No. 18-956

In the Supreme Court of the United States

GOOGLE LLC,

Petitioner,

v.

ORACLE AMERICA, INC.,

Respondent.

On Petition for Writ of Certiorari to the
United States Court of Appeals
for the Federal Circuit

BRIEF OF AMICUS CURIAE SOFTWARE
INNOVATORS, STARTUPS, AND INVESTORS
IN SUPPORT OF PETITIONER

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INTEREST OF AMICUS CURIAE[1]

Amici, who are listed individually in the attached appendix, include and represent software innovators, startups, and investors actively competing in a wide array of industry sectors and markets. This has given them

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[1] Counsel for all parties received notice of amicus curiae's intent to file this brief 10 days before its due date. Petitioner has lodged a blanket amicus consent letter with the Court, and Respondent has consented to the filing of this brief. No counsel for any party authored this brief in whole or in part, and no person or entity other than the amicus, its members, or its counsel made a monetary contribution intended to fund the brief's preparation or submission.

first-hand knowledge of the types of application programming interfaces (APIs) at issue in this case, as well as an appreciation for the role that interoperability—and the limited, fair, and stable copyright rules on which it depends—plays in driving innovation in the technology sector. Amici write to share the benefit of their considered expertise in this area, and to urge the Court to take this case to preserve longstanding limits on copyright that encourage interoperability and allow startups to thrive.

INTRODUCTION AND SUMMARY OF ARGUMENT

American startups are one of the most vital components of the U.S. economy—one of our chief sources of jobs, capital, and economic growth.[2] Our startups represent some of the most important drivers of innovation in the world. This is starkly illustrated by a recent annual listing which put 24 American startups on a list of the 53 most innovative in the world.[3] And American startups have renowned histories to match their worldwide impact: the monster powerhouse companies of today, like Apple, Microsoft, Google, Yahoo!, Intel—and Oracle itself—were all once small, garage-bound startups. Today's startups continue that storied legacy, innovating new products and services that benefit every sector of society as they grow into tomorrow's powerhouses. Amici, and

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[2] See Tim Kane, Ewing Marion Kauffman Foundation, *The Importance of Startups in Job Creation and Job Destruction* 3 (2010), <https://bit.ly/2xxx0GE>.

[3] See World Economic Forum, *Technology Pioneers 2018* <https://bit.ly/2yF8wiL> (listing 24 American start-ups out of a total of 53 as the most innovative in the world).

the companies they fund, rank among the most innovative of these.

Yet startups are under threat. The Federal Circuit's multiple rulings in this decade-long battle between Google and Oracle have changed the rules of copyright. By holding that APIs—software interfaces allowing developers to access prewritten lines of code—are copyrightable, and use of them will rarely, if ever, constitute fair use, the lower court struck a blow against the interoperability copyright meant to protect—a blow that falls particularly heavily on startup companies. And because of the Federal Circuit's special place in the copyright world, which makes it an option for copyright appeals whenever a patent is also involved, these new copyright rules will effectively be nationalized and impossible to avoid. See *Br. of Amicus Curiae Engine Advocacy in Support of Petitioner*.

This regime change will allow copyright-wielding incumbents to hold interoperability under lock and key—permitting them to decide who gets to connect to their products, and how much would-be connectors must pay. That is because APIs are essential for connecting different kinds of software components to each other, and often it is physically impossible, or at least *practically* impossible, to design around them. In a world where interoperability is critical, an inability to connect to existing products would be the death knell for any small developing business. Knowing that, incumbents—and the new brand of copyright trolls the lower court's decision will foster—will be able to make the toll to achieve interoperability very high.

That will force many startups to pay exorbitant royalties to perform rudimentary operations, or engage in hundreds, or thousands, of expensive workarounds (when

such workarounds are even possible). This will exponentially increase the costs of developing software. The likely result will be that more startups will fail, billions of dollars in investments will be lost, and consumers will be forced to spend far more to get far less—stuck with less desirable, less functional products. This Court's review is essential to bring clarity to the law and to prevent the Federal Circuit's erroneous rules from taking hold.

ARGUMENT

This case is vitally important for all startups.

The Federal Circuit's rulings at issue in this case may concern only a few lines of code shared between Oracle's Java programming language and Google's Android operating system, but their ripples will be felt throughout all of copyright law, and the entire American startup community. That is because the dominant concern in today's marketplace is interoperability. Any new product a startup might offer must integrate seamlessly into to a world of existing networks, devices, storage, and software. The specific type of product does not really matter. Software, hardware, or brick-and-mortar business—the most innovative offerings in virtually any field will be interoperable. Regardless of the product, this interoperability is ultimately traceable to software, and depends upon APIs like those at issue in this case.

By upsetting the legal regime under which these APIs have traditionally been considered freely and widely available, the Federal Circuit's ruling upsets the expectations of the entire startup world, and the balance between incumbents and the competitors that sometimes follow fast behind them, adding risk, uncertainty, and expense to every step in the product-development process. This will harm the prospects of virtually every fledgling American

startup, thereby eroding cornerstones of the U.S. economy.

A.   Startups depend on easy access to APIs.

Modern innovation flourishes through interoperability.[4] Interoperability is the reason you can read a website regardless of the browser you use, why the email you wrote on your laptop, through Microsoft's Outlook email application, can be read on someone else's Apple's iPhone, and why you can switch flawlessly from watching a movie on your phone to watching it on your computer, and then on your television. Your bicycle may be able to keep track of your workouts, even when you are using someone else's bicycle. You may be able to control the temperature of your house from your phone, or from your watch.

1. Any startup must confront this interoperative world, and find ways for its products to connect to the existing universe of products, platforms, content, and services. Some do so by designing products that connect to networks—such as through the "Internet of Things."[5] Some do so by adding features to their products that ultimately come from others—customizing them with readily available technologies. Many products, for example, add Google Maps, Twitter interfaces, or links to Facebook into their applications.

Some offerings connect to, and build upon, others' innovations—thereby competing with, and sometimes

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[4]   See Urs Gasser & John Palfrey, *Interop: The Promise and Perils of Highly Connected Systems* 111-125 (2012).

[5]   Kevin Ashton, *That 'Internet of Things' Thing*, RFID Journal (June 22, 2009), <https://bit.ly/2V0SJBJ>.

replacing, the original.[6] This, for instance, is what Mozilla has done with its Firefox browser, Thunderbird e-mail client, the SeaMonkey Internet application suite, and the FileZilla FTP client.[7] Word processing software OpenOffice[8] competes with Microsoft's Word. Blogging platform WordPress is widely used.[9] These offerings are all "open source"—they come with free licenses allowing developers to freely modify and redistribute the program's source code.[10] Yet they have become popular because they are compatible with—even as they compete against—their proprietary counterparts.[11]

2. Regardless of the type of product at issue, interoperative software lies at its heart. And APIs are critical to achieving that interoperability. These go way beyond Java's particular declaring and implementing codes. They comprise a whole series of programs, subroutines, and communication protocols providing the basic tools for building software—with a ready shorthand to stand in for the sometimes lengthy underlying code. APIs allow hardware and software to communicate with each other, and allow software to communicate with other software. APIs

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[6] See Jonathan Band, *Interfaces on Trial 2.0* 1-5 (2011).

[7] Mozilla Products, <https://mzl.la/2IASStD>.

[8] Apache Software Foundation, Open Office, http://www.openoffice.org/.

[9] http://wordpress.org/.

[10] See Open Source Initiative, *The Open Source Definition*, http://opensource.org/osd.

[11] See, e.g., Tim O'Reilly, *The Open Source Paradigm Shift,* in *Perspectives on Free and Open Source Software* 461 (J. Feller, B. Fitzgerald, S. Hissam, & K. R. Lakhani, eds., 2007).

also permit programmers to use a single set of instructions to access codes that will translate those instructions to make them compatible with a host of other platforms.

3. APIs are practically ubiquitous in programming, used in everything from online discussion,[12] to web search,[13] project management,[14] banking,[15] motion tracking,[16] and music.[17]

"If an app does anything interesting, it likely needs *** an API."[18] And APIs are proliferating at a breakneck pace—with hundreds of new APIs created every month. *Ibid.* One popular central listing currently indexes over 20,000 APIs—and it is probably an exceedingly underinclusive listing.[19] Indeed, every startup supported by amicus Foundry Group uses at least one API.

4. APIs have driven growth in the startup community, because under the legal regime that has operated until now, developers have properly assumed that they can use established API descriptive labels, and use the same API endpoints, as other, familiar pieces of software, for the sake of interoperability. This enables the creation of

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[12] Disqus, http://www.disqus.com.

[13] GitHub, Inc., https://github.com/dewitt/opensearch.

[14] Basecamp (37signals, LLC), http://basecamp.com.

[15] Simple Finance Technology Corp., http://www.simple.com.

[16] Microsoft Kinect, <https://bit.ly/2psUKdl>.

[17] Last.fm LTD, http://www.last.fm.

[18] Adam DuVander, *7,000 APIs: Twice as Many as This Time Last Year*, ProgrammableWeb (Aug. 23, 2012), <https://bit.ly/2EkDnRh>.

[19] See Programmable-Web API Directory, https://www.programmableweb.com/apis/directory.

software for just a few hundred dollars that would otherwise require millions of dollars to produce if everything had to be coded from scratch.

Fueled by APIs, today's startups have been able to flourish, bringing products efficiently to market with limited risk and expense.[20] Indeed, one study found that software programs implementing APIs make it to market 30% faster than those that do not.[21]

5. The ease and predictability of creating software with APIs has attracted venture capital funding, which in turn has further hastened the pace of innovation.[22] In 2016 alone, venture capital firms provided over $69.1 billion of to 7,750 companies, largely at the crucial "seed- and early-stage" of their development paths.[23] The dramatic increase in software startups, and indeed, startups of all kinds, can thus be traced to the ease of transmitting ideas

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[20] Jeffery Stylos & Brad Myers, *Mapping the Space of API Design Decisions*, 2007 IEEE Symposium on Visual Languages and Human-Centric Computing 53-54 (2007) (IEEE Report).

[21] See Fern Halper, Judith Hurwitz, & Marcia Kaufman, *A Web API Study: The Benefits of APIs in the App Economy* (2011), <https://bit.ly/2XlcWDv>.

[22] See Samuel Kortum & Josh Lerner, *Assessing the Contribution of Venture Capital to Innovation*, RAND Journal of Economics (2000) (finding that increases in venture capital funding in a sector are associated with statistically significant higher rates of innovation); see also Darian M. Ibrahim, *The (Not So) Puzzling Behavior of Angel Investors*, 61 Vand. L. Rev. 1405, 1407 (2008) (discussing the boosts to employment and gross domestic product that investor-backed firms provided in the 2000s).

[23] Nat'l Venture Capital Ass'n, *Yearbook 2017* 13–14 (2017) <https://bit.ly/2U5bGlP>.

into reality—in significant part due to the ready availability of APIs.

B. The Federal Circuit's rulings threaten the easy access to APIs that startups need to survive.

The Federal Circuit's decisions in this case collectively make big changes in copyright law that not only disrespect the interoperability copyright was meant to foster, but have enormous practical consequences for startups.

1. Interoperability is written into copyright's very soul. It lives in the limits imposed on copyrightability in 17 U.S.C. § 102(b), which "identifies specifically those elements of a work for which copyright is not available." *Feist Pubs., Inc.* v. *Rural Tel. Serv. Co.*, 499 U.S. 340, 356 (1991). § 102(b) extends copyright protection to expressions of ideas under easily satisfied rules, but stops short of protecting the ideas themselves and the "procedure[s], process[s], system[s], method[s] of operation, concept[s], or discover[ies]" that go into those expressions. These ideas, methods, and systems are reserved for patent law, subject to patent's very rigorous standards to ensure only very few ideas can be monopolized.

This dual-track dichotomy—between expressions and ideas, patent and copyright—preserves a wide realm of ideas and their "creative building blocks," Paul Goldstein, *Goldstein on Copyright* § 2.3.11. It allows people to build upon everyone else's ideas, to comment on them, and depart from them, thereby permitting the world of ideas to work as a seamless, interconnected whole, in which each idea is accessible, and interacts and operates together with every other one. Through this interoperability, copyright seeks to "stimulate the production of the most abundant possible array of expression," *ibid.*, and to

provide new market entrants the means to compete on equal footing with incumbents.[24]

2. The Court has long recognized that giving teeth to § 102(b)'s dichotomy requires denying copyright protection in instances where "expression" and "idea" (or building blocks) overlap. Thus, since *Baker* v. *Selden*, 101 U.S. (11 Otto) 99 (1880), the Court has maintained that the description of a method of operation—even an original and expressive one—is uncopyrightable, lest the copyright provided to the description capture the unprotectible method of operation itself. This was true of the accounting forms in *Baker*, which were not copyright-protectible even though they were described in a book that was protected, because "the object of the one [the book] is explanation; the object of the other [the forms] is use." *Id.* at 105. This concession was necessary to prevent companies from keeping whole methods of operation locked up under copyright protection, cut off from interconnected world of ideas, simply by applying a descriptive label to them.

3. Until the Federal Circuit's decision in this case, that protected zone of interoperability has been universally extended to software interfaces, preventing them from acquiring protection even when they bear a descriptive label. So Lotus's "menu command hierarchy" was denied copyright protection, despite the expressive choices that went into it, because that hierarchy attached to a pure "method of operation." *Lotus Dev't Corp.* v. *Borland Int'l, Inc.*, 49 F.3d 807, 809, 816 (1st Cir. 1995), *aff'd*, 516 U.S. 233 (1996) (per curiam). Copyright has also made more direct concessions to interoperability. A company that

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[24] See Ariel Katz, *Copyright and Competition Policy* in *Handbook of the Digital Creative Economy* (Christian Handke and Ruth Towse, eds. 2013).

copies another's software interfaces when necessary to make products work with the copyright owner's products has been held to constitute fair use, even when the resulting product competes directly with the copyright owner's. See, e.g., *Sega Enterps. Ltd.* v. *Accolade, Inc.*, 977 F.2d 1510, 1514 (9th Cir. 1992).

Under these widely-applicable principles, the legality of copying APIs and other interface components has been settled for over a quarter century. See, e.g., *Computer Assocs. Int'l, Inc.* v. *Altai, Inc.*, 982 F.2d 693, 710-15 (2d Cir. 1992); *Bateman* v. *Mnemonics, Inc.*, 79 F.3d 1532, 1539, 1543-1545 (11th Cir. 1996); *Lexmark Int'l, Inc.* v. *Static Control Components, Inc.*, 387 F.3d 522, 542 (6th Cir. 2004); *Assessment Techs. of WI, LLC* v. *WIREdata, Inc.*, 350 F.3d 640, 644-645 (7th Cir. 2003); *Mitel, Inc.* v. *Iqtel, Inc.*, 124 F.3d 1366, 1374-1376 (10th Cir. 1997); Pamela Samuelson & Suzanne Scotchmer, *The Law and Economics of Reverse Engineering*, 111 Yale L.J. 1575, 1621-1626 (2002). Congress itself weighed in to endorse this settled law when it enacted the Digital Millennium Copyright Act, making an exception to its rules against circumventing anti-piracy protections on software when done "for the sole purpose of identifying and analyzing those elements of the program that are necessary to achieve interoperability of an independently created computer program with other programs." 17 U.S.C. § 1201(f)(1).

4. Yet the Federal Circuit has changed all this, and in the process undermined concepts of interoperability hardwired into copyright law. It erased *Baker*'s limits against giving protection to an expressive description when necessary to preserve the availability of the modes of operation described. It did so by holding that § 102(b) served only to codify the "idea/expression dichotomy": the principle that "[c]opyright protection extends only to

the expression of an idea—not to the underlying idea itself." Pet. App. 137a. Through that interpretation, the Federal Circuit limited § 102(b)'s applicability, relegating it to distinguishing among the elements within a particular *piece* of software that could be protected, rather than the different *types* of software could be given copyright protection. That locked up the modes of operation embodied in the implementing code within Oracle's APIs, not because the implementing code itself was expressive, but because it bore a descriptive declaratory label.

Furthermore, while the law until now has limited copyrightability in software interfaces and APIs because of their usefulness in achieving interoperability, the Federal Circuit's interpretation of the merger doctrine refuses to give any ground to interoperability even in circumstances where there is literally no way to *avoid* using the API—where a workaround is impossible. The principle of merger provides that "[w]hen there is essentially only one way to express an idea, the idea and its expression are inseparable and copyright is no bar to copying that expression." *Concrete Machinery Co.* v. *Classic Lawn Ornaments, Inc.*, 843 F.2d 600, 606 (1st Cir. 1988). Yet the Federal Circuit deemed this principle "irrelevant" to the copyrightability of Oracle's APIs, and was in any event not satisfied, because Sun could have written the declarations in more than one way. App., infra, 142a-143a, 148a, 150a-151a. By that rule, if the creator of the API had multiple choices in how he could write the API, the merger problem disappears even if that results in making it harder, or impossible, to connect. That effectively hands to the software developer an absolute power to dictate who is entitled to connect to his products.

The Federal Circuit's determinations regarding fair use strike further blows to interoperability, first through

an over-rigid application of the transformative-use factor. The Federal Circuit held that even though Oracle's APIs comprised only a tiny fraction of the 15 million lines of code in the Android operating system, and even when Google rewrote the implementing code to create an entirely different platform, that *still* did not make Google's use transformative. Pet. App. 25a-28a. With the bar set that high, virtually no other innovator will be able to make transformative use of an API, even when it changes some of the code itself.

The lower court made things still worse with its application of the fair use defense's market-harm factor. It found that factor satisfied because some early cell phones used Java, even though neither Oracle nor Sun succeeded in developing a phone of their own. Pet. App. 50a. It also found market harm based on the potential that Oracle *might* enter the smartphone market in the future. *Id.* 51a. This did far more than simply protect the expressions Oracle had actually created in Java—it put the products Oracle *might* create, or had tried, *and failed*, to create, under a 95-year monopoly. See Sonny Bono Copyright Term Extension Act, Pub. L. No. 105-298, 112 Stat. 2827, § 102(b) (1998). These are devastating blows to the interoperability that copyright is meant to protect—and single-handedly withdraws many APIs from the public domain.

C. Without easy access to APIs, startups will be harder to develop, and harder to fund, sending ripples through the entire economy.

The collective effect of the Federal Circuit's rulings presents a serious, multi-faceted threat to startups.

1. With APIs no longer freely available for developers to use, many will have to design around them by writing code from scratch. That alone will significantly magnify

the cost of development for new products, because the very interoperability that APIs foster virtually guarantees that achieving that interoperability without them will involve writing individual code to connect to a great many pieces of other software and hardware. Moreover, when APIs are no longer readily available to translate code between different platforms, developers will have to write several different versions of programs—one for each hardware platform or incompatible program language.

2. Further complicating matters, many APIs cannot be designed around. The process is either too cumbersome or functionally impossible. This is because often developers "must use the provided APIs because the implementation details are intentionally hidden" to protect intellectual property rights in protectable elements of interacting programs. IEEE Report, *supra* note 20 at 5. But under the Federal Circuit's new rules, these barriers to interconnectivity are irrelevant—APIs will remain copyrightable no matter how hard it is to design around them. The Federal Circuit's high bar for transformative use adds a further barrier to work-arounds, because it indicates that a fair-use defense may be inapplicable even if changes are made to the API's description or its implementing code in the process of applying it in a new environment. As the result of these difficulties, many developers will have no choice but to license APIs. And given the ubiquity of APIs, it is no stretch to imagine that obtaining the licenses necessary to create new products in the future could require negotiating agreements with every platform, programming language, and each platform provider in the economy.

3. These circumstances will transform a few lines of code into powerful weapons. Those who control the APIs will be able charge tolls that would-be connectors must

pay. That will breed a new kind of troll who will be empowered to demand shakedown royalties from developers. It will also empower market incumbents to make anti-competitive uses of their APIs, locking down their products by controlling the APIs needed to connect with them. That will allow them to choose their competitors and shut down competing products.

This effective product monopolization will give incumbents a very patent-like protection for their copyrighted software and basic modes of operation—granting monopolies not to particular expressions of ideas, but to ideas themselves. These anti-competitive weapons will prove all the more attractive because obtaining them will not require meeting the rigorous standards for obtaining a patent, but only the low bar of originality under § 102(a). And because these weapons stem from copyright protection, they will come with copyright's stiff penalties, and copyright's 95-year life. All this will give incumbents huge competitive edges over startups, earned not through expressive innovation, but through the vagaries of copyright law. This combination of copyright and patent will prove a toxic mix.

4. The potency of these weapons will be magnified further still by the basic doctrinal shift from copyrightability to fair use that the Federal Circuit's decisions represent. When copyright liability ultimately depends not on objective factors applied by an Article III judge, but on the subjective views of twelve unskilled jurors—and even those juror's discretion is unnecessarily cabined by arbitrary rules—then it will be harder for product developers to make basic decisions about their potential liability during the course of design. That uncertainty will only increase the leverage possessed by the incumbents and the trolls.

5. In a world where every API thus becomes an opportunity to block a product or exact a toll, startup development will become far harder to do, and harder to fund.

Startups already face serious resource constraints—which is why 3 out of every 4 already fail. Deborah Gage, *The Venture Capital Secret: 3 Out of 4 Start-ups Fail*, Wall St. J., Sept. 20, 2012. Many will be unable to bear the extra expense and risk fostered by the Federal Circuit's decisions on their own.

And there will be few who will be willing or able to help them. The threats posed by the lower court's rulings will serve to make venture capital funding much harder to come by. Because startup investing is already such a risky enterprise, investors have little appetite for litigation risk—every dollar they spend fighting lawsuits imperils the chances that products they fund will make it to market and their investments will be recouped. Indeed, investors have proven so skittish at the prospect of copyright suits that the startup boneyard is littered with entire technological fields that suddenly became dried-up "wastelands" when copyright suits made funding them too unattractive. See Michael A. Carrier, *Copyright and Innovation: The Untold Story*, 2012 Wis. L. Rev. 891, 916 (2012).

Investors will be far less likely to invest in any startups that might face copyright lawsuits relating to APIs. Then, down the development road, when copyright threats pop up suddenly, investors will be far less likely to extend the often-critical second and third rounds of funding needed to allow the product to flourish, each of which require greater investments from increasingly risk-adverse investors. Gary Lauder, *Venture Capital: "The Buck Stops Where?"*, 2 Med. Innovation & Bus. 14, 18 (2010) (Venture Capital), <http://bit.ly/2xzoAhi>.

All that means fewer startups will survive, and those that do will see their competitiveness hampered significantly. The increased costs of development needed to design-around or license APIs will sap startups of the funding they need to compete for business. Startups will also be forced to make strategic choices to avoid copyright risks that will inhibit their ability to create innovative products, meaning that the designs of their products will ultimately be driven by the demands of recalcitrant copyright owners—not the needs of the market.

6. Customers will also feel the ill-effects of the Federal Circuit's erroneous rules. Licensing fees and increased development costs will make products more expensive. And the anti-competitive, balkanized world of product development fostered by the Federal Circuit's ruling will make available products much worse. Worse because the products that come to market will be less interoperative, and thereby less functional and innovative. Worse because companies will wall off their products from interoperability as they wall them off from competitors—deciding what web pages you can access, what files you can share, or what programs you can download.

Worse too because that loss of interoperability will breed increased switching costs. It is easy to switch between products in an interoperative world, because interoperability breeds compatibility and universality. The skills and customs you develop on one product are likely to translate when you move to another product. That is because interconnected products build off one another. But when products are less interoperative, users contemplating a switch to a new product will have to contend with the fact that doing so will require them to give up their comfort and the skills they have developed on the product—and in many cases, the innovations to that product

they have also made along the way. See Eric von Hippel, *Democratizing Innovation* 4 (2006) (cataloguing instances of end-user innovation and explaining that empirical studies show that as many as 40 percent of users engage in modifying products.). That will make consumers less likely to switch even if they identity a product.

7. Finally, the destabilizing effects of the lower court's ruling on small and startup businesses will threaten the economy as a whole.

Growth in the American economy depends on advances from small startups. Startups have nourished much of the creative disruption that has fueled innovation and the American economy, spurring developments in industries as diverse as computer software, semiconductors, online businesses, life sciences, and emerging clean technologies.[25]

Aside from the life-enhancing innovations small businesses provide, they also create over 63% of all private sector jobs,[26] and employ over 37% of all scientists and engineers.[27] At present, net job growth in the U.S. is attributable entirely to jobs created by small startup firms,

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[25] Nat'l Venture Capital Ass'n, *Venture Impact: The Economic Importance of Venture-Backed Companies to the U.S. Economy* 9–10 (5th ed. 2009), <http://bit.ly/1X8wBmZ>.

[26] Small Bus. Admin., Off. of Advocacy, *Frequently Asked Questions* 1, <http://1.usa.gov/1y1jgOO>.

[27] Nat'l Sci. Bd., Nat'l Sci. Found., *Science and Engineering Indicators*, fig. 3-12 (2016), <http://1.usa.gov/1m7gkxG>.

because companies that are more than one year old actually destroy, on average, more jobs than they create.[28]

Recently, however, the startup and small-business environment has begun to suffer. Since the 1990s, the number of technology-related startups is down nearly 40%.[29] For the first time, more companies are going out of business than starting up.[30] The Federal Circuit's new copyright rules, and the cloud they cast over the development of new products, will risk tilting the balance still further, inhibiting startup growth and innovation, and depriving the economy of good, high-paying jobs. For this reason, along with all the others mentioned above, those rules must be reversed.

CONCLUSION

The petition for writ of certiorari should be granted.

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[28] Ewing Marion Kauffman Found., *The Importance of Startups in Job Creation and Job Destruction* 4 (Jul. 2010), <http://bit.ly/1eODvIy>.

[29] J. Haltiwanger et al., Ewing Marion Kauffman Found., *Declining Business Dynamism in the U.S. High-Technology Sector* 7 (Feb. 2014), <http://bit.ly/1OWNUPp>.

[30] J.D. Harrison, *More businesses are closing than starting. Can Congress help turn that around?*, Wash. Post, Sept. 17, 2014, <http://wapo.st/1Parrns>.

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February 25, 2019

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APPENDIX

Azavea – Azavea is a software design and engineering firm based in Philadelphia with a mission to advance the state of the art in geospatial technology and to apply it for civic, social, and environment impact. Employing 65 people, Azavea's work depends on an open innovation ecosystem, and we believe that the ability to use APIs is critical to both our work and that of all our clients. Our work requires the use of APIs because all of the digital systems we build rely on the ability to integrate different components into a larger system. We believe that the primary value of an API is in the implementation,—the specific way in which instructions passed through the API interface are executed, rather than in the APIs specification. As such, we believe the implementation of an API should be subject to copyright but that the API specification should remain in the realm of ideas such that technologists can use them without seeking a license. The inability to freely use an API will be destructive to the open innovation ecosystem upon which the Internet and US technological leadership has been built and its future prosperity depends.

Esther Dyson – Swiss-born American journalist, author, businesswoman, investor, commentator and philanthropist, Esther is a leading angel investor focused on breakthrough efficacy in healthcare, government transparency, digital technology, biotechnology, and space. Esther is currently focusing her career on health and

continues to invest in health and technology startups.

Foundry Group – Foundry Group LLC is a venture capital firm that invests in early- and growth-stage technology companies throughout the United States. Its founders have almost 30 years of experience investing in venture funds. In addition to providing capital, the firm contributes its experience in starting and growing companies, its expertise in the technology sector, and its network of relationships, to help outstanding entrepreneurs and venture capital fund managers turn great ideas into great companies. Foundry Group is an SEC Registered Investment Adviser with more than $2.5 billion under management.

Tim O'Reilly -- Forty years in tech has shaped Tim O'Reilly, CEO and founder of O'Reilly Media, into a man who constantly thinks about the future in the hopes of making a difference in the present. The media mogul, futurist, and the man credited with creating the first ever commercial website (or web portal), started his media enterprise at a time when people were more likely to own a typewriter than a personal computer. His company, O'Reilly Media, delivers online learning, publishes books, runs conferences, urges companies to create more value than they capture, and tries to change the world by spreading and amplifying the knowledge of innovators.

Union Square Ventures – Union Square Ventures is a Venture Capital firm that invests in internet applications, including social media, marketplaces, developer infrastructure, health, education, and blockchain and cryptocurrencies. Founded in 2004, USV has invested in over 100 startups.