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Aaron D. Charfoos

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# How Far Have We Come, And Where Do We Go From Here: The Status Of Global Computer Software Protection Under The TRIPS Agreement

*Aaron D. Charfoos\**

## I. INTRODUCTION

Global computer software piracy has become an enormous problem as the computer software industry has grown at an ever-increasing pace over the last decade. Software piracy is defined as “the unauthorized use or illegal copying of a software product.”<sup>1</sup> In 1994, it was estimated that global software piracy rates existed near 49%, and cost the software industry approximately \$12.3 billion in revenue.<sup>2</sup> This led one commentator to state, “[S]oftware piracy is the greatest single threat to the advancement of the software industry.”<sup>3</sup>

However, piracy rates have begun to decline. Between 1994 and 1999, there was a 13% decline in software piracy rates.<sup>4</sup> The International Intellectual Property Association (“IIPA”) estimates that in 1999, business soft-

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\* Candidate for Juris Doctor in May, 2002, from the Northwestern University School of Law. I would like to thank my wife, mother, father and sister for all the love and support that they have given me over the years. Without them, I never would have been able to achieve all of my dreams and goals. I would also like to thank Prof. F. Scott Kieff who graciously reviewed and edited this article for me.

<sup>1</sup> Amy Choe, *Korea's Road Toward Respecting Intellectual Property Rights*, 25 RUTGERS COMPUTER & TECH. L.J. 341, 343 (1999).

<sup>2</sup> Business Software Alliance and The Software and Information Industry Association, *1999 Global Software Piracy Report*, pg. 8 (2000) at [http://www.bsa.org/usa/globallib/piracy/1999\\_Piracy\\_Stats.pdf](http://www.bsa.org/usa/globallib/piracy/1999_Piracy_Stats.pdf) (last visited October 24, 2001).

<sup>3</sup> Robert Holleyman, *Software Piracy Abroad: Challenges and Opportunities*, 453 PLI/PAT 419, 422 (1996).

<sup>4</sup> 1999 Global Software Piracy Report, pg. 1.

ware piracy cost the United States software industry \$2.7 billion.<sup>5</sup> By the end of 2000, this number had dropped to \$2.5 billion.<sup>6</sup> This reduction was caused by several factors, one of which was the implementation of minimum worldwide standards for the protection of computer software.<sup>7</sup> This global regime was largely established through the implementation and enforcement of the Agreement on Trade Related Aspects of Intellectual Property ("TRIPS" or "Agreement").<sup>8</sup>

#### A. The TRIPS Agreement

The General Agreement on Tariffs and Trade ("GATT") and the World Trade Organization ("WTO") Agreement on Trade Related Aspects of Intellectual Property was signed on April 15, 1994.<sup>9</sup> The Agreement was established within the WTO framework during the Uruguay Round negotiations. It provides for minimum levels of protection for intellectual property, while still allowing member nations some independence in dictating their own domestic legislation.

Under the Agreement, developed nations were required to bring their domestic intellectual property regulations into conformance with the Agreement by January 1, 1995.<sup>10</sup> Developing nations received a four-year grace period before domestic legislation was required to be harmonized with the TRIPS agreement.<sup>11</sup> This four-year window allowed developing nations the ability to slowly phase in their new legislation in an effort to make the process easier on their domestic systems. That four-year grace period ended on January 1, 2000. Therefore, this is one of the first real opportunities to assess the global effects and success of the TRIPS agreement.

The developing nations now subject to TRIPS are: Antigua and Barbuda, Argentina, Bahrain, Barbados, Belize, Bolivia, Botswana, Brazil, Brunei Darussalam, Cameroon, Chile, Colombia, Congo, Costa Rica, Côte

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<sup>5</sup> The International Intellectual Property Association, February 16, 2001, Appendix A to the Letter to Mr. Joseph Papovich, Assistant United States Trade Representative Regarding *Request for Public Comment on the Identification of Countries Under Section 182 of the Trade Act of 1974 (as Amended) ("Special 301")*, 66 Fed. Reg. 3640 (Jan. 16, 2001) available at <http://www.iipa.com/2001SPEC301CONTENTS LINK.html> (hereinafter the IIPA Letter). The IIPA is a coalition of seven trade associations including the Business Software Alliance. *Id.*

<sup>6</sup> The Global Piracy Report *supra* note 4.

<sup>7</sup> *Id.*

<sup>8</sup> Marrakesh Agreement Establishing the World Trade Organization [hereinafter WTO Agreement], Annex 1C: Agreement on Trade-Related Aspects of Intellectual Property Rights, 15 April 1994 [hereinafter TRIPS or the Agreement: reprinted in *Results of the Uruguay Round of Multilateral Trade Negotiations – The Legal Texts* (GATT Secretariat (ed.) 1994.

<sup>9</sup> *Id.*

<sup>10</sup> TRIPS art. 65.1.

<sup>11</sup> TRIPS art. 65.2.

d'Ivoire, Cuba, Cyprus, Dominica, Dominican Republic, Egypt, El Salvador, Estonia, Fiji, Gabon, Ghana, Grenada, Guatemala, Guyana, Honduras, Hong Kong, China, India, Indonesia, Israel, Jamaica, Kenya, Korea, Kuwait, Macau, Malaysia, Malta, Mauritius, Mexico, Morocco, Namibia, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Poland (areas which were not reviewed in '96-'98), Qatar, Saint Lucia, Senegal, Singapore, Sri Lanka, St. Kitts and Nevis, St. Vincent and Grenadines, Suriname, Swaziland, Thailand, Trinidad and Tobago, Tunisia, Turkey, United Arab Emirates, Uruguay, Venezuela, and Zimbabwe.<sup>12</sup> Several additional developing nation signatories implemented their legislation prior to the January 1, 2000, deadline.<sup>13</sup>

### B. Advances and Continuing Issues

The TRIPS agreement made significant advances over the pre-TRIPS international regime with respect to the protection of computer software. There are at least two significant advances. First, computer software protections have been embedded into the new dispute resolution procedures. Second, both object and source code are protected under the copyright sections of the Agreement. The dispute resolution procedures provide back-end protection (protection after offenses have occurred), while new copyright provisions provide affirmative front-end protection (protection deterring such offenses). However, the Agreement could have, and should have, gone farther to protect the software industry. By not formally deciding on the ability to patent software *per se*, the TRIPS agreement simply reiterates one of the major shortcomings of the pre-TRIPS international computer software protection regimes.

As this article will show, leaving the decision of patentability to the sole discretion of domestic policymakers ensures that consistent global protection of software will be virtually impossible to achieve. To the extent that countries offer the patent protection of software *per se*, in addition to copyright and dispute resolution legislation, computer software will be well protected by the overlap of the three. However, where patents will not be granted for software *per se*, computer software will be underprotected. Furthermore, this lack of harmonization will impose additional administrative burdens on patent holders.

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<sup>12</sup> The TRIPS Council, REVIEW OF THE IMPLEMENTING LEGISLATION, *available at* [http://www.wto.org/english/tratop\\_e/trips\\_e/intel8\\_e.htm](http://www.wto.org/english/tratop_e/trips_e/intel8_e.htm). One of the difficulties with this note is that countries are allowed to self-designate as developed or developing. Therefore, categorization under UN designations is not helpful. For many countries, it is not clear what their designation is. To the extent possible, this note will delineate between designated and nondesignated countries as well as developed and developing.

<sup>13</sup> *Id.* See later discussions *infra*, in Part IV.d and V.b.1 and V.b.2 for the status of developing nation implementation.

This article will discuss the underlying principals of computer software protection as they relate to the Agreement. Then it will assess the status of implementation under the Agreement. Finally, the article will highlight several options that may provide better protection of computer software.

Part One will examine the history of international computer software protection before TRIPS. This will include a detailed analysis of copyright and patent protection under the two dominant pre-TRIPS global treaties. It will also critique the old dispute resolution system.

Part Two will discuss the new dispute resolution mechanism set up under TRIPS. This mechanism will provide new avenues through which member nations can force other signatories to adopt compliant legislation. It also allows member nations to examine and challenge the domestic procedures and enforcement that result from compliant legislation.

Part Three will review the issue of protecting computer software under the TRIPS copyright provisions. Moving from the time of TRIPS implementation to the present state of domestic harmonization in developing countries, this comment will use the experiences of the developed world to determine how well the TRIPS agreement has worked thus far, and its likely impact in the near future. Some of the specific issues that faced developed nations during the past five years under TRIPS include the code-behavior dichotomy, reverse engineering and black box testing.

Part Four will look at the way patent law under TRIPS has affected computer software. This section will also move from the time of TRIPS implementation to the present state of domestic harmonization in developing countries, and will use the experiences of the developed world to determine how well the TRIPS agreement has worked thus far, and its likely impact in the near future. Included will be a discussion of the pure software versus physical manifestation software issue (or the *per se* software patent controversy).

Finally, Part Five explores various solutions to the current problems. This includes exploring new legal hybrid paradigms and *sui generis* approaches. This section will also contain a discussion of emerging problems that must be incorporated into any comprehensive solution to software protection.

## II. THE HISTORY OF THE PARIS-BERNE REGIME

There are two typical legal schemes under which computer software might be protected: copyrights and patents. Prior to the TRIPS agreement there were two dominant international agreements that controlled copyright and patent rights. Worldwide copyright protection was regulated by The Berne Convention for the Protection of Literary and Artistic Works initially

adopted in 1886 ("Berne Convention").<sup>14</sup> Global patent rights were regulated by The Paris Convention for the Protection of Industrial Property initially adopted in 1883 ("Paris Convention").<sup>15</sup>

#### A. The Berne Convention

The Berne Convention protects literary and artistic works under a worldwide copyright regime.<sup>16</sup> The Berne Convention protects the copyright holder's rights of reproduction, translation, adaptation, public performance, public recitation, broadcasting and film.<sup>17</sup> The Berne Convention accomplishes this by establishing minimum standards for copyright protection and guaranteeing national, nondiscriminatory treatment for copyright holders of other member countries.<sup>18</sup>

However, the Berne Convention left the status of the computer software protection largely unanswered. For example, the United States had developed a system of copyright protection for computer software as a "literary work" as early as the 1960's.<sup>19</sup> The Berne Convention did not adopt this system, or any other system, with regard to the copyrightability of computer software.<sup>20</sup> Therefore, it institutionalized a nation-by-nation approach to protection. This led to widespread speculation about whether the Berne Convention even contemplated protection of computer software.<sup>21</sup>

There are two major problems with protecting computer software through a copyright regime. First, computer code is unlike traditional text. Traditional text based copyrightable works "necessarily communicate the ideas the work contain[s]." <sup>22</sup> As commentator Charles McManis explains, the value of the traditional copyrighted work, such as a novel, is derived from the visible text itself.<sup>23</sup> A person reads a novel or a book for the story and images that are conveyed through the text on the page. However, this is not the case for computer software. The true value of the computer programs is derived from the text or code that remains largely hidden from the computer user. What is valuable is not the text, but the way the computer

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<sup>14</sup> The Berne Convention for the Protection of Literary and Artistic Works (1971) [hereinafter the Berne Convention].

<sup>15</sup> The Paris Convention for the Protection of Industrial Property (1967) [hereinafter the Paris Convention].

<sup>16</sup> See generally, The Berne Convention.

<sup>17</sup> The Berne Convention arts. 9 to 14.

<sup>18</sup> *Id.*

<sup>19</sup> Franklin Pierce Law Center, *Franklin Pierce Law Center's Sixth Biennial Patent System Major Problems Conference*, 37 IDEA: J.L. & TECH. 623, 681 (1997).

<sup>20</sup> See generally, Charles R. McManis, *Symposium: Article: Taking TRIPS on the Information Superhighway: International Intellectual Property Protection and Emerging Computer Technology*, 41 VILL. L. REV. 207 (1996).

<sup>21</sup> *Id.*

<sup>22</sup> *Id.* at 234.

<sup>23</sup> *Id.*

interfaces with the user. Therefore with computer software, “it is possible both to publish a work and keep it secret, and keeping it secret is part of the way the commercial value of the work is maintained.”<sup>24</sup>

The second problem is that the object code component of computer programs could not be easily categorized as copyrightable material because it existed somewhere between traditional copyright and patent areas.<sup>25</sup> Unlike regular text, or human readable computer source code, the object code does not instruct the computer user how to perform a task.<sup>26</sup> The object code performs the task itself by directly interfacing with the computer hardware.<sup>27</sup>

Therefore the economic value of this part of the computer program is derived from the information it conveys to the computer.<sup>28</sup> It is not derived from the information that is provided to the computer user. As McMannis stated, “Historically, the only intellectual property protection available for publicly distributed utilitarian works of this sort has been patent protection.”<sup>29</sup> The problem was that although the object code served a utilitarian function (traditionally the realm of patents), it still existed as written text, which is traditionally in the realm of copyright protection.

Because the Berne Convention did not affirmatively elect to protect computer software as copyrightable material, individual nations were left to decide whether or not to protect such works under the copyright laws. In response, the World Intellectual Property Organization (“WIPO”)<sup>30</sup> developed a *sui generis* approach to the problem.<sup>31</sup> Both France and Korea actually enacted such legislation.<sup>32</sup>

The United States rejected this *sui generis* approach. Instead, the United States enacted legislation that protected both source and object codes under traditional copyright laws and categorized them as “literary

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<sup>24</sup> *Id.*

<sup>25</sup> *Id.* at 234-35.

<sup>26</sup> *Id.*

<sup>27</sup> *Id.*

<sup>28</sup> *Id.*

<sup>29</sup> *Id.*

<sup>30</sup> The two major conventions each established their own governing bodies. However, in 1893, the two bureaus combined to form the United International Bureaux (sic) for the Protection of Intellectual Property (best known by its French acronym BIRPI). On July 14, 1967, BIRPI officially became the World Intellectual Property Organization (WIPO), under control of the U.N. WIPO currently controls the administration of 21 treaties (2 of which are jointly administered with other organization, including the TRIPS Council), and has 175 member states. World Intellectual Property Organization, General Information, available at [http://www.wipo.org/about-wipo/en/index.html?wipo\\_content\\_frame=/about-wipo/en/gib.htm](http://www.wipo.org/about-wipo/en/index.html?wipo_content_frame=/about-wipo/en/gib.htm).

<sup>31</sup> For a detailed discussion of the *sui generis* approach see *infra* Part V.

<sup>32</sup> McManis, *supra* note 20, at 234-35.

works".<sup>33</sup> The European Union also adopted this kind of object and source code protection in the European Commission Directive on Computer Programs.<sup>34</sup> Given such strong support within the developed world for copyright protection for computer programs, it is not surprising that this approach was the one adopted in the TRIPS agreement.<sup>35</sup>

## B. The Paris Convention

The Paris Convention was the worldwide patent protection regime until the promulgation of the TRIPS Agreement.<sup>36</sup> Article 1(2) defines industrial property as "*patents*, utility models, industrial designs, trademarks, service marks, trade names, indications of source or appellations of origin, and the repression of unfair competition."<sup>37</sup>

Like the Berne Convention, it requires that all member countries provide national, nondiscriminatory treatment to patent holders of other member countries.<sup>38</sup> This treatment must be equal to the level of protection that the member country chooses to provide for its own citizens.<sup>39</sup> The Paris Convention also establishes the right of priority for applications from member countries<sup>40</sup>, grace periods for payment of fees and renewals<sup>41</sup> and some limitations on exclusive patent rights<sup>42</sup>.

However, the Paris Convention generally failed to establish a truly workable international patent structure. First, the Paris Convention did not specifically define what can or cannot be patented.<sup>43</sup> Second, the Paris Convention did not establish any term for patents.<sup>44</sup> In fact, patent terms ranged from five to twenty years among the member countries.<sup>45</sup> By failing to establish such minimum standards, especially with regard to what is actually patentable, the Paris Convention left global patent protection generally, and computer software protection specifically, in a state of uncertainty.

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<sup>33</sup> See generally, Franklin Pierce Law Center, *supra* note 19.

<sup>34</sup> See Council Directive 91/250 of 14 May 1991 on the Legal Protection of Computer Programs, O.J. (L122/42) [hereinafter EC Directive].

<sup>35</sup> See TRIPS art. 10.

<sup>36</sup> See generally the Paris Convention.

<sup>37</sup> Paris Convention, art. 1(2) (emphasis added).

<sup>38</sup> *Id.* at art. 3.

<sup>39</sup> *Id.* at art. 2.

<sup>40</sup> *Id.* at art. 3.

<sup>41</sup> *Id.* at art. 5.

<sup>42</sup> *Id.*

<sup>43</sup> Bankole Sodipo, PIRACY AND COUNTERFEITING: GATT TRIPS AND DEVELOPING COUNTRIES, 197 (1997).

<sup>44</sup> *Id.*

<sup>45</sup> *Id.*



There were two schools of thought on whether computer software could be patented.<sup>46</sup> The first set of nations provided that computer software could only be patented if it produced some kind of real world mechanical result.<sup>47</sup> The second set of countries allowed software to be patented *per se* as long as it satisfied the traditional definition and requirements for patents.<sup>48</sup> The Paris Convention did nothing to clarify this dispute, thus leaving the issue unresolved.<sup>49</sup>

### C. Problems Found Under Both the Paris and Berne Conventions

Another problem, which existed under both the Paris and Berne Conventions is that neither one established an effective dispute resolution mechanism.<sup>50</sup> Dispute resolution under the Paris-Berne regime was limited to private actions between individual parties in domestic courts of member countries or the International Court of Justice.<sup>51</sup> Clearly, those countries with sufficient legal systems provided satisfactory justice when issues arose.<sup>52</sup> However, many of the signatories did not have adequate courts and could not be relied upon as fair adjudicators of these issues.<sup>53</sup>

## III. THE TRIPS DISPUTE RESOLUTION SYSTEM

### A. The Dispute Resolution Regime Established Under TRIPS Provides Computer Software Industries with a More Effective Enforcement and Review Mechanism

As was discussed in Section II, one of the major concerns under the Paris-Berne regime was that there was no effective dispute resolution mechanism in place. TRIPS clearly remedies this problem. As one commentator noted, "Berne [and Paris] ... provide[d] no effective remedies – except litigation before the International Court of Justice – for copyright infringement. TRIPS fulfills this need by mandating the creation of enforcement mechanism in domestic law and by adding the teeth of WTO's dispute settlement machinery."<sup>54</sup> All signatories, especially computer software producers in member countries, stand to benefit from the advances.

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<sup>46</sup> See generally, the discussion of patents, *infra* section V.

<sup>47</sup> *Id.*

<sup>48</sup> *Id.*

<sup>49</sup> See generally the Paris Convention.

<sup>50</sup> McManis, *supra* note 19, at 215.

<sup>51</sup> *Id.* at 227.

<sup>52</sup> *Id.*

<sup>53</sup> *Id.*

<sup>54</sup> Tuan N. Samahon, *TRIPS Copyright Dispute Settlement After the Transition and Moratorium: Nonviolation and Situation Complaints Against Developing Countries*, 31 LAW & POL'Y INT'L BUS. 1051, 1055 (2000).

## B. The General Structure of the Dispute Resolution Mechanism

Article 64.1 of the TRIPS agreement formally adopts the GATT dispute resolution mechanism as established under Articles XXII and XXIII of the GATT.<sup>55</sup> However, a five-year moratorium was placed on any nonviolation and situation complaints in order to allow signatories some latitude in establishing workable domestic systems.<sup>56</sup>

The TRIPS dispute settlement system establishes both the procedure and causes of action which any state may invoke as part of their TRIPS membership.<sup>57</sup> Of course, there is no reason that individual disputes may not be settled privately.<sup>58</sup> In fact, in the face of international sanctions and heightened scrutiny, it may be in the best interests of all parties to come to a mutually satisfactory private remedy rather than resorting to the TRIPS resolution system.<sup>59</sup>

However, if one of the members elects to use the dispute settlement system, one of the most powerful modes of software protection is found in Article XXIII(b) of the GATT.<sup>60</sup> Article XXIII(b) allows complaints for nullification or impairment of benefits to be filed even where there has been no explicit violation of a relevant agreement, a "nonviolation or situation complaint."<sup>61</sup>

This gives computer software makers the ability to not only challenge the validity of the text of domestic legislation, but also the way in which that legislation is being implemented and enforced (or the lack thereof) in a member country. This highlights one of the key differences between dispute resolution under GATT and under TRIPS.

Under the GATT, member nations only had the duty *not* to regulate trade or tariff goods.<sup>62</sup> In effect, this was a *passive* obligation because it only put a restraint on governmental action.<sup>63</sup> However, the TRIPS agreement is an *active* obligation that requires states to continuously regulate and

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<sup>55</sup> TRIPS Art. 64.1 states, "[t]he provisions of Articles XXII and XXIII of the General Agreement on Tariffs and Trade 1994 as elaborated and applied by the Dispute Settling Understanding shall apply under this Agreement except as otherwise specifically provided herein."

<sup>56</sup> Samahon, *supra* note 54, at 1055.

<sup>57</sup> See Understanding on Rules and Procedures Governing the Settlement of Disputes, Apr. 15, 1994, art. 23.1, WTO Agreement, Annex 2, in RESULTS OF THE URUGUAY ROUND, *supra* note 9, at 404, 425 (1994), 33 I.L.M. at 1226, 1241 (1994) [hereinafter DSU].

<sup>58</sup> McManis, *supra* note 19, at 230.

<sup>59</sup> *Id.*

<sup>60</sup> *Id.* at 228.

<sup>61</sup> GATT art. XXIII(b). Situation and nonviolation complaints are those that do not involve an infraction of an actual TRIPS obligation, but focus more on how those obligations are being implemented on the ground. See generally, Somohan, *supra* note 54.

<sup>62</sup> Samahon, *supra*, note 54, at 1068.

<sup>63</sup> *Id.*

monitor legislation, procedure *and* enforcement of intellectual property rights.<sup>64</sup>

One of the potential outcomes of this system is a significant impact on state sovereignty. Tuan Samahon believes that a “duty to regulate may implicate the actual functioning of a state’s judicial system. For example, a state’s backlog in all cases, not just copyright suits, might require a revamping of the judicial system – or perhaps the invention of speedy justice for copyright owners – in order to avert a situation complaint.”<sup>65</sup>

This unique aspect of the TRIPS dispute resolution regime ensures greater power by member nations to ensure strict compliance with the Agreement. Additionally, it appears that it can be used by the computer software industry to ensure that member nations eliminate software piracy by the enactment of domestic legislation, as well as “on the ground” implementation and enforcement actions.

Furthermore, TRIPS Article 67 provides that situation and nonviolation complaints do not have to simply be resolved by sanctions and other punishment remedies.<sup>66</sup> Rather, responses may include making technical resources available to the violator in order to ensure compliance.<sup>67</sup> This might occur in situations where complaints arise not from a willful violation, but rather where the country is unable to properly enforce the laws because of lack of funds, lack of adequate police or judicial systems, etc.<sup>68</sup>

#### C. The TRIPS Dispute Settlement Body has been Provided with Extensive Powers that will Aid in the Resolution of Many Matters

TRIPS incorporates four additional powers for its Dispute Settlement Body (DSB) that will aid in the resolution of disputes.<sup>69</sup> First, the DSB has the ability to establish resolution panels whose purpose is to adjudicate matters among members.<sup>70</sup> Second, the DSB can adopt and enforce the reports of those resolution panels, as well as any appellate bodies it creates.<sup>71</sup> Third, the DSB can maintain surveillance of the implementation of rulings and recommendations.<sup>72</sup> Finally, and perhaps most importantly, is the DSB’s ability to authorize suspension of concessions and other obligations under the Agreements.<sup>73</sup> This power also includes the ability to impose

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<sup>64</sup> *Id.*

<sup>65</sup> *Id.*

<sup>66</sup> *See* TRIPS art. 67.

<sup>67</sup> *See generally*, DSU.

<sup>68</sup> *See generally*, Samahon, *supra* note 54.

<sup>69</sup> *Id.*

<sup>70</sup> *Id.*

<sup>71</sup> *Id.*

<sup>72</sup> *Id.*

<sup>73</sup> *Id.*

cross-sectorial retaliation in physical goods areas.<sup>74</sup> When these four advances are viewed in light of the other changes in the dispute resolution mechanism, it is clear that the TRIPS dispute settlement regime has real “teeth.”

Article 3 of the Understanding on Dispute Settlement also allows the DSB to rule based on the “customary rules of interpretation” of the TRIPS agreement, so long as it is not inconsistent with the Agreement itself.<sup>75</sup> This allows the DSB to adopt existing international, national or regional interpretations of TRIPS language in an effort to build upon the experience of member countries.<sup>76</sup>

As technology continues to advance, Article 3 provides the DSB the ability to pick and choose from the various solutions that have been adopted by individual members. This basically gives the DSB the power to watch as living experiments are conducted in member countries, and then adopt the most successful interpretations for general application to all members. Because computer technology tends to change so rapidly, this allows policymakers the needed freedom to find specific interpretations that appear to best effectuate the goals of the Agreement.

#### IV. TRIPS COPYRIGHT PROTECTION

##### A. Significant Computer Software Protection Exists by Using the TRIPS Copyright Sections

Under the Berne Convention, computer software was not protected as a copyrightable work.<sup>77</sup> Therefore, individual members decided whether or not to extend this type of protection. The TRIPS agreement clearly protects software as a “literary work.”<sup>78</sup> However, it only protects the source and object codes, and leaves the computer behavior to the realm of patent law.<sup>79</sup>

Article 10 of the TRIPS agreement states that “[c]omputer programs, whether in source or object code, shall be protected as literary works under the Berne Convention.”<sup>80</sup> Article 10 also clarifies many of the issues that existed under the Berne Convention.<sup>81</sup> First, it specifically defines computer programs as literary works.<sup>82</sup> Thus, it ensures that computer source

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<sup>74</sup> Somahan, *supra*, note 54, at 1072.

<sup>75</sup> DSU art. 3.

<sup>76</sup> McManis, *supra*, note 20, at 228.

<sup>77</sup> See Section II.A of this note.

<sup>78</sup> TRIPS art. 10.

<sup>79</sup> *Id.*

<sup>80</sup> TRIPS art. 10.1.

<sup>81</sup> The issues left unresolved by the Berne Convention are discussed *supra*, in section II.A.

<sup>82</sup> TRIPS art. 10.1.

and object code will have the minimum standards of copyright protection as set forth in the TRIPS agreement.<sup>83</sup> Second, it clearly brings both the object *and* source codes under the scope of protection (object code had not always been included in other country's copyright protections).<sup>84</sup> Third, it stops the wholesale, verbatim copying of computer programs (whether that is copying the program onto another disk or using one program on multiple computers).<sup>85</sup>

The TRIPS drafters had to walk a very fine line in selecting copyright as the method to protect aspects of computer software. On the one hand, they wanted to encourage research and development by ensuring a property interest in the final product so that software producers had an incentive to create.<sup>86</sup> On the other hand, when copyright extends too much protection over software it can give the holder a *de facto* patent not just on the expression, but on the underlying idea as well.<sup>87</sup> Given the long term of protection afforded by copyrights,<sup>88</sup> this would be a potentially crippling situation.

Because copyright seeks to protect the expression and not the underlying idea, copyright protection was traditionally thought of as being inapplicable to useful articles such as object and source code.<sup>89</sup> However, as in the case of software, a copyright can protect useful articles so long as it does not protect the underlying idea. The difficulty, when dealing with software, is that often the idea and expression collapse on each other and cannot be separated:

In the computer software context, the [idea-expression] argument is normally transformed into an inquiry as to whether or not to copyright a program gives the copyright owner a monopoly over some very important technological function. By extrapolation, the [U.S.] courts have tried to fashion the copyright doctrine in a way that will not foreclose the development of technology in a way that would allow the creator to monopolize the technology, as would a monopoly on the patent side.<sup>90</sup>

Therefore, when the TRIPS drafters decided to protect the source and object codes, they specifically denied protection to the program's behavior. Doing so would traditionally be more appropriately protected by patents.<sup>91</sup>

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<sup>83</sup> For example, the minimum period of protection for copyright is 50 years under the TRIPS agreement. TRIPS art. 12.

<sup>84</sup> TRIPS art. 10.1.

<sup>85</sup> See TRIPS art. 9.

<sup>86</sup> See generally, Franklin Pierce Law Center *supra* note 19.

<sup>87</sup> *Id.* at 680-81.

<sup>88</sup> TRIPS art. 7 sets forth a term of the life of the author and fifty years after their death.

<sup>89</sup> See Franklin Pierce Law Center *supra* note 19, at 680-81.

<sup>90</sup> *Id.* at 682.

<sup>91</sup> A discussion of the difference between source code, object code and program behavior is found later in this section.

The behavior of the program is more closely related to the idea than are the source or object codes.

If a computer program's idea is publicly available, it allows others to easily make improvements on the program itself.<sup>92</sup> Perhaps the greatest example of this is the power and popularity of the Linux operating system. The system started off as a grassroots, free program with an open source (readable by anybody) code.<sup>93</sup> Each user added their own individual parts to the program and freely shared those improvements.<sup>94</sup> Had somebody copyrighted the *idea* of the Linux system, they would have been able to effectively bar all second comers from making any changes or improvements.

If the copyright protection chosen under the TRIPS agreement were too strong it would cause these kinds of improvements to cease.<sup>95</sup> A *de facto* patent type of protection would bar any future users or programmers from making improvements to a product because the producer would be able to control the use of the program to an extreme degree.<sup>96</sup>

B. Even Though the TRIPS Agreement Makes Significant Advances Over  
the Paris-Berne Regime, Significant Hurdles to Effective Software  
Protection Remain

The TRIPS computer software copyright provision significantly clarified the crippling debate over whether or not computer software could be protected as literary material under the Paris-Berne Regime. However, in seeking to protect computer source and object code as literary text, the authors institutionalized several important concerns raised under the Paris-Berne regime. One of the major concerns was that copyright protection could not adequately protect computer software because it is inherently different from traditional literary works.<sup>97</sup>

1. *The Behavior-Code Dichotomy*<sup>98</sup>

Many commentators have strenuously argued against using copyright protection for computer software.<sup>99</sup> The major concern arises under what

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<sup>92</sup> See generally Pamela Samuelson, et. al., *Symposium: Toward a Third Intellectual Property Paradigm: Article: A Manifesto Concerning the Legal Protection of Computer Programs*, 94 COLUM. L. REV. 2308 (1994).

<sup>93</sup> B.J. Biersdorfer, *Putting A New Soul In Your PC*, N.Y. TIMES NEWS SERV., March 1, 2001.

<sup>94</sup> *Id.*

<sup>95</sup> See generally, Samuelson, *supra* note 92.

<sup>96</sup> *Id.*

<sup>97</sup> See generally, Samuelson, *supra* note 92.

<sup>98</sup> An extended discussion of this topic will be found *infra*, in the Other Possible Solutions Sections.

<sup>99</sup> *Id.*

has been termed the behavior-code dichotomy discussed briefly above.<sup>100</sup> One commentator, Pamela Samuelson, argues that the real value of a computer program is not in its object or source codes.<sup>101</sup> Rather, much of the real value of the program is in the computer's interface with the user, more commonly known as the program's "behavior."<sup>102</sup> The average computer user rarely, if ever, looks at the source code, much less puts any value in it as a literary work. The real benefit to the consumer is what they see on the screen and how it interacts with them. For example, when a computer user uses a word processing program, the value to the user is in seeing everything that they are typing appear on the screen, checking the spelling and placement of the text and printing the document out. The source and object codes exist completely unseen.

Therefore, increases in the value of computer programs are the ever-increasing behaviors that make programs easier for users to use, and which complete more of the tasks which users' desire.<sup>103</sup> Thus most of the technical know-how or improvements lie close to the face of the program because they appeal to users' ever-increasing needs for the way the program interacts with them.<sup>104</sup> TRIPS copyright provisions, by explicitly protecting only the source and object codes, do not protect the valuable behavior of the program. Violations occur only if there is a literal copying of the source or object code.<sup>105</sup> However, because TRIPS protects against this kind of literal copying, it does provide for a level of security that the pre-TRIPS regime did not provide.

## 2. Reverse Engineering

However, such literal copying is not likely, nor is it needed. Because the behavior is not protected, any computer programmer can purchase a competitors product, run the program and identify its various behaviors, and then write a program that performs essentially the same tasks, but does not literally copy the code. This is commonly referred to as "black box testing."<sup>106</sup>

Another variation on this theme is "clean room testing."<sup>107</sup> In clean room testing, one group of programmers review and catalog all of the behaviors of a program. Then they give those descriptions to a second set of programmers who actually write a program to perform those tasks. Therefore, even if the two codes are coincidentally the same, there is no in-

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<sup>100</sup> *Id.*

<sup>101</sup> *Id.*

<sup>102</sup> *Id.*

<sup>103</sup> *Id.*

<sup>104</sup> *Id.*

<sup>105</sup> *Id.*

<sup>106</sup> *Id.*

<sup>107</sup> *Id.*

fringement because the second group of programmers did not actually copy the code of the original program. Technically, they independently created the same code by emulating the noncopyrightable portions of the original program. These two presently legal forms of software development are both potentially economically damaging.

However, black box testing and clean room testing are only part of a larger set of reverse engineering practices that threaten the software engineering industry.<sup>108</sup> Notably, TRIPS is silent on the issue of reverse engineering.<sup>109</sup> It is also clear that by only protecting source and object codes as literary works, reverse engineering is not affected by TRIPS Art. 10.<sup>110</sup> Such silence basically affirms the practice of many countries that allow reverse engineering.

#### (a) Reverse Engineering in the United States

Two significant cases in the United States affirmed the legal use of reverse engineering. In *Atari Games Corp. v. Nintendo of America*<sup>111</sup> and *Sega Enterprises Ltd. v. Accolade*<sup>112</sup> the courts affirmed the use of reverse engineering by means of decompilation and disassembly. The courts held that such activity can constitute fair use under § 107 of the United States Copyright Act of 1976 where the reverse engineering is necessary to access unprotected ideas.<sup>113</sup>

In *Atari*, Nintendo of America, Inc. ("Nintendo") accused Atari Games Corp. ("Atari") of copyright infringement.<sup>114</sup> Nintendo claimed that Atari had reversed engineered Nintendo's 10NES program. The program's purpose was to prohibit unauthorized game cartridges from being played on the NES system. The United States Court of Appeals for the Federal Circuit stated that Atari could reverse engineer the 10NES program subject to three conditions. First, Atari must reverse engineer from an authorized copy of the program.<sup>115</sup> Second, Atari could only reverse engineer to the extent of what was necessary to access unprotected ideas in the program code. Finally, the court stated that Atari could only reproduce protectible aspects of the 10NES program to ascertain which information was protected and which was not.<sup>116</sup>

The court held that Atari had infringed on Nintendo's copyright. First, Atari did not reverse engineer from an authorized copy. Rather, Atari had

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<sup>108</sup> See generally, McManis, *supra* note 20.

<sup>109</sup> *Id.*

<sup>110</sup> *Id.*

<sup>111</sup> 975 F.2d 832 (N.D. Cal. 1992).

<sup>112</sup> 977 F.2d 1510 (N.D. Cal. 1992).

<sup>113</sup> *Id.*

<sup>114</sup> See *Atari*, 975 F.2d 832.

<sup>115</sup> See *Atari*, 975 F.2d at 843-44.

<sup>116</sup> See *Id.*



improperly obtained a copy of the program from the United States Copyright office. More importantly, however, Atari had reversed engineered protected expressions in the program, which the court found to be a clear violation.<sup>117</sup>

Similarly, in *Sega, Accolade, Inc. ("Accolade")* was a competitor of Sega Enterprises, Ltd. ("Sega"), in the field of computer game cartridges to be used in the Sega Genesis game console. Accolade reverse engineered several commercially available Sega Genesis games in order to identify a way to make Accolade game cartridges compatible with the Sega Genesis game console. The court stated, "[W]here disassembly is the only way to gain access to the ideas and functional elements embodied in a copyrighted computer program and where there is a legitimate reason for seeking such access, disassembly is a fair use of the copyrighted work, as a matter of law."<sup>118</sup> The court found that reverse engineering was the only way for Accolade to make its programs compatible with the Sega Genesis console, and that creation of these games was a "legitimate reason for seeking such access."<sup>119</sup>

The two cases stand for the principal that where the person or entity seeking to reverse engineer the computer program obtains an authorized copy of the program, and uses only the unprotected parts of the program, reverse engineering is permissible.

The United States Patent and Trademark Office insisted that the *Atari* and *Sega* decisions must be viewed as exceptional.<sup>120</sup> The office insisted that the cases be interpreted as saying that reverse engineering is allowed only when the copyright owner is engaged in anticompetitive use of the copyrighted work.<sup>121</sup> However, the courts' rulings clearly extend beyond this narrow interpretation and sanction reverse engineering in a wide variety of commercial contexts.

### (b) Reverse Engineering in Europe

The European Union seems to have taken a somewhat narrower view of permissible reverse engineering.<sup>122</sup> The EC Directive Article 6 states that reverse engineering is allowed where it is: 1) necessary to achieve interoperability; 2) performed by a licensee having a right to use or copy a program; or 3) the information has not previously been available to any-

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<sup>117</sup> *See id.*

<sup>118</sup> *Sega*, 977 F.2d at 1527.

<sup>119</sup> *Id.*

<sup>120</sup> Statement of Christopher A. Meyer, Senior Copyright Attorney, Office of Legislative & International Affairs, USPTO, before the Consultative Committee on Copyright Issues Relating to Computer Programs, Tokyo, Dec. 13, 1993.

<sup>121</sup> *Id.* at 244-45.

<sup>122</sup> *Id.* at 241-42.

body under a license.<sup>123</sup> These acts are largely limited to the parts of the original program necessary for interoperability.<sup>124</sup>

Both the United States decisions and EC Directive walk a fine line between protection of the original computer software producer and hindering the production legitimate advances or derivatives by third parties. The United States and European Union appear to take a very similar pro-third party perspective. TRIPS, by rejecting the copyrightability of program behavior, also implicitly adopts this approach.

Notably, several nations have passed legislation criminalizing inventions and methods whose sole purpose is to circumvent anti-copying devices worked into computer programs.<sup>125</sup> However, this has not been the norm, with the European Union notably not following this trend.

### C. Developed Nations have Largely Implemented Legislation Protecting Computer Software as a Literary Work, but have not Elected to Protect the Behavior of Computer Software

Since the TRIPS agreement became binding upon the developed world, it has become increasingly clear that computer behavior will not be protected by these legislatures. This means that these countries have simply adopted the minimum level of copyright protection for source and object code as set forth in the TRIPS agreement.

In the United States, the 1995 case of *Lotus Development Corp. v. Borland*, 49 F.3d 807 (1st Cir. 1995), stated that:

The fact that there may be many different ways to operate a computer program, or even many different ways to operate a computer program using a set of hierarchically arranged command terms,

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<sup>123</sup> EC Directive art. 6.

<sup>124</sup> *Id.*

<sup>125</sup> For example, the countries that have enacted anti-circumvention legislation are Mexico (IP/N/6/MEX/1), Spain (IP/N/6/ESP/1), Sweden (IP/N/6/SWE/1), and Turkey (IP/N/1/TUR/C/1). Under § 63.2 of the TRIPS Agreement, all legislation which impacts one of the topics controlled by the Agreement (i.e., copyright regulations) must be sent to the TRIPS council for publication and storage. Once received by the Council, they are subject to review by the other members of the Agreement. The Council maintains a document dissemination facility, available at [http://dosconline.wto.org/gen\\_search.asp](http://dosconline.wto.org/gen_search.asp). These documents are searchable and viewable online. The document titles all have an IP/ prefix, designating them as relating to intellectual property matters. All further citations to these documents will include this format for the document title, as this ensures the easiest way to view the documents. However, the Council has encountered two serious problems in the notification and review process. First, many nations have not submitted their legislation to the council. Second, the review process will take several years. See *supra*, note 12. This author's review of the legislation has found only approximately 60 member's notifications and/or reviews of legislation specifically discussing computer software out of a total membership of over 130 members. Thus, analysis has been hindered by this fact. Therefore, this article will attempt to ascertain trends from the information available at this time.

does not make the actual method of operation chosen copyrightable; it still functions as a method for operating a computer and as such is uncopyrightable.<sup>126</sup>

Charles McManis believes that this decision stands for the principle that copyright only extends to nonfunctional expression (object and source codes).<sup>127</sup> Functional aspects (behavior) must be controlled by federal patent or state trade secret protection.<sup>128</sup>

The European Commission Directive on Legal Protection of Software seems to take a similar position. Article 1(2) states that, "[i]deas and principles which underlie any element of a computer program, including those which underlie its interfaces, are not protected by copyright under this Directive."<sup>129</sup> The key here is the rejection of "ideas and principles" underlying a computer program's interface. This appears to be directed squarely towards the behavior of computer programs.

Most of the developed nations have accepted the minimal level of protection as a "literary work" dictated under TRIPS.<sup>130</sup> However, some countries have only protected software under their copyright regime generally and not specifically as a "literary work".<sup>131</sup> For example, Turkey specifically stated that it is protected under the same category as literary works, but it is itself not a literary work.<sup>132</sup>

It is not clear whether the other countries that have not yet specifically stated whether or not software is a literary work are following the Turkey model, or if there is simply some confusion inherent in the TRIPS notification and review process. In fact, it appears more than likely that all of the countries controlled by the EC Directive (discussed above) will treat it as a literary work. What is clear is that a substantial number of nations have

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<sup>126</sup> Lotus Development Corp. v. Borland, 49 F.3d 807, 818 (1<sup>st</sup> Cir. 1995).

<sup>127</sup> McManis, *supra* note 20, at 238-39.

<sup>128</sup> *Id.*

<sup>129</sup> EC Directive art. 1(2).

<sup>130</sup> The following developed and nondesignated countries have specifically stated that they will protect computer programs as "literary works": Australia (IP/Q/AUS/1), Belgium (IP/N/1/BEL/1), Bulgaria (IP/N/1/BGR/C/2), Canada (IP/N/1/CAN/C/1), the Czech Republic (IP/Q/CZE/1), Ecuador (IP/Q(1-4)/ECU/1), Estonia (IP/N/1/EST/C/1), Hungary (IP/Q/HUN/1), Ireland (IP/Q/IRL/1), Italy (IP/N/1/ITA/1), Japan (IP/Q/JPN/Add.1), Latvia (IP/N/1/LVA/C/1), Liechtenstein (IP/Q/LIE/1), Luxembourg (IP/Q/LUX/1), the Netherlands (IP/Q/NLD/1), New Zealand (IP/Q/NZL/1), Norway (IP/Q/NOR/1), Portugal (IP/Q/PRT/1), Romania (IP/Q/ROM/1), Sweden (IP/N/6/SWE/1), Switzerland (IP/Q/CHE/1), the United Kingdom (IP/N/1/GBR/1), and the United States (IP/Q/USA/1).

<sup>131</sup> These developed and nondesignated countries are Denmark (IP/Q3/DNK/1), Ecuador (IP/Q(1-4)/ECU/1), Finland (IP/Q3/FIN/1), France (IP/Q3/FRA/1), Germany (IP/N/6/DEU/1), Greece (IP/Q4/GRC/1), the Kyrgyz Republic (IP/N/1/KGZ/C/1), Mongolia (IP/Q(1-4)/MNG/1), Panama (IP/Q(1-4)/PAN/1), and Spain (IP/N/6/ESP/1).

<sup>132</sup> IP/N/1/TUR/C/1.

complied with Article 10.1 of the TRIPS Agreement and protected computer programs under their copyright regimes.

Recently the IIPA sent a letter to the United States Trade Representative regarding nations that the IIPA has found that are not adequately protecting intellectual property rights.<sup>133</sup> Among them, the letter singled out both Bulgaria and Japan for not properly enforcing the copyright laws already promulgated that relate to computer software protection.<sup>134</sup> This letter highlights the fact that although the laws may conform to the TRIPS agreement, without proper enforcement software continues to be pirated.

#### D. Developing Nations Seem to be Following the Same Trend as the Developed Nations

To date, most of the developing nations that have reported their legislation to the TRIPS Council have provided at least copyright protection to computer programs, and most have protected computer programs as literary works.<sup>135</sup> However, several members have sent notifications that their domestic legislation is not presently in compliance with the Agreement.<sup>136</sup>

The IIPA again contests the success in harmonizing laws and ensuring enforcement. Specifically, it points out that the Dominican Republic,<sup>137</sup> Egypt,<sup>138</sup> Kuwait,<sup>139</sup> Israel,<sup>140</sup> Lebanon,<sup>141</sup> Namibia,<sup>142</sup> the Philippines,<sup>143</sup>

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<sup>133</sup> See generally, IIPA Letter, *supra* note 5.

<sup>134</sup> IIPA Letter, *supra* note 5, at 14-15.

<sup>135</sup> The following countries have given computer programs copyright protection: Belize (IP/N/6/BLZ/1), Chile (IP/N/6/CHL/1), Columbia (IP/N/6/COL/1), Iceland (IP/Q/ISL/1), and Mexico (IP/N/6/MEX/1). The following countries specifically protect it as a "literary work": Brazil (IP/N/1/BRA/C/1), Costa Rica (IP/N/1/CRI/C/1), Cyprus (IP/Q/CYP/1), El Salvador (IP/Q/SLV/1), Estonia (IP/N/1/EST/C/1), Hong Kong, China (IP/N/1/HKG/2/Add.1), Indonesia (IP/N/1/IDN/2), Israel (IP/Q/ISR/1), Korea (IP/Q/KOR/1), Macau, China (IP/N/1/MAC/C/1), Malta (IP/Q/MLT/1) the Philippines (IP/N/1/PHL/C/6), Poland (IP/Q4/POL/1), Saint Lucia (IP/N/1/LCA/1), Singapore (IP/N/1/SGP/C/1) and Trinidad and Tobago (IP/Q/TTO/1).

<sup>136</sup> Burundi is not in compliance and is seeking a 10-year waiver (IP/N/1/BDI/1). Dominica is not in compliance but has a draft bill in existence (IP/N/1/DMA/1).

<sup>137</sup> IIPA Letter, *supra* note 5, at 80-90 (citing lax enforcement as well as certain prohibited taxes).

<sup>138</sup> IIPA Letter, *supra* note 5, at 91-103. While presently "considered a literary work", the new draft Copyright Law would create a separate category for computer software, and it is unclear if this would afford the same level of protection. *Id.* at 100.

<sup>139</sup> IIPA Letter, *supra* note 5, at 142 (Kuwaiti law does not protect software as "literary works").

<sup>140</sup> IIPA Letter, *supra* note 5, at 121-33 (Citing that the Israeli government continues to use illegal software, enforcement has been lax and the Copyright Law does not provide for adequate criminal remedies.).

<sup>141</sup> IIPA Letter, *supra* note 5, at 150 (stating that Article 25 of the Copyright law violates TRIPS by creating vast exceptions to the protection of computer software).

<sup>142</sup> IIPA Letter, *supra* note 5, at 13.

<sup>143</sup> IIPA Letter, *supra* note 5, at 175-84 (citing lax enforcement).

South Korea,<sup>144</sup> Taiwan,<sup>145</sup> and Uruguay<sup>146</sup> have all either not promulgated language adhering to TRIPS or not properly enforced the Agreement.

As noted by the IIPA, many of the developing countries have amended or are presently amending their laws to become TRIPs compliant.<sup>147</sup> This suggests that although developing nations have not, as a group, achieved widespread compliance, the movement certainly appears to be in that direction.

While a detailed analysis of the enforcement and functioning of copyright legislation protecting computer software is well beyond the scope of this article, it is important to point out that implementing legislation is simply a first step towards ultimate protection. However, it is in these very situations where the legislation does not reflect the actual enforcement that the dispute resolution mechanisms discussed in Section III may prove to be the most effective tool in protecting software.

## V. TRIPS PATENT PROTECTION

### A. The Absence of Protection of Computer Software Through Patents was Largely Unchanged by the TRIPS Agreement

The TRIPS agreement made some general advances in an effort to harmonize global patent regulations. However, it did not confront the issue of whether a computer program itself can be patented. This ambivalence prolongs the question that existed in the pre-TRIPS regime, namely, can computer software be protected as such, or does it have to have a physical manifestation in order to be considered for a patent? Currently, this question is left up to the individual signatories.

Article 27 of the TRIPS agreement states that patents will be provided "for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application."<sup>148</sup> This definition of patents certainly does not foreclose computer programs from being included, but it does not affirm this notion either.

Several problems have been solved by the TRIPS agreement. There are at least three areas of advances beyond the old Paris Convention Stan-

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<sup>144</sup> IIPA Letter, *supra* note 5, at 211-23 (citing lax or even counterproductive enforcement efforts).

<sup>145</sup> IIPA Letter, *supra* note 5, at 224-45. The report cites the fact that the Copyright law does not define a computer program as a "literary work", *id.* at 242, and lax enforcement efforts, *see generally*, *id.* at 224-45.

<sup>146</sup> IIPA Letter, *supra* note 5, at 13 and 260-73. Uruguay does not expressly protect computer programs as "literary works." *Id.* at 262.

<sup>147</sup> *See generally*, IIPA Letter, *supra* note 5.

<sup>148</sup> TRIPS art. 27.

dards.<sup>149</sup> First, TRIPS strictly forbids discrimination against any invention that satisfies the TRIPS patent definition.<sup>150</sup> Second, patents are protected for a minimum term of 20 years.<sup>151</sup> Finally, discrimination based on the place of invention is forbidden.<sup>152</sup>

However, because the TRIPS copyright sections only provide protection for the source and object codes, the ability to patent the functional or behavioral aspects of the program have become the only vehicle through which software developers can effectively protect their entire program.

#### B. The Pure Software Controversy Continues Under the TRIPS Agreement.

The question of whether or not “pure software” (software having no physical manifestation) can be patented, or whether it must contain a physical manifestation continues under the TRIPS regime. Some commentators believe that TRIPS actually does resolve this issue. The discussion has revolved around the choice of words in Article 27.

What does the term “capable of industrial application”<sup>153</sup> actually mean?<sup>154</sup> One of the footnotes to the text of the Agreement states that “capable of industrial application” is synonymous with “useful.”<sup>155</sup> One commentator believes, therefore, that it could be consistent with TRIPS to limit computer software patents only to those software inventions that have some form of an industrial application.<sup>156</sup>

However, there is some evidence that this narrow interpretation is inappropriate. Article 2 of the TRIPS agreement formally adopts the Paris Convention.<sup>157</sup> And Article 1 of the Paris Convention states that “industrial property” must be viewed “in the broadest sense.”<sup>158</sup> This broader sense certainly would leave room for patents to be awarded for pure computer software, but certainly would not appear to require such an outcome.

Another commentator reiterates this confusion.<sup>159</sup> Bankole Sodipo argues that the pure software question does not necessarily revolve around the “industrial application” language, but rather the “invention” and “techno-

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<sup>149</sup> Sodipo, *supra* note 43, at 198.

<sup>150</sup> TRIPS art. 27.1.

<sup>151</sup> TRIPS art. 33.

<sup>152</sup> TRIPS art. 27.1. This issue will be discussed later, but this provision forced the United States to change its practices for the first to file patent system.

<sup>153</sup> TRIPS art. 27.

<sup>154</sup> McMannis, *supra* note 20, at 247-48.

<sup>155</sup> TRIPS art. 27 n.5.

<sup>156</sup> McMannis, *supra* note 20, at 247-48.

<sup>157</sup> TRIPS art. 2.

<sup>158</sup> Paris Convention art. 1.

<sup>159</sup> Sodipo, *supra* note 43, at 204-05.

logical" language.<sup>160</sup> If patents are allowed for any "technology," computer software may receive patents because computers are a form of technology.<sup>161</sup> However, if it is related to any "invention" and not "technology," the United States and European Commissions stances will be upheld because "invention" connotes a physical manifestation.<sup>162</sup> Without a concrete interpretation, the language creates a level of uncertainty, allowing signatories the ability to choose either to recognize pure software as patentable or not. Some commentators believe that the uncertainty will leave most publicly distributed computer programs unprotected.<sup>163</sup>

C. Both the Developed and the Developing Signatories to TRIPS have  
taken Divergent Approaches to the Pure Software Issue

Today, five years after TRIPS came into force for the developed world, and just a year after it began to control the developing world there appears to be little consensus on the pure software issue. The United States, as well as several other countries including Nigeria and Australia, seems to be moving more toward allowing patents on software.<sup>164</sup> However, the European Union seems to be moving to bar patents on software *per se*.<sup>165</sup>

1. *There is No Consensus Among the Developed Nations on the Pure  
Software Patent Controversy*

The United States appears to be moving in a direction of allowing computer software patents on programs *per se*.<sup>166</sup> However, the movement has occurred slowly over the last three decades. In 1968, the Patent and Trademark Office declared computer programs unpatentable subject matter.<sup>167</sup> They later rescinded this position<sup>168</sup> opening up the possibility for computer software patents.

Originally, "it was thought that because computer programs involved math, which consists of universal principles akin to the laws of nature, programs were not patentable subject matter."<sup>169</sup> This attitude is embodied in *Gottschalk v. Benson*.<sup>170</sup> The Supreme Court refused to allow a patent for an invention whose main utility was its ability to devise programs for digi-

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<sup>160</sup> *Id.*

<sup>161</sup> *Id.*

<sup>162</sup> *Id.*

<sup>163</sup> See generally, McManis, *supra* note 20.

<sup>164</sup> See *infra*, Section V.B.1.

<sup>165</sup> See *infra*, Section V.B.1.

<sup>166</sup> Sodipo, *supra* note 43, at 203.

<sup>167</sup> 33 Fed. Reg. §§ 15609-10 (1968).

<sup>168</sup> 34 Fed. Reg. § 15724 (1969).

<sup>169</sup> James P. Chandler, *Patent Protection for Computer Programs*, 1 MINN. INTELL. PROP. REV. 33, 41 (2000).

<sup>170</sup> See 409 U.S. 63 (1972).

tal computers.<sup>171</sup> Similarly in 1978, the Supreme Court was again faced with the issue of patentability of another computer software method, and again refused to allow the patent to be issued.<sup>172</sup>

This attitude began to shift in the 1980's. In *Diamond v. Diehr*,<sup>173</sup> the Supreme Court allowed a patent to be issued for a program that both opened a cauldron (the technical result), and included the software used to calculate the precise temperature in the cauldron by means of an mathematical equation. Today, the United States allows patents for a wide range of computer programs that include a physical manifestation.<sup>174</sup> As Bankole Sodipo points out, "Today the US allows computer software inventions which involve algorithms, as in *Re Iwashishi*, and the number of applications and grants have increased significantly over the years."<sup>175</sup>

As an aside, there was yet another significant shift in United States patent law that occurred as a direct result of the TRIPS agreement. The United States and the Philippines both maintain a national patent priority system based on the first-to-invent procedure.<sup>176</sup> However, the rest of the world maintains a first-to-file system.<sup>177</sup> The old United States system stated that the first to invent the patent *in the United States* received the patent. This was seen as a major obstacle against harmonization as it was biased against foreign inventions.<sup>178</sup> In keeping with the anti-discrimination Article 27(1) of the TRIPS agreement, the United States has recently changed its law to state that the first to invent in any country will receive the patent.<sup>179</sup>

Europe seems to have rejected the computer software *per se* rule. The European Patent Convention ("EPC") specifically requires member states to refuse to grant patents to computer programs as such,<sup>180</sup> unless the software makes some sort of technical contribution.<sup>181</sup> "The rationale is that whilst mental acts and business processes remain unpatentable, inventions which result in a technical end should not be discriminated against merely because the technical end is effected by a computer program."<sup>182</sup>

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<sup>171</sup> See *Gottschalk*, 409 U.S. 63.

<sup>172</sup> *Parker v. Flook*, 437 U.S. 584 (1978) (the Court refused a patent for a method of updating "alarm limits" for a chemical process).

<sup>173</sup> 450 U.S. 175 (1981).

<sup>174</sup> See generally *State Street Bank & Trust Co. v. Signature Financial, Inc.*, 149 F.3d 1368 (Fed. Cir. 1998).

<sup>175</sup> Sodipo, *supra* note 43, at 203 (citations omitted).

<sup>176</sup> *Id.* at 205.

<sup>177</sup> *Id.*

<sup>178</sup> *Id.*

<sup>179</sup> *Id.*

<sup>180</sup> Convention on the Grant of European Patents (10<sup>th</sup> ed. 2000) [hereinafter EPC] art. 52(2)(c).

<sup>181</sup> European Patent Office Guidelines C IV 2.2.

<sup>182</sup> Sodipo, *supra* note 43, at 204.



Twenty-three developed members have notified the Council that they will not patent software as such.<sup>183</sup> Notable exceptions include the United States,<sup>184</sup> Australia<sup>185</sup> and Japan<sup>186</sup>. Most of the nations that do not allow patenting are part of the European Union, but there are other geographical areas represented.<sup>187</sup> Thus, it seems clear that most of the developed nations do not allow patenting of software as such.

2. *It is Not Clear Whether Developing Nations will Allow Patents on Computer Programs Per Se*

To date, very few of the developing nations have signaled whether or not they will allow patents to issue on computer software as such. Nigeria will allow patenting as such, however, Nigeria cryptically carves out an exception for inventions that are of a “scientific nature.”<sup>188</sup> Unfortunately, until more developing countries notify the TRIPS Council of their legislation, no discernable patterns have emerged.

VI. OTHER POSSIBLE SOLUTIONS TO PROTECTING COMPUTER SOFTWARE

While TRIPS addresses the computer software protection problem under copyright law, there are a number of other possible solutions that may be more effective including the “compulsory patent” system and the *sui generis* approach.

A. The Compulsory Patent System

TRIPS could have mandated that signatories protect software behavior or functionality under patent law. The program could be patented *per se* as long as it complied with the traditional requirements of patents set forth in the TRIPS Agreement. This would have allowed the source and object codes to be protected by copyright, and then the behavior to be protected by patent. Such a regime could be used to protect the entire software product.

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<sup>183</sup> These include Austria (IP/Q3/AUT/1), Belgium (IP/Q3/BEL/1), Bulgaria (IP/Q3/BGR/1), Canada (IP/Q3/CAN/1), the Czech Republic (IP/Q/CZE/1), Denmark (IP/Q3/DNK/1), Finland (IP/Q3/FIN/1), France (IP/Q3/FRA/1), Germany (IP/N/6/DEU/1), Greece (IP/Q3/GRC/1), Ireland (IP/Q3/IRL/1), Italy (IP/Q3/ITA/1), Mongolia (IP/Q/(1-4)/MNG/1), the Netherlands (IP/Q3/NLD/1), New Zealand (IP/Q3/NZL/1), Norway (IP/Q3/NOR/1), Portugal (IP/Q3/PRT/1), the Slovak Republic (IP/Q3/SVK/1), Slovenia (IP/Q3/SVN/1), Spain (IP/Q3/ESP/1), Sweden (IP/Q3/SWE/1), Turkey (IP/Q3/TUR/1) and the United Kingdom (IP/Q3/GBR/1); available at [http://docsonline.wto.org/gen\\_search.asp](http://docsonline.wto.org/gen_search.asp).

<sup>184</sup> See discussion above.

<sup>185</sup> IP/Q3/AUS/1.

<sup>186</sup> IP/Q3/JPN/1.

<sup>187</sup> For example Canada (IP/Q3/CAN/1).

<sup>188</sup> *Id.*

Under such a system however, a 20-year patent term seems excessive. The point is to provide an incentive for software producers, but not to stifle future progress. Therefore, a term of 10 years may be more appropriate. The 10-year term would allow computer program developers time to amortize their investment,<sup>189</sup> but not provide any long-term monopoly on the product.

To some extent the term of the patent may be a moot point. With the speed of advancement in the computer software arena, it is entirely possible that any given patentable program will be obsolete long before the 10-year patent period runs out.<sup>190</sup> The apparent character of the software market is an ever-changing program incorporating more complex behaviors.

One of the reasons that such a solution was not adopted under the TRIPS agreement is likely to have been a strategic choice. Countries have had diverging attitudes towards the pure software issue. Five years ago the United States was patenting pure software programs while the European Commission was preparing to bar the patents on pure software. Therefore, it is not clear whether the signatories of the TRIPS agreement could have agreed upon a measure such as the one above.

#### B. The *Sui Generis* Approach

The second possible solution is the *sui generis* approach. This system has been extensively discussed recently, and, as mentioned above, been adopted by WIPO and others.<sup>191</sup> Perhaps the most accepted, as well as the most debated, manifestation of the *sui generis* approach is "The Manifesto."<sup>192</sup>

The authors of the Manifesto believe that the present legal regime is incapable of protecting computer programs because they are inherently unlike anything the present system has ever seen:

Although incremental technical innovation has generally been left to the rigors of free competition, the rationale for doing so has been, apparently, the assumption that incremental innovators would have some natural lead-time after introducing an innovative product to the market, during which they could charge monopoly prices. Such lead-time arose, in part, because manufacturers of industrial products embodying incremental innovations were able to keep secret much of the know-how required to make their products. Allowing third parties to reverse engineer and appropriate incremental innovation also substantially contributed to the cumulative innovation process because those who reverse engineer often

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<sup>189</sup> Franklin Pierce Law Center, *supra* note 19, at 694-95.

<sup>190</sup> *Id.* at 695.

<sup>191</sup> See *supra* section II.A.

<sup>192</sup> See generally, Samuelson, *supra* note 92.

introduce improvements as the reimplementation of another's innovation or learn how to produce the product more efficiently. Even in the face of such competition, firms with lead-time generally receive enough return on their investment to provide adequate incentives for incremental innovation.<sup>193</sup>

However, the computer software industry is not like this at all. The computer software industry is built on incremental changes. These incremental changes in the behavior of the program, which are its true economic value, exist on the face of the program. This means that they can be easily duplicated by other programmers through reverse engineering. Moreover, the cost of producing the computer program, unlike other material objects, is almost nothing.<sup>194</sup> Therefore, present legal regimes are either underprotecting programs by not providing producers with strong enough protection, or overprotecting by awarding patent/copyright monopolies.<sup>195</sup> Underprotection hurts software producers who cannot receive a return on their investment. Overprotection stifles innovation.

The authors of the Manifesto believe that a new market oriented system would better protect computer programs. Under their system, they would establish "a legal regime that would not restrict appropriations of compiled know-how in programs any further than is necessary to avoid market failure and restore the kind of healthy competition that occurs when innovators enjoy sufficient natural lead time."<sup>196</sup>

Programmers would enjoy a monopoly over the product for a period of time necessary to recoup the investment that they made in the product.<sup>197</sup> After that time, competitors would be able to enter the field with their own version of the product. The authors provide three considerations to determine the length of the monopoly:

(1) the nature and size of the software entity or component that has been imitated; (2) the means by which a second comer obtains access to such an entity and the degree of dependence (or independence) of a second comer's creation; and (3) the degree of similarity between the products and markets of the original and second comers.<sup>198</sup>

This new approach has also received much criticism. First, some critics argue that the principle idea of the authors of the Manifesto, namely that

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<sup>193</sup> *Id.* at 2367-68 (citations omitted).

<sup>194</sup> *See generally*, Samuelson, *supra* note 92.

<sup>195</sup> *Id.* at 2361-62.

<sup>196</sup> *Id.* at 2365.

<sup>197</sup> *Id.*

<sup>198</sup> *Id.* at 2378 (citations omitted).

the present system is not able to handle computer software, is not true.<sup>199</sup> For example, Robert Gorman believes that the present system adequately protects computer programs.<sup>200</sup>

Professor Gorman also states that there are enough conflicts in the law trying to incorporate various other intellectual property regimes (patent, copyright, trademark, etc.), and that adding an additional regime will only complicate the matter.<sup>201</sup> Finally, Professor Gorman notes that while several people have posited a *sui generis* approach, almost nobody has concretely set forth a model code and true implementation plan, so the idea continues to exist only in the abstract.<sup>202</sup>

## VII. THERE ARE PROBLEMS THAT MUST BE ADDRESSED IN ALL SOLUTIONS

One of the major continuing problems is that prior international intellectual property agreements managed harmonization through a program of national treatment of commerce in objects or activities located in a particular jurisdiction. However, today's global computer networks are "rapidly undermining the whole concept of territorially-limited intellectual property rights."<sup>203</sup> This territorial approach also faces great hurdles in the face of new methods of commerce where computer programs can be downloaded from remotely located servers onto the user's computer, or even run from those servers that are located in different areas from where the user's terminal is located.

Additionally, computer software protection must ensure the interoperability of computer software systems.<sup>204</sup> This must be done on both the micro level at the user's computer, as well as the overall workings of local area networks, wide area networks, and the "information superhighway." If software makers tightly controlled their source and object codes, as well as the programs behavior, communications among different computer programs and platforms would become more difficult as conflicts between programs hindered their interoperability.

If this scenario were taken its extreme limits, this would lead to an ever-increasing balkanization of computers. Software programmers would have to engineer an entire suite of programs and platforms for any one user, because there would be no guarantee that the user could integrate another program or platform. For the user, this would reduce choice and force them

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<sup>199</sup> See generally Robert A. Gorman, *Commentary: Comments on a Manifesto Governing the Legal Protection of Computer Programs*, 5 ALB. L.J. SCI. & TECH. 278 (1996).

<sup>200</sup> *Id.*

<sup>201</sup> *Id.* at 283.

<sup>202</sup> See generally, Gorman, *supra* note 199.

<sup>203</sup> McManis, *supra* note 20, at 226.

<sup>204</sup> *Id.* at 232.

to choose among discrete packages that included everything from their operating system, to the programs used daily.

### VIII. CONCLUSIONS

The protection of computer software under the TRIPS agreement appears to be both an advance and a loss for the computer software industry. The final outcome will depend on the way in which each of the individual countries chooses to craft their own domestic legislation.

It is clear, that protection of the source and object codes as literary works is an advance. Under the prior Berne convention, even this level of protection was left to the individual countries. Therefore, wholesale copying of the code could occur legally in those countries that failed to provide copyright protection for software programs. This effectively left the computer programmers with little possible recourse.

Similarly, under the Paris Convention, there was no clear direction about whether or not programs could be patented. Therefore, the world broke into two separate camps. First, some countries would not allow any form of patent unless the program was able to manifest itself in some sort of physical expression. The second group patented computer programs *per se*.

Under the new TRIPS regime, programs are protected as literary works. This provides computer programmers with the usual rights available to copyright holders. The most important of which is the bar against unauthorized copying or reproduction. Furthermore, this right is supported by an aggressive dispute settlement system. Because of the unique properties of the TRIPS agreement, it is possible to affirmatively affect the legislation and enforcement of copyright law in countries. Not only can a signatory force another signatory to adopt compliant legislation, they can also challenge the means and adequacy of enforcement of those legislative goals.

TRIPS does not, however, afford copyright protection for the behavior or functional aspect of the program. This is partly because of the traditional boundaries of copyright protection for nonuseful aspects of inventions. Historically, patent law protected such useful inventions.

TRIPS does not foreclose the possibility that a computer program, or its behavior, could be patented. However it does not force such an outcome. Therefore, it leaves the issue of the "pure software" patent unanswered. Each member state will be allowed to adopt their own legislation on this matter.

To the extent that member nations provide copyright protection for the object and source code, along with patent protection for the computer program *per se*, the TRIPS agreement is a major advance over the previous systems. However, countries, such as those that adhere to the EC Directive on Computer Programs, will provide only nominal protection for computer programs under copyright law and not patent law.

To date, the adoption of copyright protection among developed, developing and nondesignated countries has been a success. This suggests that

broad copyright protection among all members will be achieved in the future. However, the patentability of computer programs as such has not received such worldwide consensus. The developed world continues to remain divided into two camps. Additionally, few of the developing countries have notified the TRIPS Council of their legislation. Therefore, it is not clear what the future holds for computer patent protection. However, if the current state is any indication, it seems clear that the world will continue to remain divided under the TRIPS regime.

The hope is that more countries will follow the dual protection model conceptualized by the United States. However, there are legitimate concerns about this model. Therefore, perhaps it is best to provide for a shorter patent period for computer programs in order to ensure that competitors are allowed to build on the software, while still allowing computer companies to recoup their initial research and development costs.

