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PROGRAMMING A FAIR USE: THE LIMITATIONS OF JUDICIAL PRECEDENT

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**PROGRAMMING A FAIR USE: THE
LIMITATIONS OF JUDICIAL PRECEDENT**

*By Patrick Misale**

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I. INTRODUCTION

A ten-year litigation battle between two tech titans, Google, LLC and Oracle America, Inc., ended after a decade of litigation and a second petition to the Supreme Court.¹ Two industry leaders twice battled a copyright dispute regarding application programming interfaces (“APIs”) to the highest court, without settling.² APIs provide the necessary foundation to translate software code across different programming languages, which allows users to manage the software programs interchangeably on any computer or other similar technological device.³ Currently, APIs promote the interoperability of software developed over many industries and account for special concerns of the health care industry in the past decade.⁴ Furthermore, software development careers are expected to grow twenty-two percent over the next ten years.⁵ Both the device and application which you are using to read this comment likely have used APIs to display this text in a readable format.⁶

If you have ever used a credit card to pay for something while shopping online, then you have likely used a web-based API, which allowed you to input and authenticate your information on the

¹ See *Google LLC v. Oracle Am. Inc.*, 141 S. Ct. 1183 (2021).

² *Id.* at 1195.

³ See discussion *infra* Section II (D).

⁴ *Understanding Emerging API-Based Standards*, OFF. NAT’L COORDINATOR FOR HEALTH INFO. TECH., <https://www.healthit.gov/isa/understanding-emerging-api-based-standards> (last visited Feb. 7, 2021).

⁵ BUREAU OF LABOR STAT., U.S. DEP’T LABOR, Occupational Outlook Handbook, Software Developers, <https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm> (last visited January 14, 2021).

⁶ See *Introduction to web APIs*, MDN WEB DOCS, https://developer.mozilla.org/en-US/docs/Learn/JavaScript/Client-side_web_APIs/Introduction (last updated Jan. 28, 2021) (discussing commonly used browser and third-party APIs and the use of Document Object Model API which allows for the manipulation of documents on a browser web page).

retailer’s webpage. APIs allow software developers to write programs—sometimes written in different programming languages—to work together seamlessly on a single application. APIs are widely used in many industries, and many governments provide useful API information for developers to manage in their own applications.⁷ In 2019, Yahoo Finance projected the global API management market to grow to \$3.6 billion—a twenty-two percent increase over five years.⁸ The use of APIs in data analytics, cloud services, and Internet of Things (“IoT”) devices has driven the value of the market. Further, APIs challenge policy considerations for security in many industries like medical technology because of how we connect devices to our physical bodies.⁹ Many medical devices use open source APIs in their software that expose users to exploitable vulnerabilities and attacks.¹⁰

The technology presents many policy considerations resulting from the total time spent disputing the particular use of the Java APIs by Google. In the world of tech, a decade is more than a lifetime.¹¹ Google LLC (“Google”) and Oracle America, Inc. (“Oracle”) began their dispute in 2010, the same year that Apple debuted the first iPad.¹² Since 2010, the iPad has created an entire industry lineup and eight generations of the original model.¹³ The extraordinary decade of

⁷ See *For Developers*, USA GOV, <https://www.usa.gov/developer> (last visited Feb. 7, 2021); *API technical and data standards (v2-2019)*, GOV’T DIGIT. SERV., <https://www.gov.uk/guidance/gds-api-technical-and-data-standards> (last updated Jul, 24, 2020).

⁸ *Global Application Programming Interface (API) Management Market Analysis & Forecast, 2014-2024*, YAHOO FINANCE (Sep. 16, 2019), <https://finance.yahoo.com/news/global-application-programming-interface-api-134637253.html?guccounter=1>.

⁹ *Understanding Emerging API-Based Standards*, *supra* note 4.

¹⁰ E.g., *CVE-2019-11405 Detail*, NAT’L VULNERABILITY DATABASE, <https://nvd.nist.gov/vuln/detail/CVE-2019-11405> (last visited Feb. 7, 2021).

¹¹ For example, Pebble smartwatch was founded in 2012 and went out of business in 2016. See, e.g. Aaron Holmes, *The 13 biggest tech company failures in the last 10 years*, BUSINESS INSIDER (last updated Dec. 24, 2019, 12:02 PM), <https://www.businessinsider.com/tech-companies-that-shut-down-went-bankrupt-in-last-decade-2019-11#2017-jawbone-9>.

¹² *Apple Launches iPad*, APPLE NEWSROOM (Jan. 27, 2010), <https://www.apple.com/newsroom/2010/01/27Apple-Launches-iPad>.

¹³ Daniel Nations, *A List of iPad Models and Generations*, LIFEWIRE (Jan. 12, 2021), <https://www.lifewire.com/list-of-ipad-models-and-generations-1994232>.

litigation revisited several facets of the common law of copyright. The parties argued familiar doctrines, such as merger and the fair use defense, as they applied to APIs, a tech standard among the software industry.¹⁴

This comment will analyze the efficiency of common law jurisdictions at resolving and guiding matters of global import that require a higher level of technical competency. This comment will also answer the questions of how effectively the United States judicial system has resolved Oracle and Google's copyright dispute over the programming tool known as APIs. Further, this comment will investigate what guidance is provided to the industry as to the proper allocation of rights and protections.

The common law derives from the principal of *stare decisis* and emphasizes the development of the law through judicial decision-making.¹⁵ The United States, as an example, is primarily a common law country. To contrast with the common law system, this comment will consider the perspectives from civil law and hybrid systems, like Japan, and speculate how a dispute of copyright protections for APIs may be resolved. Civil law systems are organized by the civil code, or text of the law, not prior judicial systems.¹⁶ As technology continues to challenge legal concepts, new perspectives are instructive toward balancing justice and equity.

In Section II, this comment provides the history of copyright protections in three contexts. First, Section II (A) provides a historical overview of the development of world treaties for copyright, highlighting the modern age of software and computer programming. Second, Section II (B) focuses on the development of copyright protections and the fair use defense as they extend to computer programs and software in United States statutes and common law.

¹⁴ Oracle Am., Inc., 886 F.3d at 1211, 1234.

¹⁵ *Stare Decisis*, BLACK'S LAW DICTIONARY (11th ed. 2019) ("The doctrine of precedent, under which a court must follow earlier judicial decisions when the same points arise again in litigation.").

¹⁶ *Civil Code*, BLACK'S LAW DICTIONARY (11th ed. 2019) ("A comprehensive and systematic legislative pronouncement of the whole private, noncommercial law in a legal system of the continental civil-law tradition.").

Third, Section II (C) describes copyright development in Japan's hybrid legal system, beginning with Meiji Restoration.

Section II (D) will frame the discussion for copyright protections by first explaining what an API is in technical terms and how APIs first appeared in American courts in the 1990s. From there, using APIs as a test of ability, Section III will open a discussion which analyzes the framework for copyright protections as they currently exist in both the United States and Japan. Section III (A) will suggest that the Japanese legal system is a useful comparative tool because of its similarities with the U.S. legal systems. Sections III (B)-(D) will offer a three-step analysis of the ability of each framework: first, the ability to handle the complexity of current technology and how the benefits of copyright protections are received by end users; second, the ability to respond to global demands for guidance on protecting technology without borders; and third, the ability to balance the needs of the growing industry of software developers and code writers.

Finally, this comment will conclude in Section IV by arguing that the inefficiencies and delays of judicial decision-making hinder modern technological innovation. The flexibility of judicial doctrine may routinely promote an overall benefit to innovation, but in the context of the rapidly increasing pace of technological capacity, guidance must be established quickly enough to ensure protections are fairly distributed.

II. BACKGROUND: COPYRIGHT PROTECTIONS AND SOFTWARE DEVELOPMENT

A. World Treaties

Copyright is a subset of intellectual property rights which grants the exclusive right of original works to the author.¹⁷ Similar to other intellectual property rights, the policy for copyrights is to

¹⁷ PAUL GOLDSTEIN, *COPYRIGHT'S HIGHWAY: FROM GUTENBERG TO THE CELESTIAL JUKEBOX 1* (Stanford University Press 2003) ("From copyright law's beginnings close to three centuries ago, [copyright] has meant just what it says: the right to make copies of a given work . . . and to stop others from making copies without one's permission.").

encourage the creation of original works by guaranteeing protections for the author or artist to copy, distribute, and adapt their original work for a limited period.¹⁸ If anyone may copy an author's work for their own benefit, then an author may not have any incentive to engage in creation and disclose their work to the public.¹⁹ Thus, copyright encourages the authors and artists to engage in their work. For example, books are considered original works. The physical writing and copying of the book before the invention of the printing press was a manually intensive task that prevented widespread dissemination.²⁰ Further, the rights guaranteed to an author vary among jurisdictions.²¹ International treaties are agreed upon by member nations to mitigate the problems inherent in protecting the rights of authors and creators to their work.

While numerous world treaties relate to intellectual property rights, the following three help establish copyright protections for computer programs: the Berne Convention for the Protection of Literary and Artistic Works ("Berne Convention");²² the Agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPS");²³ and the World Intellectual Property Organization Copyright Treaty ("WCT").²⁴

The development of international copyright protections begins with the Berne Convention. The Berne Convention was adopted by the United States in 1886 to unify creators' rights to their work in all

¹⁸ *Id.* at 5–7.

¹⁹ *Id.* at 145.

²⁰ *Id.* at 31.

²¹ *Id.* at 139–41.

²² The Berne Convention for the Protection of Literary and Artistic Works, Sep. 9, 1886, revised at Paris Jul. 24, 1971. 25 U.S.T. 1341, 1161 U.N.T.S. 3 [hereinafter The Berne Convention].

²³ Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 3; 33 I.L.M. 1197 (1994) [hereinafter TRIPS Agreement].

²⁴ WIPO Copyright Treaty, Dec. 20, 1996, S. Treaty Doc. No. 105-17 (1997); 2186 U.N.T.S. 121; 36 I.L.M. 65 (1997) [hereinafter WIPO Copyright Treaty].

participating countries.²⁵ Encoded therein were three basic principles: (1) national treatment, or the idea that authors are granted the protections from the country of origin in Union countries; (2) automatic protection; and (3) independence of protection.²⁶ The Berne Convention also established protection minimum standards and duration, notably providing a protection for the life of the author plus fifty years.²⁷ The Berne Convention has gone through several alterations, most recently, the Paris Act in 1971.²⁸ The Paris Act was adopted by the United States in 1988 and Japan in 1975.²⁹ The Paris Act provides that “[i]t shall be a matter for legislation in [member countries] to permit the reproduction” of literary and artistic works as long as the “reproduction does not conflict with a normal exploitation of the work”³⁰ This provision was to be used as a test for members of the convention to devise a system providing for limitations and creating exceptions for the reproduction of works without infringement.³¹

Following the Berne Convention and Paris Act, negotiations for a trade agreement began in 1986 as a precursor to TRIPS. The goals of this new agreement were the “reduction of distortions and impediments to international trade, promotion of effective and adequate protection of intellectual property rights, and ensuring that measures and procedures to enforce intellectual property rights do not themselves become barriers to legitimate trade.”³² In 1995, TRIPS became an international agreement between all the members of the World Trade Organization (“WTO”) and proscribed the minimum

²⁵ *Summary of the Berne Convention for the Protection of Literary and Artistic Works (1886)*, WORLD INTELL. PROP. ORG., https://www.wipo.int/treaties/en/ip/berne/summary_berne.html.

²⁶ See The Berne Convention, *supra* note 22, at art. 5, 18, 20; *Summary of the Berne Convention for the Protection of Literary and Artistic Works (1886)*, *supra* note 25.

²⁷ The Berne Convention, *supra* note 22, at art. 7.

²⁸ *Id.* at art. 5, 18, 20.

²⁹ *Id.* at 31–3.

³⁰ *Id.* at art. 2 (2).

³¹ *Summary of the Berne Convention for the Protection of Literary and Artistic Works (1886)*, *supra* note 25.

³² *Overview: the TRIPS Agreement*, WORLD TRADE ORG., https://www.wto.org/english/tratop_e/trips_e/intel2_e.htm (last visited Feb. 7, 2021).

regulatory standards for intellectual property.³³ The agreement also contained provisions addressing enforcement, dispute settlement, and basic principles like national and most-favored-nation treatment.³⁴ Members of the WTO were then bound to comply with articles 1 through 21 of the Berne Convention, Paris Act.³⁵ The TRIPS agreement confirmed that computer programs, whether in object or source code, are protected by copyright as literary works under the Berne Convention.³⁶ TRIPS further provided that computer program authors have the right to authorize or prohibit commercial rental to the public.³⁷

The following year, the World Intellectual Property Organization (“WIPO”) created a special agreement under the Berne Convention.³⁸ The WIPO Copyright Treaty is part of a pair of agreements often called the WIPO internet treaties.³⁹ The WCT adds computer programs, “whatever may be the mode or form of their expression” and databases or “compilations of data or other material, in any form” to the subject matter protected by copyright.⁴⁰ Under the WCT, authors are granted the right of distribution, the right of rental, and the right of communication to the public.⁴¹ The WCT explicitly extends the test from the Berne Convention for determining limitations and exceptions to the digital environment.⁴² The WCT was signed by the United States in 1997, ratified in 1999 and incorporated

³³ TRIPS Agreement, *supra* note 23, at Part I, art. 1.

³⁴ *Overview: the TRIPS Agreement*, *supra* note 32.

³⁵ TRIPS Agreement, *supra* note 23, at Part II, art. 9.

³⁶ *Id.* at Part II, art. 10 (1).

³⁷ *Id.* at Part II, art. 11.

³⁸ WIPO Copyright Treaty, *supra* note 24.

³⁹ The WIPO Copyright Treaty and WIPO Performance and Phonogram Treaty are known together as the Internet Treaties. *WIPO Internet Treaties*, WORLD INTELL. PROP. ORG., https://www.wipo.int/copyright/en/activities/internet_treaties.html (last visited Feb. 7, 2021).

⁴⁰ WIPO Copyright Treaty, *supra* note 24, at art. 4, 5.

⁴¹ *Id.* at art. 6–8.

⁴² “Contracting Parties shall . . . confine any limitations of or exceptions to rights provided for therein to certain special cases that do not conflict with a normal exploitation of the work and do not unreasonably prejudice the legitimate interests of the author.” *Id.* at Article 10 (1).

in the Digital Millennium Copyright Act (“DMCA”) in 2002.⁴³ The WCT was also effective in Japan in 2002.⁴⁴ These world treaties form the principles of copyright and have led to different interpretations in the United States as compared to Japan.

B. Overview of United States Copyright

Copyright protections in the United States existed before the creation of the U.S. Constitution.⁴⁵ Common law countries, like the United States, used judicial decisions to develop the law.⁴⁶ As is often the case in common law jurisdictions, explicit protections for new or developing technology are codified in statutes after years of decision-making.⁴⁷ The principles of copyright law—extending to computer programs—are the sum of world treaties, legislative actions, and judicial rulings. Most major developments in U.S. copyright law began as part of national or international legislation.⁴⁸ However, as suggested by legal scholar Orit Fischman-Afon, because copyright principles are rooted in world treaty, the internet is not revolutionary, and the progression of copyright is a slow and gradual change on a “case-by-case” basis,⁴⁹ and what was fast in the nineteenth century is unduly slow in the modern judicial system.⁵⁰ The progression of copyright has seen several legislative advancements that account for the larger, rapid

⁴³ *WIPO-Administered Treaties: Contracting Parties*, WIPO LEX, https://www.wipo.int/treaties/en/ShowResults.jsp?lang=en&treaty_id=16 (last visited Nov. 22, 2021).

⁴⁴ *Id.*

⁴⁵ *See generally* PAUL GOLDSTEIN, *COPYRIGHT’S HIGHWAY: FROM GUTENBERG TO THE CELESTIAL JUKEBOX 1* (Stanford University Press 2003) (discussing the origins of copyright protections, beginning with the Statute of Anne in England and the similar 1790 Copyright Act adopted in the United States).

⁴⁶ *Common Law*, CORNELL L. SCH., https://www.law.cornell.edu/wex/common_law (last visited Oct. 3, 2021).

⁴⁷ *Id.*

⁴⁸ Orit Fischman-Afori, *The Evolution of Copyright Law and Inductive Speculations as to Its Future*, 19 J. INTELL. PROP. L. 231, 254 (2012).

⁴⁹ *Id.* at 253–55.

⁵⁰ For example, the Pony Express hit a record in 1861, taking seven days and seventeen hours to deliver President Abraham Lincoln’s inaugural address from St. Louis to Sacramento. U.S. POSTAL SERV., *THE UNITED STATES POSTAL SERVICE: AN AMERICAN HISTORY 1775 – 2006*, at 13 (Government Relations, U.S. Postal Service, 2007).

changes as compared with the gradual changes of common law on the merits of each software copyright case.

1. The U.S. Constitution into the Copyright Act and Cases

The origin of protections for copyrighted works in the United States originated in the Constitution under Article I, wherein Congress has the power to “promote the Progress of Science and useful Arts” by securing an author’s “exclusive Right” to their own writings for a limited time.⁵¹ From there, Congress adopted the first statute codifying copyright protections for maps, charts, and books in 1790.⁵² Congress then revised the Copyright Act of 1790 in forty year intervals from 1831 to 1909.⁵³

The next major amendment to the Copyright Act occurred in 1976 following the Paris Act of the Berne Convention, where Congress restated Title 17 and updated the categories of copyrightable works to be more flexible and non-exhaustive.⁵⁴ However, congressional actors waited to include legislation on computer programs fearing that copyright law was not “sufficiently developed for a definitive legislative action.”⁵⁵ Congress had waited for the National Commission on New and Technological Uses of Copyrighted Works (“CONTU”) to finish a study on how technology is effecting intellectual property.⁵⁶ The House Report for the 1976 Act had considered computer programs after suggesting, “[t]he history of copyright law has been one of gradual expansion. . . .”⁵⁷ Therein, it is specified that copyright protection does not extend to “any idea, procedure, process, system, method of operation, concept, principle, or discovery” and intended that only the expression adopted by the computer programmer is protected.⁵⁸ In 1980, after the CONTU report, the definition of copyrightable subject

⁵¹ U.S. CONST. art. I, § 8, cl. 8.

⁵² U.S. COPYRIGHT OFF., <http://www.copyright.gov/history/1790act.pdf> (last visited Feb. 7, 2021).

⁵³ H.R. REP. NO. 94-1476, at 47 (1976), *reprinted in* 1976 U.S.C.C.A.N. 5659, 1976 WL 14045.

⁵⁴ H.R. REP. 94-1476, at 54; *see also* The Berne Convention, *supra* note 22.

⁵⁵ H.R. REP. 94-1476, at 116.

⁵⁶ *Id.* at 78.

⁵⁷ *Id.* at 51.

⁵⁸ *Id.* at 56–7.

matter was amended to include computer programs, nearly forty years after the first computer program was written and in response to an overall “economic malaise” with a U.S. rate of investment equivalent to only one-third of Japan’s.⁵⁹ Additionally, the 1980 amendments to the Copyright Act repealed section 117 of the 1976 Act, which expressed the intent to not modify copyright for computer programs.⁶⁰

The Copyright Act defines an infringer as “[a]nyone who violates any of the exclusive rights of the copyright owner. . . .”⁶¹ Authors of copyrighted works may seek recovery for infringement in damages or injunction.⁶² Fair use, a judicial doctrine and defense to infringement, was codified in the 1976 Copyright Act as a limitation on the exclusive rights of the copyright owner.⁶³ The House Report indicated that fair use is one of the most important limitations on the exclusive right of copyright, and yet, “no real definition of the concept ha[d] emerged.”⁶⁴ Fair use had been part of judicial doctrine as early as 1841.⁶⁵

Currently, using copyrighted work for the purposes of, but not limited to, criticism, comment, news reporting, teaching, scholarship, or research, is not an infringement and is a permitted fair use.⁶⁶ There are four factors for determining if a use is fair use: (1) the purpose and character of use, including whether such use is of commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and sustainability 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

⁵⁹ Computer Programs are defined as “a set of statements or instructions to be used directly or indirectly in a computer program in order to bring about a certain result.” 17 U.S.C.A. § 101 (2010); *see also* H.R. REP. 96-1307(I), at 1 (1980), *reprinted in* 1980 U.S.C.C.A.N. 6460, 1980 WL 12929.

⁶⁰ H.R. REP. 96-1307(I), at 25, 27.

⁶¹ 17 U.S.C.A. § 501.

⁶² 17 U.S.C.A. § 502–06.

⁶³ 17 U.S.C.A. § 107.

⁶⁴ H.R. REP. 94-1476, at 65.

⁶⁵ *See* *Folsom v. Marsh*, 9 F. Cas. 342 (C.C.D. Mass. 1841).

⁶⁶ 17 U.S.C.A. § 107; *see also* *Harper & Row Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 561 (1985).

work.⁶⁷ However, fair use is not clearly defined as either an affirmative defense or a statutory right to customers, a distinction which plays a critical role in the digital age.⁶⁸

The familiar doctrines founded in copyright law like fair use, merger, *scènes à faire*, and public domain were applied to software and computer programs as the issues came before the courts on a case-by-case basis. The CONTU report explained that copyright's idea-expression doctrine, stemming from the Supreme Court decision in *Baker v. Selden* and codified in Title 17, Section 102(b), should be used as a limit upon the protections granted for computer programs.⁶⁹ Throughout the 1980s and 1990s, computer software copyright protections developed through a series of litigation as the courts struggled to balance the Copyright Act with a "technologically complex industry."⁷⁰

The first two major cases during this period were litigated in the Third Circuit. Apple Computers was among the first to enter the battlefield as multiple competitors sought to use Apple's object code in their own systems because they believed that the code was unprotected by copyright.⁷¹ The Third Circuit found that the computer, operating system, and applications were substantially protected by the Copyright Act.⁷² However, the court fumbled a bit and explained that compatibility is a commercial and competitive objective, and therefore, does not concern the idea-expression

⁶⁷ 17 U.S.C.A. § 107(1)–(4).

⁶⁸ Kevin M. Lemley, *The Innovative Medium Defense: A Doctrine to Promote the Multiple Goals of Copyright in the Wake of Advancing Digital Technologies*, 110 PENN. ST. L. REV. 111, 128-29 (2005).

⁶⁹ See generally *Baker v. Selden*, 101 U.S. 99 (1879) (explaining that the idea-expression dichotomy is a limit on the protections of copyright for when there is a limited number of ways to express an idea); Peter S. Menell, *Rise of the Api Copyright Dead?: An Updated Epitaph for Copyright Protection of Network and Functional Features of Computer Software*, 31 HARV. J.L. & TECH. 305, 316-17 (2018).

⁷⁰ Menell, *supra* note 69, at 321–22.

⁷¹ *Apple Comput., Inc. v. Franklin Comput. Corp.*, 714 F.2d 1240, 1242–45 (3d Cir. 1983).

⁷² *Id.* at 1247–53.

doctrine.⁷³ The next case, *Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.*, considered whether “the similarity in the overall structure of programs can be the basis of infringement. . . .”⁷⁴ In undertaking this analysis, the Third Circuit used the idea-expression doctrine from *Baker* to establish copyrightability, but has since been criticized as conflating merger analysis with the idea-expression dichotomy.⁷⁵ The Third Circuit recognized that when balancing protection and disclosure, copyright law seeks to “accommodate the fact that intellectual pioneers build on the work of their predecessors.” The Third Circuit then concluded that “copyright principles derived from other areas are applicable in the field of computer programs.”⁷⁶ *Whelan* affirmed that the literal elements of computer programs are subject to copyright protections.⁷⁷

The U.S. Court of Appeals for the Second Circuit chose a different route for computer software analysis. In *Computer Associates Intern., Inc. v. Altai, Inc.*, the court followed the abstraction test for separating ideas from expression, first considered by Judge Learned Hand in 1930.⁷⁸ *Altai* stands for “programmers’ freedom to write code to interoperate with APIs established by a third party. . . .”⁷⁹ *Altai* further emphasized that copyright protections can extend to the non-literal elements of computer programs.⁸⁰

⁷³ *Id.* at 1253; see also Menell, *supra* note 69, at 305 (describing the confusion of the Third Circuit in interpreting the idea-expression dichotomy).

⁷⁴ *Whelan Assoc., Inc. v. Jaslow Dental Lab’y, Inc.*, 797 F.2d 1222, 1234 (3d Cir. 1986).

⁷⁵ Menell, *supra* note 69, at 325 (2018).

⁷⁶ *Whelan Assoc., Inc.*, 797 F.2d 1222, at 1238.

⁷⁷ *Id.*, at 1233.

⁷⁸ *Computer Assoc. Intern., Inc. v. Altai, Inc.*, 982 F.2d 693, 706-08; *Nichols v. Universal Pictures Corp.*, 45 F.2d 199, 121 (2d Cir. 1930).

⁷⁹ Menell, *supra* note 69, at 329 (discussing the implications and effects following the Second Circuit opinion).

⁸⁰ “Congress has made clear that computer programs are literary works entitled to copyright protection.” *Computer Associates Intern., Inc. v. Altai, Inc.*, 982 F.2d at 712. Note that the “non-literal elements” as compared with the literal elements are the human readable text of a code and are later often referred to as the source and object code.

The next set of cases directly addressed whether API developers could seek recovery for infringement. The U.S. Court of Appeals for the Federal Circuit decided *Atari Games Corp. v. Nintendo of America, Inc.*, in 1992.⁸¹ Nintendo placed a security code within its console system to only allow authorized game cartridges to be playable.⁸² Atari, through deceptive methods, had obtained Nintendo's source code from the Copyright Office.⁸³ The Federal Circuit acknowledged that individuals in "rightful possession of copy of a work" may reverse engineer the work, as a fair use, to understand its ideas, processes, and methods of operation.⁸⁴ The Ninth Circuit confronted the same problem in *Sega Enterprises, Ltd. v. Accolade*, but added that reverse engineering of the code is a fair use where a legitimate reason exists for doing so and reverse engineering is necessary to gain an understanding of the unprotected elements of the program.⁸⁵ In the last of these three cases, *Sony Computer Entertainment, Inc. v. Connectix Corp.*, the court extended its decision in *Sega* to allow the reverse engineering of Sony's BIOS as a fair use.⁸⁶

The development of copyright law in the 1980s and 1990s primarily played out before the courts. The courts' development of legal frameworks applying the Copyright Act and fair use principles lead the United States toward the adoption of the Digital Millennium Copyright Act ("DMCA").

2. Digital Millennium Copyright Act

The DMCA is a comprehensive legislation that incorporates the WIPO Internet Treaties,⁸⁷ and is "designed to facilitate the robust development" of copyright issues and protections in the digital age.⁸⁸ The ease of copying works in the digital age was thought to chill the

⁸¹ *Atari Games Corp. v. Nintendo of America, Inc.*, 975 F.2d 832 (Fed. Cir. 1992).

⁸² *Id.* at 835–37.

⁸³ *Id.*

⁸⁴ *Id.* at 842.

⁸⁵ *Sega Enters., Ltd. v. Accolade*, 977 F.2d 1510, 1527 (9th Cir. 1992).

⁸⁶ *Sony Comput. Ent., Inc. v. Connectix Corp.*, 203 F.3d 596, 602–08 (9th Cir. 2000).

⁸⁷ *WIPO Internet Treaties*, *supra* note 39.

⁸⁸ S. REP. NO. 105-190, at 1–2 (1998), *reprinted in* 1998 WL 239623.

incentive for authors and creators to make their works available on the internet.⁸⁹ The DMCA is divided into five titles: Title I, the WIPO Copyright and Performances and Phonograms Treaties Implementation Act of 1998; Title II, the Online Copyright Infringement Liability Limitation Act; Title III, the Computer Maintenance Competition Assurance Act; Title IV, six miscellaneous provisions to the functions of the Copyright Office; and Title V, the Vessel Hull Design Protection Act.⁹⁰

Title I was intended to set a marker for other nations seeking to implement the treaties.⁹¹ The Senate Report indicated that the evolution of technology requires the law to adapt to make digital networks safe and create the “legal platform for launching the global digital on-line marketplace for copyrighted works.”⁹² Prior to adopting the WCT, the United States found the provision defining reproduction too “controversial” and instead included a confirmation of the pre-existing definition under Article 9 of the Berne Convention.⁹³ Title I explicitly prohibits the circumvention of protection measures created by authors and creators.⁹⁴ The initial effect of the anti-circumvention provisions confused the fair use defense.⁹⁵ Intending to foster innovation and creativity, Congress included sections 1201(g)-(f), and adopted a framework similar to the one established in *Sega* to allow

⁸⁹ *Id.* at 8.

⁹⁰ Digital Millennium Copyright Act of 1998, 17 U.S.C.A. §§ 1201–205, 1301–332; see also *THE DIGITAL MILLENNIUM COPYRIGHT ACT OF 1998: U.S. Copyright Office Summary*, <https://www.copyright.gov/legislation/dmca.pdf> (last visited Feb. 7, 2021) (summarizing the contents of the DMCA).

⁹¹ S. REP. 105-190, at 2.

⁹² *Id.*

⁹³ *Id.* at 4.

⁹⁴ Anti-circumvention provisions provide legal sanctions for defeating a technological protection measure and then distributing works. Anti-circumvention provisions were considered in Article 7 of the WCT, but were replaced for similar language of Article 9 in the Berne Convention. See S. REP. 105-190, at 4, 11–16.

⁹⁵ See Jacqueline Lipton, *The Law of Unintended Consequences: The Digital Millennium Copyright Act and Interoperability*, 62 WASH. & LEE L. REV. 487, 494–95 (2005) (discussing the effects anti-circumvention provisions had in the context of the fair use defense).

software developers to reverse engineer for the purposes of achieving interoperability.⁹⁶

After the Copyright Office released a report discussing comments from proposed rulemaking and changes to Section 1201 of the DMCA, the commenters suggested an amendment to section 1201(a) to “require a nexus between circumvention of an access control and copyright infringement.”⁹⁷ The Owners’ Rights Initiative suggested an alternative amendment to exclude computer programs that enable the operation of a device or machine.⁹⁸ Both suggestions were expressly denied by the Copyright Office because the Office preferred to address any issues through the application of existing legal doctrine.⁹⁹ Seemingly, the Copyright Office intended for the American copyright concept to be developed in the courts through judicial doctrine.

3. The Current State of Copyright: Revisiting Copyrightability and Fair Use in *Google v. Oracle*

The most recent major development in U.S. software copyright law began over a decade ago in the Northern District of California, where Oracle filed a complaint against Google for patent and copyright infringement of Oracle’s Java API.¹⁰⁰ The ensuing litigation addressed old facets of copyright common law as applied to new technology. Questions of copyrightability, whether Google’s actions constituted infringement of the declaring code and structure, sequence, and

⁹⁶ See S. REP. 105-190, at 13; *Sega Enters., Ltd.*, 977 F.2d at 1520–528.

⁹⁷ The commenters sought to codify the Federal Circuit’s holding to only prevent access with a reasonable relationship to the goals of copyright law. See *Chamberlain Grp., Inc. v. Skylink Techs., Inc.*, 381 F.3d 1178, 1251 (Fed. Cir. 2004); *Section 1201 of Title 17: A Report to the Register of Copyrights*, United States Copyright Office, at 42 (2017), <https://www.copyright.gov/policy/1201/section-1201-full-report.pdf>.

⁹⁸ *Section 1201 of Title 17: A Report to the Register of Copyrights*, *supra* note 97, at 47.

⁹⁹ *Section 1201 of Title 17: A Report to the Register of Copyrights*, *supra* note 97, at 49.

¹⁰⁰ Complaint for Plaintiff, *Oracle Am., Inc. v. Google, Inc.*, 872 F.2d 974 (2012) (No. CV10-03561 LB), 2010 WL 3355241.

organization (“SSO”), and whether any infringement may be defended as a fair use, were raised throughout the litigation.

After the first trial on the issues of copyrightability and fair use, the jury found Google’s use of the Java API infringed on Oracle’s copyright, but remained “deadlocked on the question of whether Google’s copying was a fair use.”¹⁰¹ The district judge then found as a matter of law that the API packages were not copyrightable, and Oracle appealed to the Federal Circuit.¹⁰² The Federal Circuit, interpreted the case law of the Ninth Circuit¹⁰³ and expressly acknowledged a circuit split on the issue of copyrightability and the merger doctrine.¹⁰⁴ Reversing the trial judge’s decision on copyrightability, the Federal Circuit found that the API’s declaring code was copyrightable.¹⁰⁵ Google petitioned for a writ of certiorari to determine the copyrightability of APIs, but was denied by the Supreme Court.¹⁰⁶

Next, the case was remanded back to the district court for a new jury trial where the jury found Google’s use of the now copyrightable API was a defensible fair use.¹⁰⁷ Oracle motioned for judgment as a matter of law on the issue of fair use, which the district court denied, entering final judgement in favor of Google.¹⁰⁸ Oracle then appealed the district court’s final judgement to the Federal Circuit which reviewed *de novo* and found that Google’s use of the API packages was not a fair use as a matter of law.¹⁰⁹ The Federal Circuit

¹⁰¹ Oracle Am., Inc., 886 F.3d at 1186.

¹⁰² *Id.*

¹⁰³ *Id.* at 1232.

¹⁰⁴ Oracle Am, Inc., v. Google Inc., 750 F.3d 1339, 1358 (Fed. Cir. 2014) (“We need not assess the wisdom of these respective views because there is no doubt on which side of this circuit split the Ninth Circuit falls”).

¹⁰⁵ Google had written its own implementing code and the trial court’s merger analysis was not relevant to a determination on the copyrightability of the Java API. *Id.* at 1360-61.

¹⁰⁶ Google, Inc., v. Oracle Am., 135 S. Ct. 2887 (2015).

¹⁰⁷ The thrust of Oracle’s argument against fair use was based on the Supreme Court decision in *Harper and Row Publishers supra* note 61. Oracle Am., Inc. v. Google, Inc., No. C 10-03561, 2016 WL 3181206 at 2 (N.D. Cal. June 8, 2016).

¹⁰⁸ *Id.* at 13.

¹⁰⁹ Oracle Am., Inc., 886 F.3d, at 1211.

concluded that factors one and four weighed heavily against a finding of fair use because (1) Google's use had commercial value, (2) the copying of the code was not transformative, and (3) the effects on the market and potential market were harmful to Oracle.¹¹⁰ The other two factors did not weigh heavily enough in favor of finding fair use for Google.¹¹¹ Google, once again, filed a petition for certiorari, which was granted in 2019.¹¹²

The Supreme Court then reversed and remanded the case in 2021.¹¹³ In an opinion delivered by Justice Breyer, the Court found that nature of the API altered the fair use analysis in favor of Google, highlighting the flexibility of the doctrine as new technology emerges.¹¹⁴ On the fair use factors, the Court found that the first factor—nature of the copyrighted work—weighed in favor of fair use; the second factor—purpose and character of use—was not wholly determinative; the third factor—amount and sustainability of the portion used—weighed in favor of fair use; and the fourth factor—market effects—weighed in favor of fair use (35).¹¹⁵

During the course of this extensive litigation, Google also developed its Android platform,—continuing its potential infringement of Oracle's copyrighted software—into wearable devices, motor-vehicle interface, and the Internet of Things (“IoT”).¹¹⁶ Evidence of this expansion was excluded from trial, but Oracle currently retains the right to sue for infringement in these areas in a separate proceeding. Presently, the U. S. system of software copyright will continue to develop through judicial interpretation of the common law doctrines and principles, as exemplified by the *Oracle* case above.

¹¹⁰ *Id.* at 1179,1196–04, 1207–11.

¹¹¹ *Id.*

¹¹² *Oracle Am., Inc. v. Google LLC*, 886 F.3d 1179 (Fed. Cir. 2018), *cert. granted*, 140 S. Ct. 520 (U.S. Nov. 15, 2019) (No. 18-956).

¹¹³ *Google LLC v. Oracle Am., Inc.*, 141 S. Ct. at 1209

¹¹⁴ *Id.* at 1197 (The language of . . . the “fair use” provision reflects its judge-made origins . . . That background . . . makes clear that the concept is flexible, that courts must apply it in light of the sometimes conflicting aims of copyright law, and that its application may well vary depending upon context.”).

¹¹⁵ *Id.* at 1201–08.

¹¹⁶ *Oracle Am., Inc.*, 886 F.3d, at 1188.

C. Overview of Japanese Copyright

The modern Japanese legal system began during the Meiji Restoration in 1868, after the end of the feudal system¹¹⁷ based on Prussian and French civil legal systems¹¹⁸ that prioritize the civil code over judicial decision making. However, The United States influenced much of the Japanese legal system after World War II.¹¹⁹ The Japanese legal system is a hybrid approach, aggregating influences from several major legal systems.¹²⁰ The National Diet holds the legislative power, comprised of the House of Representatives (Shūgiin) and the House of Councilors (Sangiin).¹²¹ The Cabinet, headed by the Prime Minister holds the executive power.¹²² The Cabinet or members of the National Diet can draft bills that are published in the Kanpō, or official gazette.¹²³ The courts hold judicial power with a similar three-tiered hierarchy to that of the U.S.'s judicial branch.¹²⁴ Notably, only the decisions of the Supreme Court of Japan are binding on the lower courts, and the higher courts are just influential on lower courts.¹²⁵

Japanese copyright law began with the Publishing Ordinance, enacted in 1869 to establish protection and regulations.¹²⁶ In 1899, Japan joined the Berne Convention and, in compliance, altered its copyright law based on the Publishing Ordinance.¹²⁷ Over the next seventy years, Japan amended its 1899 copyright law several times in response to changes in technology, which far outpaced the ability of

¹¹⁷ *Introduction to Japan's Legal System*, LIBR. OF CONG., (last updated Dec. 30, 2020), <https://www.loc.gov/law/help/legal-research-guide/japan.php>.

¹¹⁸ *Id.*

¹¹⁹ *Id.*

¹²⁰ Elliot J. Hahn, *An Overview of the Japanese Legal System*, 5 NW. J. INT'L L. & BUS. 517, 522 (1983).

¹²¹ *Introduction to Japan's Legal System*, *supra* note 117.

¹²² *Id.*

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ *Id.*

¹²⁶ *Copyright System in Japan: II. History of Copyright System in Japan*, COPYRIGHT RSCH. AND INFO. CENTER, <https://www.cric.or.jp/english/csj/csj2.html> (last visited Nov. 22, 2021).

¹²⁷ *Id.*

the 1899 structure.¹²⁸ Rather than continue amending an outdated model, in 1962, Japan requested its Copyright System Council to investigate and report on a reformation of the copyright system.¹²⁹ Japan's newly enacted 1971 Copyright Law had four characteristics: (1) clearly defined moral and economic rights and extended protections spanning fifty years after the author's death; (2) detailed limitations on rights allowing for exploitation of works in specific circumstances; (3) neighboring rights in accordance with the Rome Convention; and (4) provisions for licensing, registration, and arbitration systems.¹³⁰ This new model was then amended to match the various international treaties such as the Paris Act and the WIPO Copyright Treaty.¹³¹ Aside from the international treaties, Japan has amended its Copyright Law nearly every year since 1984 to remain consistent with societal changes.¹³²

Currently, Japanese Copyright Law provides a comprehensive and robust framework for copyright protection, including relevant provisions for computer software. A "work" is defined as a "creatively produced expression of thoughts or sentiments that falls within the literary, academic, artistic, or musical domain."¹³³ An illustrative list of works incorporates "works of computer programming," but not the programming language, coding conventions, or algorithm.¹³⁴ The "author" is simply the person who created the work.¹³⁵ The rights of authors are then divided by two principles—moral rights and economic rights.¹³⁶

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ *Id.*

¹³² *Id.*

¹³³ 著作権法 [Copyright Act], Act No. 48 of 1970, art. 2, translated in (Japanese Law Translation [JLT DS]), <http://www.japaneselawtranslation.go.jp/law/detail/?id=3379&vm=04&re=2&new=1> (Japan).

¹³⁴ *Id.* at art. 10, para. 1.

¹³⁵ *Id.* at art. 2.

¹³⁶ The moral rights include three rights: to (1) make the work public, (2) determine the indication of the author's name, and (3) preserve integrity. The economic rights consist of the more common copyrights, like the rights of

Recent amendments to this framework established limitations on the rights of authors to prevent the exploitation of their work where the purpose is not to enjoy the “thoughts or sentiments expressed in that work.”¹³⁷ Specifically, an exploitation of a work is permitted explicitly for data analysis and for use in computer data processing.¹³⁸ In its entirety, the provision states:

[I]f it is exploited in the course of computer data processing or otherwise exploited in a way that does not involve what is expressed in the work being perceived by the human senses (for works of computer programming, such exploitation excludes the execution of the work on a computer), beyond as set forth in the preceding two items.¹³⁹

The National Diet expressed that this amendment, and the others, were in response to recent technological progress and intended only for exploitations that cause minimal or no damage to the rights of owners.¹⁴⁰ The system of copyright law in Japan, overall, actively reviews and considers recent innovations and advances.

reproduction, performance, presentation, public transmission, recitation, exhibition, distribution, transfer of ownership, lending, translations, adaptation, and exploitation of derivative work. *Copyright Law of Japan: Outline of the Copyright Law*, COPYRIGHT RSCH. AND INFO. CENTER, <https://www.cric.or.jp/english/clj/ocl.html> (last visited Nov. 22, 2021).

¹³⁷ *The Copyright Act revised in 2018 will further improve the machine learning environment in Japan*, NAKAMURA & PARTNERS, (May 23, 2019) http://www.nakapat.gr.jp/en/legal_updates_eng/the-copyright-act-revised-in-2018-will-further-improve-the-machine-learning-environment-in-japan.

¹³⁸ 著作権法 [Copyright Act], Act No. 48 of 1970, art. 30-4, translated in (Japanese Law Translation [JLT DS]), <http://www.japaneselawtranslation.go.jp/law/detail/?id=3379&vm=04&re=2&new=1> (Japan).

¹³⁹ *Id.*

¹⁴⁰ Mizue Funakoshi, Miyuki Tsuda, *Overview of the Amended Copyright Act of Japan and Its Impact on NDL Services*, NAT'L DIET LIBR., (March 21, 2019), <https://www.ndl.go.jp/jp/international/news/2019/NCC2019.pdf>.

D. Application Programming Interface

To frame the discussion in the foregoing sections, the precise definition of an application programming interface must be pinned down. The National Institute of Standards and Technology (“NIST”) provides an impenetrable, to most, definition of an application programming interface as follows: “A system access point or library function that has a well-defined syntax and is accessible from application programs or user code to provide well-defined functionality.”¹⁴¹ The U.S. Federal Circuit described the Java API, the subject of the *Oracle* litigation, as “a collection of ‘pre-written Java source code programs for common and more advanced computer functions.’”¹⁴² Indeed, creating a conceptual description of APIs without requiring too much technical knowledge can prove challenging.¹⁴³

One of the most easily digestible analogies for understanding APIs was articulated by Michael Risch, Vice Dean and a Professor of Law at Villanova University Charles Widger School of Law.¹⁴⁴ He analogized the Java API from *Oracle* to a universal remote that may control a television and cable box.¹⁴⁵ The television remote has a set of functions, like volume up and down, that when pressed, send a signal to the television. The signal sent from the television remote may be specific to a particular television brand. Similarly, the cable box will have a specific remote with specific signals to change channels.¹⁴⁶ If

¹⁴¹ *Application Programming Interface*, NAT’L INST. STANDARDS AND TECH., https://csrc.nist.gov/glossary/term/Application_Programming_Interface (last visited Feb. 7, 2021).

¹⁴² *Oracle Am., Inc.*, 886 F.3d at 1186.

¹⁴³ During oral argument before the Supreme Court, several metaphors were advanced to attempt to convey an understanding of what an API is, to which the Justices can apply the law. Justice Kagan analogized the issue to writing proofs in math class. Oral Argument at [timestamp 10.8.3], *Google, LLC. v. Oracle Am., Inc.*, 140 S. Ct. 520 (2020) (No. 18-956); Similarly, Justice Thomas compares the issue to that of stealing players from a football team. *Id.* at [timestamp].

¹⁴⁴ Michael Risch, *Google v. Oracle and the Search for an Analogy*, (Oct. 12, 2020), <https://writtendescription.blogspot.com/2020/10/google-v-oracle-and-search-for-analogy.html>.

¹⁴⁵ *Id.*

¹⁴⁶ *Id.*

the cable box has a universal remote that can change the channel and volume of the television at the same time, then the remote must have the signals to all television brands to be functional. The specific signal to a specific television cannot change or the command would fail. The cable remote incorporates all the relevant television signals in one remote to function as a single remote.¹⁴⁷ This analogy is useful in understanding how APIs provide interoperability like the universal remote. In short, APIs simplify programming by providing a shortcut to the underlying software library implementing the rules of a code. The incompatibility of technical jargon—“application programming interface”—exacerbates legal analysis of the issue.

III. DISCUSSION: DOCTRINAL LAG¹⁴⁸

The following section discusses the U.S.’s approach toward the copyrightability of expression of software programs enabling interoperability and the fair use defense as evinced by years of common law development, most recently in the *Oracle* litigation. The Japanese legal system is used as a comparative tool to draw out efficiency concerns. The difficulty in explaining precisely what an API is, for the purpose of legal analysis, demonstrates an important trend among the legal system; digital technological complexity does not efficiently translate into legal doctrine. The analysis begins with an explanation of why the U. S. and Japanese legal systems were chosen for comparison. Next, this section discusses a comparison of how the two systems handle technical complexities. Following that is a discussion of the globalization of digital commons and potential consequences a decision in the United States may have in other nations. Finally, this section provides a comparison of the two systems’ allocation of entitlements and how those resulting distributions respond to the needs of industry and consumers. This discussion emphasizes the importance of a new perspective for addressing software copyright.

¹⁴⁷ *Id.*

¹⁴⁸ The use of “lag” here refers to the common usage relating to internet connected devices. Lag refers to the delay in communication from an input to a server and then back to a client. Here, the section heading refers to the delay created through the slow process of developing common law through judicial doctrine.

A. Considerations for the United States and Japan

The United States is one of a few countries to directly confront the use of APIs in the context of copyright protections, has confronted interoperability in the past, and appears to be leading the discussion currently.¹⁴⁹ However, one other jurisdiction, the European Court of Justice, had cause to consider the issues of a program's functionality and denied copyright protection for functionalities of the computer program and language, similar to the purposes of an API.¹⁵⁰ The European Union courts decided the case during the beginning of the copyright dispute in *Oracle*, and have seemingly closed the matter for further dispute.¹⁵¹

Like many other nations, Japan has not had the occasion to litigate on APIs. However, recent advancements in Japan led to its high global ranking in technical expertise and technical innovation.¹⁵² The hybridization of the Japanese civil legal system and persistence in technical innovation sum to an illustrative perspective in contrast with the U.S. legal system. That is, the Japanese system frequently amends their copyright act, almost yearly, to address the rights and limitations of copyright protections as technology advances.¹⁵³ Further, any dispute arising in Japan's judicial system will not establish precedent for future cases unless decided by the highest court.¹⁵⁴ Additionally, the Japanese system of copyright protections does not provide a fair use exception like the U.S. system¹⁵⁵ Rather, the Japanese Copyright Act is

¹⁴⁹ See *supra* Section II (B)(1).

¹⁵⁰ Case C-406/10, SAS Inst. v. World Programming Ltd., Opinion of the Advocate General Bot, ¶ 71–6 (Nov. 2011) available at <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62010CC0406>; see also Jonathan Band, *The Global API Copyright Conflict*, 31 HARV. J.L. & TECH. 615, 619–21 (2018) (discussing the case with reference to the United States at the time).

¹⁵¹ Band, *supra* note 150, at 620–21.

¹⁵² *Japan*, U.S. NEWS AND WORLD REP., <https://www.usnews.com/news/best-countries/japan> (last visited Feb. 7, 2021).

¹⁵³ *Copyright System in Japan: II. History of Copyright System in Japan*, *supra* note 126.

¹⁵⁴ *Id.*

¹⁵⁵ See Teruo Doi, *Availability of the Fair Use Defense under the Copyright Act of Japan: Legislative and Case Law Developments for Better Adapting It to the Digital/Network*

far more comprehensive in scope and specificity while remaining amendable to modern advancements.¹⁵⁶ Though Japan may be much smaller than the United States in population and legal history, the insights gained from comparing the two systems helps draw out efficiency problems inherent in the common law mechanism for resolving technically-dense disputes.

B. Assessing Ability: United States and Japan on Technological Complexity

Technical jargon can obfuscate the legal analysis. Oral argument for *Oracle* sent the Supreme Court Justices spiraling to find an appropriate metaphor to understand the APIs used by Google.¹⁵⁷ Even if a legislative body, with more resources and time, were to investigate and decide on appropriate legislation for technological advancements, they cannot possibly foresee the future, much less arrive at a timely consensus. A legal system that can favorably balance potential future demands and present assertions of entitlement may be a unicorn. Perhaps the system should mirror the speed of technological innovation.

1. United States: The Common Law and Technical Capacity

The common law history of the U.S. legal system, rooted in the doctrine of *stare decisis*, is one of the flexible instruments by which legal principles are developed.¹⁵⁸ At the top of copyright law is the Constitution's declaration that Congress has the power to grant protections to "promote the Progress of Science and useful Arts."¹⁵⁹ Years of world treaties and complex litigation advanced copyright law

Environment, 57 J. COPYRIGHT SOC'Y U.S.A. 631 (2009-2010) (discussing recent Japanese decisions on the lack of availability for a fair use defense).

¹⁵⁶ See *supra* Section II (C).

¹⁵⁷ See *supra* text accompanying note 143.

¹⁵⁸ 15A Am. Jur. 2d *Common Law* § 1 (2021) ("The common law, as frequently defined, includes those rules of law which do not rest for their authority upon any express or positive statute or other written declaration, but rather upon statements of principles found in the decisions of the courts."); see also *Stare Decisis supra* note 15.

¹⁵⁹ U.S. CONST. art. I, § 8, cl. 8.

protections through the twentieth century.¹⁶⁰ Underlying those developments, and filling in the ambiguities of the statute, the courts analyzed historical precedent and judicial doctrines.¹⁶¹ The courts applied these doctrines beginning in the middle of the nineteenth century to the copyrightability of API.¹⁶² Of the many benefits of applying and adapting precedent in the common law is a sense of predictability and certainty without the imposition of speculative legislation. Application of the doctrine of *stare decisis*, although “not an inexorable command,” is the “preferred course because it promotes the evenhanded, predictable, and consistent development of legal principles, fosters reliance on judicial decisions, and contributes to the actual and perceived integrity of the judicial process.”¹⁶³ Justice Brandeis wrote that it is usually “more important that the applicable rule of law be settled than that it be settled right.”¹⁶⁴

The problems inherent to evolving common law precedent are evinced through the *Oracle* case and the history of software copyrightability. Even though copyrightability has been developed for over a century, there existed a disagreement on how to test the copyrightability applied in this context.¹⁶⁵ From 1983 until the 2000s, the courts struggled to find the appropriate test, often flipping between the idea-expression distinction and the abstraction test.¹⁶⁶ These tests were used to analyze copyright cases across a variety of technical advances in interoperability, including operating systems, video game systems, and user interfaces.¹⁶⁷ The end of the circuit split was under the DMCA’s adoption of the *Sega* framework in the early 2000s.¹⁶⁸ Although the courts had come to some consensus, technology continued to advance and once again extended these nuanced legal analyses of copyright. The API conflict in the *Oracle* litigation embodies

¹⁶⁰ See *supra* Section II (B).

¹⁶¹ See *supra* Section II (B).

¹⁶² E.g., *Oracle Am., Inc.*, 872 F.2d at 984–85 (referencing *Baker v. Selden*, 101 U.S. 99 (1879) for an analysis on merger).

¹⁶³ *Payne v. Tennessee*, 501 U.S. 808, 827–28 (1991).

¹⁶⁴ *Burnet v. Coronado Oil & Gas Co.*, 285 U.S. 393, 406 (1932).

¹⁶⁵ See *Oracle Am, Inc.*, 750 F.3d at 1358.

¹⁶⁶ See discussion *supra* text accompanying notes 69–86.

¹⁶⁷ E.g., *Apple Computer, Inc.*, 714 F.2d 1240; *Sega Enterprises, Ltd.*, 977 F.2d 1510.

¹⁶⁸ See *supra* Section II (B)(2).

the continuation of the dispute. However, this time, the courts and justices were challenged to understand technical software programming.¹⁶⁹

Further, the doctrine of fair use, an equitable doctrine arising in 1841 until its codification in the 1976 Copyright Act, has a long tradition in U.S. legal history, but cannot foresee all equities involving technological advancements.¹⁷⁰ The fair use doctrine enshrines more than a century of judicial wisdom. Fair use provides an affirmative defense to a use constituting infringement in instances where holding the infringer liable would be an injustice.¹⁷¹ Each factor of the fair use analysis further adds a layer of derivative judicial precedent to be interpreted.¹⁷² The Supreme Court stated that transformative use is the “central purpose” of the first factor.¹⁷³ Each step of the analysis requires a consideration of multiple precedents.¹⁷⁴ Though each layer of analysis provides an extra layer of certainty and accuracy, the underlying analysis could just as well be wrong.

Looking forward, software is poised to bring in incredible advancements over the next century.¹⁷⁵ However, computer literacy is not a requirement to become a lawyer or a judge.¹⁷⁶ Still, many judges and attorneys possess an array of expertise in varying fields. One solution, rife with policy considerations and beyond the scope of this comment, is to create technologically literate judges and juries in the United States for matters requiring technical literacy. Although this solution may be tempting, it only remediates one dimension of the

¹⁶⁹ See *supra* note 143.

¹⁷⁰ 17 U.S.C.A. § 107.

¹⁷¹ *Id.*

¹⁷² For example, the first factor outlined in § 107 considers the purpose and character of the use, which in turn consider whether the use is transformative. *Id.*

¹⁷³ *Campbell v. Acuff-Rose Music, Inc.*, 510 U.S. 569, 578 (1994).

¹⁷⁴ See *id.*, at 579.

¹⁷⁵ Specifically, artificial intelligence based systems are rapidly outpacing legal frameworks. *Artificial Intelligence*, GAO, <https://www.gao.gov/artificial-intelligence> (last visited Oct. 3, 2021).

¹⁷⁶ *Comprehensive Guide to Bar Admission Requirements 2020*, NAT'L CONF. OF BAR EXAM'RS, (2020) https://www.ncbex.org/assets/BarAdmissionGuide/CompGuide2020_021820_Online_Final.pdf.

problem and does not respond to the challenges of resource availability or bias.

Where Congress does not legislate, the courts must interpret the law as it applies to technological advances. Acknowledging that the appellate process may reveal nuanced legal theory in technical advancements still requires the unfortunate consequence of the costs associated with time spent litigating.¹⁷⁷ The tech industry cannot sit patiently as experts attempt to convey an understanding to a panel of judges. Indeed, Google employed Java's API in several other fields, like automotive and IoT, which were exempted from evidence in the second proceeding.¹⁷⁸ Google's actions suggest that judicial action may not be harmful, even if late, to the industry because economics, as the driving force to innovate, will incentivize advancements to continue. Google, however, is a large corporate entity with incredible resources and legal expertise at hand.¹⁷⁹ The costs of litigation to Google may not deter pursuing legal rights, but the same costs to a smaller entity may just as well be an effective deterrent. The accuracy and candor of the U.S. judicial system is noteworthy, but the costs of litigation may limit the availability of a remedy to only those with enough influence or resources.

2. Japan: A Hybridized Approach With a Focus on Innovation

In contrast with the United States, Japan has a more comprehensive legislative scheme that outlines copyright law.¹⁸⁰ This scheme provides a clearly defined list of copyrightable works, which excludes rules, algorithms, and programming languages from protection.¹⁸¹ One of the major differences is that any exception to

¹⁷⁷ *E.g. Litigation Cost Survey of Major Companies*, 2010 CONF. ON CIV. LITIG. (May 10, 2010) https://www.uscourts.gov/sites/default/files/litigation_cost_survey_of_major_companies_0.pdf.

¹⁷⁸ Oracle Am. Inc., 886 F.3d at 1232.

¹⁷⁹ Mike Walsh, *How Google Runs Their Legal Team*, MEDIUM (Aug. 25, 2016) <https://fieldnotes.mike-walsh.com/how-google-runs-their-legal-team-344095b74a14>.

¹⁸⁰ *Copyright System in Japan: II. History of Copyright System in Japan*, *supra* note 126.

¹⁸¹ *See supra* Section II (C).

copyrightable expressions are only permitted for those specified in the rules.¹⁸² There exists no equitable rule of reason like a fair use defense, though it had been considered previously.¹⁸³ Moreover, judicial opinions do not have binding precedent, severely limiting any doctrinal development.¹⁸⁴

An assumption inherent in Japan's legislative-focused legal model may be that its organizational structure provides certainty to creators seeking protections by incorporating an exhaustive list of protections and limitations. However, new technology, unconsidered in the text, will likely have no protections until the statutes are amended. Unlike the dispute between Google and Oracle, any issues of APIs lacking an intellectual property protection will unlikely be resolved by the courts because APIs are unprotected work under the Copyright Act.¹⁸⁵ Further, even if presented with an argument for the protection of APIs under copyright, any argument of fair use or exploitable use would be covered by the various exceptions and permissible uses depending on the context of that use.¹⁸⁶ Thus, in turn, the Japanese Copyright Act provides certainty to the creators of new expressions and works. A consequence of this rigidity is the lack of protections for new inventions that creates a frequent need to amend the text of the law.

¹⁸² 著作権法 [Copyright Act], Act No. 48 of 1970, art. 2, translated in (Japanese Law Translation [JLT DS]), <http://www.japaneselawtranslation.go.jp/law/detail/?id=3379&vm=04&re=2&new=1> (Japan).

¹⁸³ Teruo Doi, *supra* note 155.

¹⁸⁴ See *supra* text accompanying note 125.

¹⁸⁵ "Protection under this Act for a work set forth in paragraph (1), item (ix) does not extend to the programming language, coding conventions, or algorithms used to create the work." See *supra* text accompanying note 133, at Article 10 (3). Further, coding conventions are then defined as the "special stipulations for the use of a programming language. . . ." See *supra* note 133, at Article 10 (3)(i), (ii).

¹⁸⁶ 著作権法 [Copyright Act], Act No. 48 of 1970, art. 47-3, 47-4, 47-5, translated in (Japanese Law Translation [JLT DS]), <http://www.japaneselawtranslation.go.jp/law/detail/?id=3379&vm=04&re=2&new=1> (Japan).

Aristotle found the “habit of lightly changing the laws [to be] an evil” because many small changes may create disobedience.¹⁸⁷ Repeated changes to the text of law for trivial distinctions seeds doubt and weakens trust in the text’s authoritative accuracy. A creator may choose to abstain from a change-creating beneficial activity because they fear a loss of protections may occur from repeated changes. Further, early policy adoption regulating underdeveloped technology may limit the overall development and may pigeonhole ideas.

Starting in 1981, Japanese Copyright Law has been amended forty-nine times, sometimes multiple times in a year.¹⁸⁸ The legislative bodies responsible for the continued amendments consist of several ministries in Japan that work with the private sector to develop intellectual property strategies.¹⁸⁹ Japan restructured its organization of IP strategy to allow for global innovative achievements.¹⁹⁰ The Intellectual Property Strategy Headquarters coordinates the many IP agencies, like the Cultural Affairs Agency.¹⁹¹ For copyright, the Cultural Affairs Agency houses the Copyright Subdivision, which regularly discusses how to organize the copyright system around information technology advancements and social change.¹⁹² The division also evaluates global developments in the digital era.¹⁹³ The investigative process of the Cultural Affairs Agency continues to push Japanese Copyright law in a direction favorable to scientific progress.

¹⁸⁷ ARISTOTLE, POLITICS, BOOK TWO, Part VIII (Benjamin Jowett trans.) (350 B.C.E.), accessed at <http://classics.mit.edu/Aristotle/politics.2.two.html>.

¹⁸⁸ *Copyright Law of Japan*, *supra* note 136.

¹⁸⁹ The three major ministries include: the Ministry of Economy, Trade, and Industry; the Ministry of Education, Culture, Sports, Science, and Technology, and the Ministry of Internal Affairs and Communication. *Formulation and Implementation of National IP Strategy in Japan*, JAPAN PATENT OFF. (Feb. 3, 2012), https://www.wipo.int/edocs/mdocs/aspac/en/wipo_inn_tyo_12/wipo_inn_tyo_12_ref_t4a3yamazaki.pdf.

¹⁹⁰ *Id.*

¹⁹¹ *Id.*

¹⁹² *Copyright*, AGENCY CULTURAL AFFAIRS, GOV'T OF JAPAN, <https://www.bunka.go.jp/english/policy/copyright/> (last visited Feb. 7, 2021).

¹⁹³ *Copyright System in Japan*, COPYRIGHT RSCH. AND INFO. CENTER, <https://www.cric.or.jp/english/csj/csj3.html> (last visited Feb. 7, 2021).

C. Global Considerations: Harmonization Among the Nations

Following the Federal Circuit decision on copyrightability of APIs, many countries watched closely as the United States readdressed interoperability policies through litigation and how those policies might apply to API.¹⁹⁴ However, this was not the first time the United States influenced the legal discussion of software protections on interoperable features. In the 1990s, the United States resisted a movement in Asia-Pacific regions for reverse engineering exceptions that would permit the deconstruction of copyrighted works for the purposes of analyzing interoperability.¹⁹⁵ In Japan, the movement toward interoperability started after observing the United States and the EC Software Directive.¹⁹⁶ The United States had, at the time, channeled reverse engineering protections through the fair use doctrine.¹⁹⁷ In 1993, the United States and Japan clashed over a new directive in Japan seeking to permit the copying of computer programs required for reverse engineering.¹⁹⁸ In a public hearing, Japan heard from the United States and ACIS members.¹⁹⁹ The Japanese commission responsible for investigating the change in Copyright Law ultimately decided to not reach a conclusion after insistent pressure from the United States and interested parties.²⁰⁰ By way of example, this first global debate and interest in the protections provided to

¹⁹⁴ Dugie Standeford, *Federal Circuit Ruling in Oracle v. Google Could Affect Global Software Industry*, INTELL. PROP. WATCH (Mar. 4, 2018) <https://www.ip-watch.org/2018/04/03/federal-circuit-ruling-oracle-v-google-affect-global-software-industry>.

¹⁹⁵ JONATHAN BAND, MASANOBU KATOH, INTERFACES ON TRIAL 2.0, 135–36, (2011).

¹⁹⁶ A 1993 press release from Japan's Consultative Committee announced interest in studying whether Japanese Copyright Law should provide for reverse engineering based on, "developments on the international horizon." JONATHAN BAND, MASANOBU KATOH, INTERFACES ON TRIAL, 297 (1995).

¹⁹⁷ See *supra* text accompanying notes 84–86.

¹⁹⁸ The clash was part of increasing tensions between the United States and Japan regarding trade imbalance. At the time the United States had over 50% of the Japanese software market and the new directive was taken by the United States as competitive. JONATHAN BAND, *supra* note 196, at 299.

¹⁹⁹ JONATHAN BAND, *supra* note 196, at 304–08.

²⁰⁰ JONATHAN BAND, *supra* note 196, at 313–14 ("The Consultative Committee may have yielded to the intense pressure placed by the U.S. government.").

copyrightable works illustrates the powerful influence the United States may have over foreign nations, especially when it holds a large market interest in the country, as it did over Japan's software market.²⁰¹

Software applications are used globally on all matter of devices. Any nation that chooses to limit or expand the protections of copyright should consider the effects on the global industry. Achieving harmony includes a never-ending cycle of communications with the industry, global leaders, and end users—a feat easier said than done. However, ignoring the practical effects of decisions like *Oracle* on the global community will only create more burdens and expenses.

D. Balancing the Needs of the Software Industry, Consumer, and Legal Professional

The language of legal professionals, software developers, and everyday consumers may well encompass three different dialects. If a legal professional does not understand, or presumptively misunderstands the software developer, then there could exist an imbalance in legal protection or assertions of entitlement. Ronald Coase suggested that in a presumed situation without costs, the allocation of entitlement may not matter and the parties will achieve economic efficiency regardless of the legal position.²⁰² To best reach the needs of the consumer, software developer, and legal professional, legislatures and courts should consider possible alternative allocations of rights and the effects of those allocations on the market. Any undefined or uncertain allocation of rights may complicate costs and deter innovation.

1. The Cost of Uncertainty

The burden of uncertainty will factor into how companies devise software development. Take the Java API from the *Oracle* case: Oracle had stipulated that use of the sixty-one classes was necessary within the Java API to the functioning of software.²⁰³ Assuming an API is copyright protected, then it is likely any company seeking to use the

²⁰¹ See *supra* note 196, at 299.

²⁰² Ronald H. Coase, *The Problem of Social Cost*, 56 J.L. & ECON. 837 (2013).

²⁰³ *Oracle Am.*, 886 F.3d at 1189.

API to achieve interoperability may only do so after licensing or showing fair use after a trial on the issue of infringement. In this instance of entitlement, the costs of infringement litigation—or licensing—will limit the incentive to use another’s API. Further, the company designing the original API will have much greater market control if the use has been widely adopted. In the alternative to using the original API, those willing to undergo the costs of designing software in multiple programming languages, or having to write original command functions, may then be offset onto the consumer. The offset can take the form of forcing the user to stay on the company’s chosen software platform for their various devices. The offset may also simply be a premium cost to compensate the company for any risk taken by using the copyrighted API. The U.S. has not seen a real example of this consequence—yet. However, many companies would prefer a consumer to stay with their chosen platform.²⁰⁴ For the developer, the consumer may be the best party to carry the burden of increased regulation when creating interoperability. If the developer were to bear the cost, then they may choose to not forgo interoperable functions.

Still, a large part of the industry engages in activities like open source software, and “copyleft” licensing.²⁰⁵ In *Oracle*, the Java APIs included a free licensing scheme for independent creators so long as they freely share with the community.²⁰⁶ This type of activity has been developed outside of the legal regime to benefit security and development concerns of those within the industry.²⁰⁷ Though beyond the scope of this paper, open source software and alternative licensing are integral in the current industry.²⁰⁸ While the goal among the

²⁰⁴ For example, macOS functions and performs best on Apple devices. *macOS. It’s why there’s nothing like a Mac*, APPLE INC., <https://www.apple.com/za/macOS/what-is> (last visited Feb. 7, 2021).

²⁰⁵ *What is Open Source?*, RED HAT INC., <https://opensource.com/resources/what-open-source> (last visited Feb. 7, 2021) (explaining that copyleft is sometimes used to refer to open source licenses that allow users permission to use open source software for any purpose).

²⁰⁶ *Oracle Am.*, 886 F.3d at 1187.

²⁰⁷ *What is Open Source?*, *supra* note 205.

²⁰⁸ Open source software is so pervasive throughout common usage of the internet that without it, “operating systems, databases, web servers, programming languages, and developer tools” would not be possible. Paul Sawers, *Wizards of OSS*:

developer industry may be to achieve interoperability, the anomaly presented by *Oracle* still persists: extraordinary costs in the legal battle to define limits of API ownership.

One way to prevent the burden from offsetting onto the consumer or the industry, is to encode certainty into the law. Consider the hypothetical developer seeking to use another's API for her new, revolutionary application, which defies the principles of intellectual property laws. She may be aware of her rights, and so long as the law is certain, she can make a decision to develop and potentially infringe upon the expression or work of another. Now consider an alternative where the certainty is not within the law per se, but rather there is certainty of a streamlined system for finding entitlement and interpreting the law in the context of this new application. Her decision to continue working on the project provides her with at least some sense of protection without the fear of overwhelming corporate entities and decade-long litigation.

E. A Perspective for Software Copyright

The dangers presented by premature rulemaking and laggard decision-making must be balanced to achieve progress. However, progress in the software industry requires a focus on speed as well as accuracy to match the pace at which advancements are made without deterring beneficial activity. While software remains in both the realm of copyright and patent, the coming era of innovation will further exemplify the unfit adoption of outdated principles in each legal discipline. Further, the problems must be addressed with a global perspective. The internet of globally connected devices will grow exponentially over the next few years.²⁰⁹ As people begin to literally connect themselves to the technology, legislative bodies must consider how to protect the incentive to continue developing software with

Industry Perspectives on Open Source Software, VENTUREBEAT (Jun. 18, 2021), <https://venturebeat.com/2021/06/18/wizards-of-oss-industry-perspectives-on-open-source-software/>.

²⁰⁹ *The Internet of Things (IoT): An Overview*, CONG. RSCH. SERV. (Feb. 12, 2020) <https://crsreports.congress.gov/product/pdf/IF/IF11239> (projecting the global IoT market will reach \$1,567 billion in 2025).

interoperable features.²¹⁰ Furthermore, they must do so in a way that will not inhibit progress.

Between the United States and Japan, certain principles are effective. In the United States, judicial doctrine and common law contribute to accuracy. For example, Title 17 provides a non-exhaustive list of copyrightable works.²¹¹ The list allows enough flexibility for new innovation to be protected under copyright.²¹² In turn, if the entitlement should be too great, the fair use defense limits the entitlement granted to a creator.²¹³ Accuracy of the correct entitlements is then determined through litigation, but only for those willing to expend the resources to seek a proper distribution of rights. The process of litigation will draw out the case-by-case facts to seek the most accurate and fair result. In contrast, Japan's comprehensive and frequently amended Copyright Act contributes to efficiency.²¹⁴ By devising several legislative bodies to investigate and present yearly amendments to the Copyright Act, there are active and current considerations relevant in the text of the law.²¹⁵ A perfect model for copyrighting software and future innovation would be costly and resource intensive. To reach the demands of the software industry, bilateral, open communication between the software industry and legal bodies is necessary. The industry also needs speedy litigation in undetermined or nuanced applications.

Further, current trends favor open resources where information is openly shared and accessed.²¹⁶ A general consensus among the community may grow out of a need to meet consumer demands. The community may also have expectations based on a premise of how an application operates before a legal decision may

²¹⁰ The Neuralink is a device that is implantable in the human brain to connect people with computers. Once implanted, it will be dependent upon software for updates and regular use. *Interfacing with the Brain*, NEURALINK, <https://neuralink.com/approach/> (last visited Feb. 11, 2021).

²¹¹ 17 U.S.C.A. § 102(a).

²¹² See *supra* Section III (F)(1).

²¹³ 17 U.S.C.A. § 107; see also *supra* Section II (B)(1).

²¹⁴ See *supra* Section III (F)(2) (discussing the efficiency of and concerns of frequently amending legal text).

²¹⁵ See *supra* Section II (C).

²¹⁶ *What is Open Source?*, *supra* note 205.

have been created. Before the *Oracle* case, APIs were often presumed uncopyrightable because they were necessary for the interoperable features of software applications.²¹⁷ In the *Oracle* case, Google argued at trial that Oracle allowed others within the community to use their API so long as they gave back to the community and did not derive profit from the Java API.²¹⁸

While the incontrovertible truth is that the U.S. copyright system is good enough to continue, changes should be considered to avoid future controversy. One of the most harmful and problematic points of contention occurs at the trial level, where judges and juries must determine law and fact, respectively, for topics where non-technical jargon greatly limits real comprehension. If the United States looks to Japan for legal insight, then judicial controversy will generally only be regarded with non-binding precedent, nearly the anathema of the U.S. doctrine of *stare decisis*.²¹⁹ Conversely, amending the statutory text too frequently would negatively impact faith in the strength and certainty of the law. Further, research offices and initiatives on current developments can only peek so far into the future and without providing any certainty through guidance. The API conflict of *Oracle* challenged the fundamental principles of copyright law by showing the limits of precedent in deciding future controversy. Technical advancements in software are frequent; it is merely a matter of time before the next API-like controversy occurs in a new context. Should that controversy be on interoperable implantable medical devices, for instance, one hopes that the legal dispute over the software in their heart monitor can be resolved quickly. In these irregular cases, the United States should employ a more streamlined process to resolve the dispute.

²¹⁷ Timothy B. Lee, *The Supreme Court Hears Oracle v. Google tomorrow—Here's What's at Stake*, ARS TECHNICA, (Oct. 6, 2020), <https://arstechnica.com/tech-policy/2020/10/google-asks-supreme-court-to-overrule-disastrous-ruling-on-api-copyrights>.

²¹⁸ *Oracle Am.*, 886 F.3d at 1187.

²¹⁹ *Stare Decisis*, *supra* note 15.

IV. CONCLUSION

Technology advances exponentially faster than the various judicial systems of the world. The technology necessarily arrives first, then the law. In cases like *Oracle*, the United States places century-old legal precedent in the context of APIs—the fundamental structure and organization of code by which many modern devices achieve interoperability. This mismatch is both necessary for the legal system to continue to operate, and absurd in the context of modern innovation. The problem extends across borders and discipline, from the United States to Japan, from law to software. The solution is to provide certainty by assuring rights are distributed within a legal framework that maps the technical jargon of the field and assures equal protections across nations. The need for regulation, legislation, and global consensus is imperative, as the machine readable code is quite literally connecting to people.

The United States and Japan have taken considerable steps towards securing a future where the law can keep pace with the technology. Even still, the United States had to decide how to secure the rights of an API by the determinations of judges and attorneys analogizing to the legal precedent; technical proficiency and comprehension severely limit the application of legal precedent. That process took over ten years, during which an entire mobile platform was built and left potentially infringing. This is the consequence of a legislative rule, which attempts to be flexible, but inevitably cannot cover all aspects of technology. Conversely, Japan has so consistently modified its copyright protections that there may even be doubt as to the certainty of protection. However, the varied communication between industry and Ministries creates an ongoing discussion of how to adapt the law to current trends. The uncertainty present in both systems is ultimately offloaded onto the consumer, who waits perilously for software updates and pays premiums to use devices interchangeably. Though there may not be a perfect textual solution, the United States must consider how the industry will react. Software is used ubiquitously inside all borders and primed for incredible market domination in the coming years.

To achieve the proper balance between certainty and protection, the process by which legal principles are applied should mimic the speed of development. A growing industry cannot be limited by the laggard leg of the judicial branch, or the scrupulous legislative branch waiting for just the right amount of development to pass down new law. Instead, the legal system must communicate openly with the industry, and be wary of the consumer who may be left with unsupported and embedded software. The solution as proposed is not without problems. There is undeniable bias and flaw in so rapidly assessing emerging technology. The achievements of the future will be incomprehensible, but today should not limit tomorrow's innovation. The careful evaluation of the flaws within current practices should be studied further. An active approach toward developing the law, delivered by a proficient team from each discipline, can better assess and process new innovation.