 (2011); Kyri Tsircou, *Is Video Game Cheating Illegal?*, TSIRCOU INTELL. PROP. L. (May 22, 2018), <http://tsircoulaw.com/uncategorized/is-video-game-cheating-illegal/>.

19. Matt Francis, *4 Things You Absolutely Need to Know About Software Bots*, WORKING MOUSE: INNOVATION (June 27, 2017), <https://workingmouse.com.au/innovation/4-things-you-absolutely-need-to-know-about-software-bots>.

software” that can essentially carry out game play without the physical player’s actions.<sup>20</sup> This is appealing to coders and gamers because bots can complete “tedious tasks,”<sup>21</sup> such as increasing experience and collecting in-game currency and valuable items.<sup>22</sup> This allows the coder to focus on the more intricate and interesting parts of the task or game.<sup>23</sup> Bots have been around for over 50 years, but like every other form of technology, they have evolved drastically.<sup>24</sup> Bot software has progressed to the point where its artificial intelligence technology enables the bots to resemble the activity of a human player.<sup>25</sup>

### C. “Mods”

The third key concept surrounding these issues is a “mod.” Mods, or gaming modifications, alter the code of games for aesthetic and functional purposes.<sup>26</sup> Gamers often modify the computer software in games that have a poor story line, low quality graphics, or small errors in the lines of code (known as “bugs”).<sup>27</sup> A common defense that mod creators assert is that each player has their own preferences when it comes to what they believe makes a perfect game; mod creators therefore defend their modifications on their alleged right to make the game the best it can be.<sup>28</sup> These modifications are becoming increasingly popular, possibly because of how much easier it has become to share mods with other gamers due to advances in technology.<sup>29</sup> The Steam Workshop is a popular source for sharing certain types of mods with other gamers.<sup>30</sup> Once a software developer grants the Steam Workshop permission to limited modifications, players can publish their own mods or download mods made by others.<sup>31</sup> Mods from Steam Workshop are often simple aesthetic changes such as items of clothing for the game’s character or altering the appearance of the map.<sup>32</sup>

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20. Jennifer Miller, Comment, *The Battle Over “Bots”: Anti-circumvention, the DMCA, and “Cheating” at World of Warcraft*, 80 U. CIN. L. REV. 653, 654–55 (2011).

21. Francis, *supra* note 19.

22. Francois Triquet, *Bots in the Gaming World: What, Who, How and Why?*, RECAST.AI: BOTS (Sept. 1, 2016), <https://recast.ai/blog/bot-in-video-games/>.

23. Francis, *supra* note 19.

24. Kurt Wagner, *Bots, Explained*, RECODE (Apr. 11, 2016, 5:00 AM), <https://www.recode.net/2016/4/11/11586022/what-are-bots>.

25. Allison Guy, *Video Game-Playing Robot Acts More “Human” than Humans*, NEXT NATURE NETWORK (Oct. 6, 2012), <https://www.nextnature.net/2012/10/video-game-playing-robot-acts-more-human-than-humans/>.

26. Michael Wueste, Comment, *Gaming Mods and Copyright*, MICH. TECH. L. REV. (Nov. 6, 2012), <http://mttlr.org/2012/11/06/gaming-mods-and-copyright/>.

27. *The IP Implications of Video Game Mods*, N.Y.U. J. INTELL. PROP. & ENT. L. (Feb. 29, 2016), <https://blog.jipel.law.nyu.edu/2016/02/the-ip-implications-of-video-game-mods/>.

28. *Id.*

29. *Id.*

30. *Here’s How it Works*, STEAM WORKSHOP, <https://steamcommunity.com/workshop/workshopsubmitinfo/> (last visited Mar. 15, 2019).

31. *Id.*

32. *Id.*

### D. Reverse Engineering

The final concept that is necessary to address is a recent issue between competitors in software development: “reverse engineering.”<sup>33</sup> Reverse engineering is a method of dismantling something, piece by piece,<sup>34</sup> to understand how it works.<sup>35</sup> This allows a computer programmer to use the deciphered code to create slightly different algorithms as a means for duplicating the program without necessarily being liable for copying verbatim.<sup>36</sup> For example, one coder spent over 1,200 hours before successfully reverse engineering the source code for the 1996 version of the popular online game, *Diablo*.<sup>37</sup> Source code contains the specific coding information for how a program functions; therefore it is usually kept confidential by the programming company.<sup>38</sup> By working to reverse engineer the source code instead of editing lines of code to make modifications—which is tedious and often inefficient—there is more control over the finished product.<sup>39</sup> The newly written source code is easier to modify because the coder has a greater understanding of the commands embedded in each line of code, making it easier to fix bugs and add updates.<sup>40</sup>

Intellectual property infringement on gaming servers often stems from bots, mods, and reverse engineering. These manipulations of computer software are evolving in both sophistication and accessibility, thus creating a need for more representation in the applicable law.

## III. COPYRIGHT BACKGROUND

### A. Statutes & Acts

Copyright protection extends to “original works of authorship fixed in any tangible medium of expression—now known or later developed—from which they can be perceived, reproduced, or otherwise communicated.”<sup>41</sup> More specifically in the context of this article, “derivative works” are often the subject of copyright infringement allegations.<sup>42</sup> They are either based on previous works or consist of modifications “which, as a whole, represent an original work of authorship.”<sup>43</sup> Copyright owners have certain exclusive rights to their works, such as the right to reproduce copies and construct derivative works.<sup>44</sup> However, it is not considered infringement

33. L. J. KUTTEN & FREDERIC M. WILF, COMPUTER SOFTWARE PROTECTION-LIABILITY-LAW-FORMS § 2:149 (Dec. 2018).

34. *Id.*

35. Joe Linhoff, Note, *Video Games and Reverse Engineering: Before and After the Digital Millennium Copyright Act*, 3 J. ON TELECOMM. & HIGH TECH. L., 209, 210 (2004).

36. KUTTEN & WILF, *supra* note 33.

37. Joe Donnelly, *A Coder Spent 1,200 Hours Reverse-Engineering Diablo's Source Code*, PC GAMER (June 20, 2018), <https://www.pcgamer.com/a-coder-spent-1200-hours-reverse-engineering-diablo-source-code/>.

38. Lee T. Gesmer, Esq., *Negotiating User Access to Source Code in Computer Products*, GESMER UPDEGROVE LLP (Mar. 1, 1989), <https://www.gesmer.com/news/negotiating-user-access-to-source-code-in-computer-products>.

39. Donnelly, *supra* note 37.

40. *Id.*

41. 17 U.S.C. § 102 (1990).

42. 17 U.S.C. § 101 (2010).

43. *Id.*

44. 17 U.S.C. § 106 (2002).

for the owner of a copy of a computer program to make or authorize the making of another copy or adaptation of that computer program provided: (1) that such a new copy or adaptation is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner, or (2) that such new copy or adaptation is for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful.<sup>45</sup>

The means by which one can transfer a copy or adaptation of the program are subject to the rights the program provides.<sup>46</sup> Courts “will not allow § 117 to be used for the benefit of a commercial third party who modifies a computer program for [its own] commercial benefit.”<sup>47</sup>

In 1998, the Digital Millennium Copyright Act (“DMCA”) was established to take copyright law “squarely into the digital age.”<sup>48</sup> The DMCA prohibits circumventing technological measures that limit access to protected works.<sup>49</sup> Circumvention of technology is synonymous with bypassing the copyright owner’s security system without their consent.<sup>50</sup> The enactment of the DMCA is pertinent to the argument surrounding reverse engineering. Before the DMCA, reverse engineering was permitted through the fair use doctrine.<sup>51</sup> However, § 1201(f) of the DMCA “limits anti-circumvention indirectly by allowing reverse engineering for *only limited purposes*.”<sup>52</sup>

The most recent statutory law addressed in this article is the Computer Fraud and Abuse Act (“CFAA”), which appears in 18 U.S.C. § 1030 and was enacted in 2008.<sup>53</sup> The act “makes it unlawful to knowingly and with intent to fraud . . . exceed authorized access of a protected computer, and by means of such conduct further the intended fraud and obtain anything of value.”<sup>54</sup> This act was created to “reduce the hacking and cracking of . . . computer systems.”<sup>55</sup>

Copyright law has undergone a substantial technological update in the past 20 years, from including computer software as a copyrighted work to the DMCA and CFAA. However, there are still gaps in our laws that cause disputes regarding copyright infringement of code. The following cases and examples will illustrate how the law has been applied, while demonstrating a need for additional changes.

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45. 17 U.S.C. § 117(a) (1998).

46. *Id.* § 117(b).

47. KUTTEN & WULF, *supra* note 33, at § 2:25.

48. Miller, *supra* note 20, at 657.

49. Linhoff, *supra* note 35, at 229.

50. Miller, *supra* note 20, at 658.

51. Linhoff, *supra* note 35, at 213.

52. *Id.* at 230 (emphasis added) (limiting the scope of accepted circumvention to identification and analysis of the minimum information necessary for interoperability).

53. 18 U.S.C.A. § 1030(a)(6) (West 2018).

54. Joseph Rothberg, *Cheating in Gaming: Will Copyright Laws Level Up?*, FORBES: LEGAL ENT. (Sept. 1, 2016, 10:00 AM), <https://www.forbes.com/sites/legalentertainment/2016/09/01/cheating-in-gaming-will-copyright-laws-level-up/#19c744885ccd>.

55. *Computer Fraud and Abuse Act (CFAA)*, TECHOPEDIA, <https://www.techopedia.com/definition/27434/computer-fraud-and-abuse-act-cfaa> (last visited Feb. 14, 2019).

### B. Oracle v. Google: Copyright Protection for Code

The case of *Oracle America, Inc. v. Google Inc.* illustrates the problems courts face when evaluating an alleged instance of copyright infringement and identifies potential affirmative defenses that may be presented. It involves a copyright dispute for packages of “computer source code,” also known as API packages, which are written in the Java programming language.<sup>56</sup> Oracle is the copyright owner for Java and its API packages.<sup>57</sup> However, Google still decided to use the Java language because of its interoperability features.<sup>58</sup> Google copied 37 of Java’s API packages verbatim, even keeping the same names.<sup>59</sup> Oracle sued Google, arguing that the packages were subject to copyright protection and that Google had infringed.<sup>60</sup> Oracle’s main argument for copyright protection of its Java API packages was that “they are expressive and could have been written and organized in any number of ways to achieve the same functions.”<sup>61</sup> In response, Google asserted the affirmative defense of fair use.<sup>62</sup>

Under § 107 of the Copyright Act, use of a copyrighted work is permissible for certain purposes, such as criticism, teaching, scholarship, or research.<sup>63</sup> While the issue of fair use is decided on a case-by-case basis, there are “four non-exclusive factors to be considered”:

- (1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
- (2) the nature of the copyrighted work;
- (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
- (4) the effect of the use upon the potential market for or value of the copyrighted work.<sup>64</sup>

The court also discussed the merger doctrine in its analysis of the parties’ arguments.<sup>65</sup> The merger doctrine is an exception that does not provide copyright protection to ideas that can only be articulated in a limited number of ways.<sup>66</sup> Specifically regarding computer programs, when specific lines of code that were previously protected under copyright law are the “only and essential means” of achieving a certain goal, the work can be copied without constituting infringement.<sup>67</sup> However, the code here could have been written in various ways.<sup>68</sup> Therefore, the court held that the merger doctrine does not apply in this case.<sup>69</sup>

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56. *Oracle Am., Inc. v. Google Inc.*, 750 F.3d 1339, 1347 (Fed. Cir. 2014).

57. *Id.* at 1350.

58. *Id.*

59. *Id.*

60. *Id.* at 1347.

61. *Id.* at 1358–59.

62. *Id.* at 1371.

63. *Id.* at 1372.

64. *Id.* at 1373.

65. *Id.* at 1359.

66. *Id.*

67. *Id.* at 1360.

68. *Id.* at 1361.

69. *Id.*



However, the court concluded that the “declaring code and the structure, sequence, and organization of the 37 Java API packages are entitled to copyright protection.”<sup>70</sup> Typically, short phrases are not subject to copyright protection.<sup>71</sup> But, the court stated that “the relevant question for copyrightability purposes is not whether the work at issue contains short phrases—as literary works often do—but, rather, whether those phrases are creative.”<sup>72</sup> The court reasoned that Oracle was creative with regards to the “‘selection and arrangement’ of the method declarations” of its API packages and the declaring code.<sup>73</sup> Further, the court concluded that “a set of commands to instruct a computer to carry out desired operations may contain expression that is eligible for copyright protection.”<sup>74</sup>

*Oracle v. Google* illustrates many of the issues that courts encounter in instances of alleged copyright infringement and identifies potential affirmative defenses. Further, the case sets an important precedent for further evaluation of computer software in relation to copyright protection. The court’s holding that computer programs “can be subject to copyright protection as ‘literary works’” is the most crucial part of the case, the implications of which can be seen throughout this article.<sup>75</sup>

#### IV. VIDEO GAMES

##### A. The Video Game Industry

The video game industry has incurred exponential growth since its start in the 1970s.<sup>76</sup> In fact, video games are beginning to rival the movie industry’s success.<sup>77</sup> In 2017, the video game “industry generated worldwide revenue of \$117 billion” from over two billion active players.<sup>78</sup> However, a 2012 report on United States and Canadian games asserted that one in every five computer games were pirated.<sup>79</sup> This further illustrated the devastating financial effect that file sharing has on gaming companies, costing them billions of dollars.<sup>80</sup> Due to the importance of the video game industry in today’s economy, there is a greater need to protect the intellectual property, specifically copyrights, surrounding these programs and products. This is because “at its core, copyright law incentivizes the creation of works.”<sup>81</sup> Therefore,

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70. *Id.* at 1354.

71. *Id.* at 1352.

72. *Id.* at 1362.

73. *Id.* at 1363.

74. *Id.* at 1367.

75. *Id.* at 1354.

76. Linhoff, *supra* note 35, at 210.

77. *Id.*

78. Joel David Rodrigues, *The Importance of the Intellectual Property in the Gaming Industry*, INVENTA INT’L (Aug. 8, 2018), <https://inventa.com/en/news/article/321/the-importance-of-the-intellectual-property-in-the-gaming-industry>.

79. Emma Woollacott, *Finally, Some Objective Figures on Games Piracy*, FORBES (May 15, 2013, 10:34 AM), <https://www.forbes.com/sites/emmawoollacott/2013/05/15/finally-some-objective-figures-on-games-piracy/#4914bad731a5>.

80. *Id.*

81. Brian Casillas, Comment, *Attack of the Clones: Copyright Protection for Video Game Developers*, 33 LOY. L.A. ENT. L. REV. 137, 144 (2013).

game creators may be deterred from investing their time and money into a game if others could disregard the law and copy their product.<sup>82</sup>

## B. Bots in Video Games

### i. Blizzard's Video Games

Blizzard Entertainment ("Blizzard") is a "game development studio and publisher," which means it creates and distributes video games.<sup>83</sup> Blizzard is one of the world's most respected and popular makers of computer games.<sup>84</sup> For example, Blizzard created critically acclaimed video games such as the Diablo games, World of Warcraft, and Overwatch.<sup>85</sup> World of Warcraft ("WoW") is arguably Blizzard's most successful game, with "over 100 million accounts created and over 12.5 million subscribers at its peak."<sup>86</sup> WoW allows the players to use their hero avatars to partake in virtual quests with other online players as they explore the Warcraft universe.<sup>87</sup> Heroes can cast spells, earn mana (a resource for certain in-game actions), acquire in-game currency which can be used to purchase gear and other items, and battle boss enemies.<sup>88</sup> WoW has been a constant source for intellectual property debate, specifically relating to copyright infringement from the use of bots and pirate servers.<sup>89</sup>

Blizzard's business model is directly dependent upon its video games having "balance[s] for players of all skill levels."<sup>90</sup> However, bots allow players to "manipulate the game environment for their own benefit and unfairly and artificially increase their standing and rank" within the games.<sup>91</sup> Leveling up characters and earning in-game items takes significant time and effort in game play.<sup>92</sup> Compromising that time investment can damage a game's integrity and value.<sup>93</sup> In addition, bots can negatively impact a game's economy in a number of ways.<sup>94</sup> For example, a portion of the money that Blizzard earns from its games comes from in-game purchases, or "microtransactions."<sup>95</sup> Certain bots can cause a player to earn "gold"—which can be used to purchase in-game items—at an unnaturally

82. *See id.*

83. Michael Sacco, *Activision-Blizzard is not Blizzard*, ENGADGET (Apr. 12, 2009), <https://www.engadget.com/2009/04/12/activision-blizzard-is-not-blizzard/>.

84. Van der Sar, *supra* note 7. *See Top 50 Video Game Makers*, IGN, <https://www.ign.com/lists/video-game-makers/8> (last visited Feb. 16, 2019).

85. BLIZZARD, <https://www.blizzard.com/en-us/> (last visited Feb. 16, 2019).

86. Jamie Burchette, *Copyright Conflicts Between World of Warcraft and its Players*, WAKE FOREST U. SCH. L. J. BUS. & INTELL. PROP. L. (Sept. 21, 2017), <http://ipjournal.law.wfu.edu/2017/09/world-of-warcraft-faces-copyright-concerns-as-its-popularity-grows/>.

87. *World of Warcraft: Description*, NVIDIA: GEFORCE, <https://www.geforce.com/games-applications/pc-games/world-of-warcraft/description> (last visited Feb. 16, 2019).

88. *New Player's Guide*, BLIZZARD: WORLD OF WARCRAFT, <https://worldofwarcraft.com/en-us/game/new-players-guide/part-four> (last visited Feb. 16, 2019).

89. Burchette, *supra* note 86.

90. Van der Sar, *supra* note 7.

91. Complaint at 6, *Blizzard Entm't, Inc. v. Enright*, No. 8:15-cv-1840 (C.D. Cal. Nov. 9, 2015), <https://www.plainsite.org/dockets/2ofzed1aa/california-central-district-court/blizzard-entertainment-inc-v-james-enright-et-al/>.

92. *Id.* at \*5.

93. *Id.* at \*9.

94. *Id.* at \*7.

95. *Id.*

accelerated rate.<sup>96</sup> This encourages players to use bots to gain currency instead of paying Blizzard directly for these in-game items.

In the case of *Blizzard Entertainment v. James Enright*, Blizzard sued Enright, the creator of a WoW bot, which not only violated WoW's licensing agreement but also allegedly constituted copyright infringement.<sup>97</sup> This bot cost Blizzard millions of dollars in losses from decreased revenue and consumer goodwill.<sup>98</sup> These claimed losses were based on research that "WoW bots can create a massive amount of in-game gold, which raises the prices of items for legitimate users."<sup>99</sup> Blizzard asserted that "bots cause legitimate players to lose interest, costing the company millions in lost revenue" while the bot maker earns a profit.<sup>100</sup> This case is pending, but judges in foreign jurisdictions have stated that bots "destroy[] the balance of the game, ma[ke] honest players unhappy, and therefore unfairly hamper[] Blizzard's commercial exploitation of its [game]."<sup>101</sup> Ideally, this case could further establish precedent related to the economic harms of bots in copyright infringement cases.

## ii. MDY v. Blizzard

*MDY Industries v. Blizzard Entertainment* demonstrates how bots can cause a corporation to suffer financial losses and illustrates the need for well-written end-user license agreement ("EULA").<sup>102</sup> It involves an action against a corporation that produced "bot" software to be used in WoW.<sup>103</sup> The bot, named "Glider," automatically completes the tasks in the beginning levels of WoW but "does not alter or copy WoW's game client software, does not allow a player to avoid paying monthly subscriptions due to Blizzard, and has no commercial use independent of WoW."<sup>104</sup> MDY was selling access to the Glider bot, which eventually led to \$3.5 million in revenue.<sup>105</sup>

In order to play WoW, each player must agree to Blizzard's EULA and terms of use.<sup>106</sup> While these legal documents allegedly did not prohibit bots, later technology and terms made it apparent to MDY that bots were prohibited.<sup>107</sup> Thereafter, MDY altered its bot to be undetectable.<sup>108</sup> Much of Blizzard's time and money went into responding to complaints about bots, specifically the Glider bot.<sup>109</sup>

MDY used the "essential step" defense, which provides that there is no copyright infringement where a player makes a copy of the program that is "created and used solely 'as an essential step in the utilization of the computer program in

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96. *Id.*

97. *Id.* at \*1–2.

98. *Id.* at \*1.

99. Van der Sar, *supra* note 7.

100. *Id.*

101. *Blizzard Entm't, Inc.*, No. 8:15-cv-1840; Felix Hilgert, *German Courts Ban Bots in Blizzard Games (Again)*, VIDEO.GAMES.L. (Feb. 24, 2015), <http://gameslaw.org/german-courts-ban-bots-in-blizzard-games-again/>.

102. *MDY Indus. v. Blizzard Entm't, Inc.*, 629 F.3d 928 (9th Cir. 2010).

103. *Id.* at 929.

104. *Id.* at 935.

105. *Id.* at 936.

106. *Id.* at 935.

107. *Id.* at 936.

108. *Id.*

109. *Id.*

conjunction with a machine.”<sup>110</sup> However, WoW players and Glider users cannot use this defense because they do not own the software copies.<sup>111</sup> Therefore, the court held that the players must act within the “scope of Blizzard’s limited license” or their actions may constitute copyright infringement.<sup>112</sup>

The court also evaluated case precedent where, in regards to breach of a EULA, “potential for [copyright] infringement exists only where the licensee’s action (1) exceeds the licensee’s scope (2) in a manner that implicates one of the licensor’s exclusive statutory rights.”<sup>113</sup> The use of the Glider bot does not inherently commit copyright infringement because the bot does not implicate any of Blizzard’s exclusive rights.<sup>114</sup> That is, Glider does not “alter or copy WoW software” or the like.<sup>115</sup> Therefore, the court held that the bot did not constitute copyright infringement under the game’s terms and the DMCA.<sup>116</sup>

*MDY* illustrates two issues related to video games and copyright infringement. First, it is an example of how possible infringers, such as bots, can cause financial losses to corporations. Second, it emphasizes the importance behind the use of specific language in EULA.

### C. Mods in Video Games

Modern modding arose in the early 1980s.<sup>117</sup> Modifying computer software, or “modding,” is “the process of altering, adding to, or deleting video game code” to change certain aspects of a game.<sup>118</sup> Coders can use mods to add content, including “levels, characters, items, or objectives.”<sup>119</sup> Extensive modding, or “total conversion modding,” occurs when the majority of the original code is deleted and replaced with new code to the extent that the modder “essentially creates a new game.”<sup>120</sup> Mod games can grow to be even more popular than the original games they are based on. For example, Counter-Strike, a widely popular online game, was modified from the game Half-Life.<sup>121</sup> Half-Life is a first-person shooter game featuring a scientist as the hero of the story.<sup>122</sup> In contrast, Counter-Strike is a multi-player battle between two opposing teams but does not involve a continuing

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110. *Id.* at 938.

111. *Id.* at 939.

112. *Id.*

113. *Id.* at 940.

114. *Id.* at 941.

115. *Id.*

116. *Id.* at 958.

117. Mark Kretzschmar & Mel Stanfill, *Mods as Lightning Rods: A Typology of Video Game Mods, Intellectual Property, and Social Benefit/Harm*, 1 SOC. & LEGAL STUD. 1, 5 (2018).

118. Ryan Wallace, Comment, *Modding: Amateur Authorship and How the Video Game Industry is Actually Getting it Right*, 2014 BYU L. REV. 219, 220 (2014), <https://digitalcommons.law.byu.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=2915&context=lawreview>.

119. *Id.* at 220–21.

120. *Id.* at 221.

121. *Id.*

122. *Half-Life*, COUNTER-STRIKE WIKI, <http://counterstrike.wikia.com/wiki/Half-Life> (last visited Feb. 18, 2019).

story.<sup>123</sup> The co-creator of Counter-Strike, Minh Le, chose Half-Life as a base due to its realistic setting.<sup>124</sup>

Not every video game is perfect for every person who buys it.<sup>125</sup> Some forms of modification are frequently allowed and even encouraged. Proponents of mods claim “modding is self-expression that lets modders tell new stories,” but “the specific content of a mod matters.”<sup>126</sup> Beneficial mods include those that work “toward[s] inclusion, whether by representing marginalized people or through modding for accessibility like increasing contrast for those with low vision.”<sup>127</sup> Some argue that modding “can spark interest in the original product, and can even incentivize new people to purchase the [original] game just to play the mod.”<sup>128</sup> Many mods are completely harmless in that they just add characters or items to an existing game.<sup>129</sup> One modification to the popular game, Skyrim, dressed up the dragons as WWE’s Macho Man Randy Savage.<sup>130</sup> In fact, it has become fairly common for gaming companies to encourage limited modifications by providing access to source code and API packages.<sup>131</sup> The video game, Doom, was “the first popular modifiable game” and allowed for mods subject to the terms of the EULA as long as they were not used for commercial gain.<sup>132</sup> Therefore, certain “friendly” mods could lead to an increase in sales of the original game.<sup>133</sup>

Despite their popularity, mods often violate the DMCA and the CFAA.<sup>134</sup> This is partially because “modders usually circumvent copy protection technology on the source game and/or violate the [EULA].”<sup>135</sup> When mods violate the terms or licensing agreements, as prohibited by the CFAA, they are “interpreted as presumptively illegal.”<sup>136</sup>

Many publishers prohibit some form of mods on their games.<sup>137</sup> Certain mods, like cheating mods in multiplayer games, cause more harm than good by not only hurting the gaming company but also hurting players that follow the rules.<sup>138</sup> Often the reason for prohibiting these malicious mods is that the company is concerned with “losing artistic control of [its] product” or “stability and fairness” in the game’s environment.<sup>139</sup> One of the biggest copyright issues with modding occurs when a

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123. Zorine Te, *Dust to Dust: The History of Counter-Strike*, GAMESPOT (May 26, 2014, 12:32 AM), <https://www.gamespot.com/articles/dust-to-dust-the-history-of-counter-strike/1100-6419676/>.

124. *Id.*

125. Christopher Pearson, Blog, *The IP Implications of Video Game Mods*, N.Y.U. J. INTELL. PROP. & ENT. L. (Feb. 29, 2016), <https://blog.jipel.law.nyu.edu/2016/02/the-ip-implications-of-video-game-mods/>.

126. Kretzschmar & Stanfill, *supra* note 117, at 2, 4.

127. *Id.* at 4.

128. Wallace, *supra* note 118, at 221.

129. Rafi Letzter, *Online Communities are Changing Video Games to Make Them Better, Weirder, and Much More Wonderful*, BUS. INSIDER (July 20, 2015, 11:49 AM), <https://www.businessinsider.com/video-game-modding-2015-7>.

130. *Id.*

131. Kretzschmar & Stanfill, *supra* note 117, at 7.

132. *Id.*

133. Wallace, *supra* note 118, at 221–23.

134. Kretzschmar & Stanfill, *supra* note 117, at 2.

135. *Id.*

136. *Id.* at 3.

137. *Id.* at 9.

138. *Id.*

139. Rodrigues, *supra* note 78.

third party “creates a standalone game without permission from the developer—and then the new game takes market share away from the original.”<sup>140</sup>

The intellectual property law applicable to mods was written when “modding was in its infancy.”<sup>141</sup> Therefore, without sufficient intellectual property protection in the law, terms of service and EULA, as legal contracts, are the “key way[s] the [gaming] industry uses the law as a tool to keep their customers in line.”<sup>142</sup> However, copyright law considers mods to be derivative works, which violate the gaming companies’ rights when made against the wishes of the copyright holder.<sup>143</sup> Because the majority of mods require downloading the original game, and mods tend to work from the game’s existing code, “modders are inherently acknowledging that they are, in reality, deriving something from the copyrighted work.”<sup>144</sup> With technological growth comes a need for lawyers and policymakers to re-analyze mods to craft new protections for video game manufacturers.<sup>145</sup>

### *D. Reverse Engineering*

#### *i. The DMCA: Before & After*

The purpose of the DMCA was to support the “adaptation of the law of copyright to the digital age.”<sup>146</sup> Specifically, the enactment of the DMCA constituted a change in the law surrounding reverse engineering.<sup>147</sup> Before its ratification, reverse engineering was permitted under the fair use doctrine of copyright law.<sup>148</sup> “The anti-circumvention provisions of the DMCA prohibit the circumvention of a ‘technological measure that effectively controls access to a work protected under this title.’”<sup>149</sup> Circumvention is defined as “bypassing the technological measure without the copyright owner’s permission.”<sup>150</sup>

There is a three-step process by which the DMCA limits the scope of acceptable reverse engineering: “restricting the act, the means, and the publication of results.”<sup>151</sup> First, the act limits the *who* and the *how*.<sup>152</sup> Second, the means restriction specifies the scope and the use.<sup>153</sup> Third, the publication of results restricts the *who*, *why*, *what*, and *how*.<sup>154</sup> One interpretation of these limitations is that they criminalize reverse engineering where the “purpose is anything other than interoperability with an independent created computer program.”<sup>155</sup>

140. Jeffrey N. Rosenthal & Ethan M. Simon, *How Video Game Mods are Changing the Intellectual Property Game*, LEGAL INTELLIGENCER (July 30, 2018, 3:38 PM), <https://www.law.com/thelegalintelligencer/2018/07/30/how-video-game-mods-are-changing-the-intellectual-property-game/>.

141. Wallace, *supra* note 118, at 235.

142. Kretzschmar & Stanfill, *supra* note 117, at 10.

143. Wallace, *supra* note 118, at 224.

144. *Id.* at 242.

145. Kretzschmar & Stanfill, *supra* note 117, at 4.

146. Linhoff, *supra* note 35, at 229.

147. *Id.*

148. *Id.* at 213.

149. *Id.* at 229.

150. *Id.* at 230.

151. *Id.* at 231.

152. *Id.*

153. *Id.*

154. *Id.* at 232.

155. *Id.* at 232.

## ii. Private Servers

While WoW's Terms of Use prohibit using "unauthorized servers that emulate" WoW due to copyright protection, instances of infringement are still prevalent.<sup>156</sup> Private and pirate servers are usually created through reverse engineering.<sup>157</sup> Blizzard permits players to host certain not-for-profit patches and demos for custom-made maps and quests, but still bans private servers.<sup>158</sup> Private servers "allow a player to play WoW without any interaction with or payment to Blizzard."<sup>159</sup> For example, Nostralius was one private server turned pirate server that had copied a legacy server—a previous and beloved version of the game—"the original version of WoW from 2004."<sup>160</sup> The popular server "had over 150,000 active players and 800,000 accounts."<sup>161</sup> However, Blizzard discovered Nostralius and sent a cease and desist order.<sup>162</sup> Thereafter, the same team created another legacy server called Elysium, and Blizzard has yet to take action against Elysium, possibly due to the 250,000 signatures on a petition for Blizzard to reinstate a legacy server.<sup>163</sup> Some argue that because Blizzard is "currently unwilling to provide a service that WoW's players demand themselves, allowing private servers may be the only option to meet the player community demands."<sup>164</sup>

It is well established that bots, mods, and reverse engineering are controversial topics in the video game industry. *MDY v. Blizzard* demonstrates the harmful effects some bots may have, as well as the importance of carefully drafted EULAs.<sup>165</sup> Mods can range from comical character additions, to total conversion mods like Counter-Strike, to helpful mods that increase accessibility of games to all players.<sup>166</sup> In the past, most video game publishers prohibited at least some form of modification—mainly cheating mods—and encouraged mods that can spark interest in its gaming franchises.<sup>167</sup> The strenuous process of reverse engineering has been partially regulated by the DMCA, but private servers still run rampant across the internet.<sup>168</sup> The technological advancements that have been made to bots, mods, and reverse engineering must also be made to the law surrounding it.

## V. PROPOSED SOLUTIONS

The copyright protections behind computer software are constantly threatened by malicious software from third parties. The main threats to code are the aforementioned bots, mods, and reverse engineering. These attackers negatively impact companies that develop software because they lead to financial losses and can

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156. Burchette, *supra* note 86.

157. Matthew McCurley, *The Lawbringer: A Primer on Private Servers*, ENGADGET (Jan. 28, 2011), <https://www.engadget.com/2011/01/28/the-lawbringer-a-primer-on-private-servers/>.

158. Burchette, *supra* note 86.

159. *Id.*

160. *Id.*

161. *Id.*

162. *Id.*

163. *Id.*

164. *Id.*

165. *MDY Indus. v. Blizzard Entm't, Inc.*, 629 F.3d 928 (9th Cir. 2010).

166. *See supra* Part IV.C.

167. *See supra* Part IV.C.

168. *See supra* Part IV.D.

decrease the value of products. If these protections are not strongly enforced, future inventors may be discouraged from focusing their efforts on new forms of gaming technology.

A decrease in innovation and interest could lead to a reduction in profits and economic value. Video games are a multi-billion-dollar industry that create jobs and stimulate economic growth.<sup>169</sup> “Computer and video game companies provide jobs to more than 220,000 people in 50 states.”<sup>170</sup> If the industry becomes saturated with malicious software and fewer developers consider it worthwhile to create new material, it could crash.

There are at least three possible solutions to this issue. First, there should be stronger and more frequent enforcement against copyright infringement for computer software. This burden would mainly fall upon the software developers. They will need to “remain vigilant through diligent enforcement of their rights.”<sup>171</sup> When publishers are aware of infringement, whether it be through bots, mods, or private servers, and they fail to act, it sets a perverse precedent. Blizzard’s actions alone have set a variety of case precedent that distinguishes what types of alterations are acceptable and even encouraged from the types of infringement that are harmful and strictly prohibited.<sup>172</sup> That precedent is perverse in that it gives others the idea that copyright infringement is not taken seriously and is conduct without consequence.

A second solution is to encourage Congress to establish a new category of protection for video games and related computer software.<sup>173</sup> As previously mentioned, a majority of the copyright law on code was written before significant technological advancements.<sup>174</sup> As computer software progresses, it is crucial that the law adapt to accommodate the technology.

A third solution, more specific to video games, would be to draft more explicit EULAs and Terms of Service/Use. While this will not necessarily prevent infringement from occurring, it could prove to be a very useful tool in litigation, especially when paired with the first proposed solution of stronger enforcement against infringement. This solution could have a significant impact because a player must accept the EULA before it can successfully download the game. One of Blizzard’s earliest cases was against bnetd.org, who had allegedly infringed by creation of a private server for WoW II.<sup>175</sup> The Eastern District Court of Missouri found, and the Eighth Circuit later affirmed, that:

- (1) Blizzard’s EULA and Terms of Use, which prohibited reverse engineering, were enforceable contracts;
- (2) the defendants waived their right to a “fair use” defense;

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169. *The U.S. Video Game Industry’s Economic Impact*, ENT. SOFTWARE ASS’N, <http://www.theesa.com/article/u-s-video-game-industrys-economic-impact/> (last visited Feb. 18, 2019).

170. *Industry Facts*, ENT. SOFTWARE ASS’N, <http://www.theesa.com/about-esa/industry-facts/> (last visited Oct. 22, 2018).

171. Rothberg, *supra* note 54.

172. *See supra* Part IV.D.ii.

173. *See supra* Part IV.D.ii.

174. *See supra* Part III.A.

175. Mona Ibrahim, *Why Blizzard Welcomes Some Mods and Sues Others*, POLYGON: OPINION (Mar. 23, 2017, 11:00 AM), <https://www.polygon.com/2017/3/23/15034994/blizzard-mods-bnetd-org-law-suit-world-of-warcraft>.



- (3) the EULA and Terms of Use did not constitute an abuse of copyright; and
- (4) in addition to violating the agreements, the defendants also violated the DMCA's anti-circumvention and anti-trafficking regulations (17 U.S.C. § 1201(a) and (b), respectively).<sup>176</sup>

The court held that the private server constituted both a breach of contract and “violated the Copyright Act because they no longer had a valid license when they reverse engineered the game.”<sup>177</sup> This case demonstrates how effective drafting of the EULA and Terms of Use (or Service) can aid a gaming company in litigation. Another example of effective drafting can be found in the EULA for the game *Defender's Quest*.<sup>178</sup> The language explicitly stated that “[y]ou may not modify, distribute . . . create derivative works from, adapt, . . . [or] reverse engineer . . . any part of the game.”<sup>179</sup> The attorney stated that he included this language because the game's “developers want to protect the commercial viability, integrity[,] and balance of gameplay,” as all creators do.<sup>180</sup> However, as mentioned above, some modifications are allowed by gaming publishers.<sup>181</sup> For *Defender's Quest*, the attorney carved out an exception for modification that adhered to the EULA's other restrictions to allow creative expression for the players.<sup>182</sup> This was done to support modders while still protecting developers and their intellectual property rights.<sup>183</sup> This is an ideal example of a middle ground for drafting the EULA because it allows for protection of the developer's intellectual property rights while leaving room for player creativity.<sup>184</sup>

## VI. CONCLUSION

Computer code, and therefore video games, are subject to copyright protection. The three main methods of infringement on computer software are the use of bots, mods, and reverse engineering. Due to the immense economic value that coded products provide, enforcing the intellectual property rights of computer software is imperative. There are two groups that this protective burden may fall on: the legislature and the gaming developers. Further protection could be granted by modernizing a section of copyright law to further include code and to add in video games as a protected class. Otherwise, the drafters of the EULA and Terms of Service/Use must take care to explicitly prohibit these common modes of copyright infringement. Code is everywhere and deserves intellectual property protection.

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176. *Id.*

177. *Id.*

178. *Id.*

179. *Id.*

180. *Id.*

181. *See supra* Part IV.C.

182. Ibrahim, *supra* note 175.

183. *Id.*

184. *Id.*