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COMMENT

OPEN SOURCE SOFTWARE AND STANDARDS
DEVELOPMENT ORGANIZATIONS: SYMBIOTIC FUNCTIONS
IN THE INNOVATION EQUATION[†]

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Two groups—industry standards development organizations (SDOs) and the open source software (OSS) community—have contributed enormously to the breathtaking technological achievements of recent decades that permit anyone almost anywhere in the world to catch a Pokémon on a \$100 smart-phone. SDOs have been remarkable stewards of this innovation,

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developing principles and processes of self-governance, such as FRAND (“fair, reasonable and non-discriminatory”) licensing, as well as catalyzing the inclusion of the best available technology from their applicable fields through the standards they set. Meanwhile, the OSS community, with its strong ethos of sharing and transparency, has accelerated the pace of software innovation. However, the intersection of their jurisdictions, OSS embedded *in* standards, has become a contentious subject. Some critics now question the compatibility of OSS with FRAND licensing, arguing instead that standards using OSS should be royalty-free.

As SDOs consider the interaction between OSS licensing models and FRAND terms, it is important to recognize that both OSS and standards are good for innovation, can and do coexist with the right choice of license, and indeed complement one another. SDOs should not lightly undertake modifications to their policies and practices that are unnecessary, and will likely have serious negative repercussions on the quality of technology contributed to their standards.

I. STANDARDS AND OPEN SOURCE SOFTWARE BOTH ADVANCE INNOVATION

An important precipitating factor in the recent wave of innovation has been the creation and adoption of industry standards. In the telecommunications industry, widely adopted, highly innovative standards such as 3G and 4G have created vastly improved technical capabilities. The technology behind these standards is protected by standard essential patents (SEPs), which are accepted into a technical standard by SDOs. An important balance has long been maintained by leading SDOs such as the European Telecommunications Standards Institute (ETSI) and the International Telecommunication Union (ITU), recognizing the need to reward innovators by compensating them for giving access to their patented inventions, while also recognizing the need to make standardized and interoperable technology that requires such inventive contributions available for implementers of standards to use at reasonable cost.¹ As evidenced by the enormous technical

1. In contrast, the Institute of Electric and Electronics Engineers, an SDO which previously developed one of the most successful standards of all time (802.11 or WiFi) under policies very similar to those of ETSI and ITU, made drastic policy changes in 2015, systematically ignoring the concerns of patent holders. Its policy will likely impact the willingness of innovators to contribute leading-edge technology to IEEE standards, versus standards development efforts of other standards bodies that have maintained a balance to encourage

advances in standardized technology in fields like mobile telecommunications, the standardization process based on FRAND licensing has served and is serving humanity well, providing huge consumer value through both innovation and reasonably priced products.

Open Source Software also provides efficiencies and network effects crucial to innovation. Unlike proprietary software, OSS gives developers access to the source code of computer programs developed by others working on a given open source project, and enables developer communities to share tools and build on common infrastructure. In recent years, OSS has been critical in shaping cloud computing, big data and mobile technology.² The community-based development process for OSS has also allowed it to organically develop a cohesive social network.³ This social element has been an important driver in the adoption of OSS by industry. In order to take advantage of OSS-enabled technological infrastructure in their own products and services, commercial entities have had to adapt their internal processes to comply with the software licenses and other requirements of Open Source communities, as well as provide funding and engineering talent to contribute to—and even to lead—Open Source projects.

Properly managed, companies engender goodwill with programmers and customers through investments in open source⁴ and reduce development and maintenance expense by sharing software costs across the applicable open source community, redeploying the saved funds on more investments in innovation rather than recreating duplicative infrastructure, while customers enjoy highly innovative, stable, low-cost software.

II. FRAND WORKS, FOR BOTH PATENTS AND OSS

contribution of the best available technology as well as affordable license rates for implementers.

2. Harish Pillay, *Is open source the key to innovation?*, ZDNET (August 6, 2014), <http://www.zdnet.com/article/is-open-source-the-key-to-innovation/>; Eren Niazi, *5 ways open source is transforming tech in 2014*, OPENSOURCE.COM (February 18, 2014), <https://opensource.com/business/14/2/5-ways-open-source-transforming-tech-2014>.

3. Tom Tauli, *Why All the 'Open Source' Innovation?*, FORBES (December 23, 2015), <http://www.forbes.com/sites/tomtaulli/2015/12/23/why-all-the-open-source-innovation/#5456f4df1f72>.

4. JOSH LERNER & MARK SCHANKERMAN, *THE COMINGLED CODE: OPEN SOURCE AND ECONOMIC DEVELOPMENT* 49 (2010).

SDOs have long required that members agree to the FRAND system of licensing in order to participate in the standard-development process. The “fair, reasonable and non-discriminatory” tenets of FRAND require SEP holders to abide by licensing terms that are pro-competitive, include reasonable terms and conditions, and treat similarly situated licensees similarly. SDO guidelines historically also accommodate licensing of software generally (including OSS) under FRAND principles, rendering the two systems compatible by definition.⁵

For a number of years some critics argued that FRAND was “broken”, and the “monopolies” conferred by SEPs would result in “patent holdup” and “royalty stacking” as SEP holders exploited the sunk costs of standards implementers. However, as FRAND-based industries like mobile telecommunications have matured and large bodies of data have become available showing the actual economics of the industry over 20-plus years, empirical studies and other scholarly works have sharply refuted the earlier dire predictions.⁶ There is now no credible, current scholarship informed by the data, finding any issue with FRAND licensing in the standards development context. In fact, industries like mobile telecommunications are thriving under the FRAND licensing regime. Indeed cries of patent holdup and royalty stacking are making their way to the place where well-intentioned, seemingly plausible academic theories go once confronted by massively incompatible marketplace data.⁷

In the meantime, critics have more recently begun airing a new argument: that FRAND is discriminatory towards OSS and

5. ETSI Rules of Procedure, 11 EUR. TELECOMM. STANDARDS INST. 35 (2016).

6. John D. Harkrider, *Seeing the Forest Through the SEPS*, 27 *Antitrust A.B.A.* 22 (2013).

7. As for hold-up, the real threat, as noted by courts in both the U.S. and EU, is “hold-out”, where powerful implementers of standards refuse to license SEPs on any terms in a might-makes-right gambit to free ride on others’ innovation investments. See *Certain Wireless Devices*, USITC Inv. No. 337-TA-868 114 (June 13, 2014) (Administrative Law Judge Theodore R. Essex) (Initial Determination); *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1333 (Fed. Cir. 2014) overruled by *Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed. Cir. 2015) (Rader, C.J., dissenting); see also *The European Commission and the value of patents for 5G and IoT*, 4IP News, April 26, 2016, <http://www.4ipcouncil.com/news/european-commission-and-value-patents-5g-and-iot>.

inherently incompatible with OSS.⁸ As was the case with hold-up and royalty-stacking theories, there is no real-world indication of any incompatibility or discrimination, and the predominant view is that the marketplace has developed solutions to incorporating FRAND principles in licensing OSS.⁹

III. OPEN SOURCE SOFTWARE IS COMPATIBLE WITH FRAND

Contributors and SDOs are readily able to ensure that OSS contributions are compatible with FRAND by simply choosing compatible OSS licenses for contributions.

The Open Source Initiative (OSI), a standards body of sorts and arbiter of the “open source definition”, lists over 70 different licenses that have been reviewed and approved under its License Review Process.¹⁰ Broadly speaking, these licenses fall into one of two categories, permissive or copyleft. Copyleft licenses require the licensed software and any modifications to be redistributed with the same set of rights (*i.e.*, under the same copyleft license), thus preventing the software from becoming proprietary.¹¹ Claims of incompatibility of open source licenses with FRAND licensing predominantly stem from copyleft licenses and the conflation of open source software with free software. The original copyleft license, the General Public License (GPL), was designed by Richard Stallman, founder of the Free Software Foundation, an organization that continues to advocate for free software.¹²

Permissive licenses, on the other hand, do not place restrictive terms on software redistribution, providing an opportunity for innovators to benefit financially from their modifications to

8. Jay P. Kesan, *The Fallacy of OSS Discrimination by FRAND Licensing: An Empirical Analysis*, 29 (Illinois Public Law and Legal Theory Research Papers Series No. 10-14, 2011).

9. Benoit Muller, *Annex V: Views and Trends with Respect to Standards and IPRs*, *Study on the Interplay between Standards and Intellectual Property Rights (IPRs)*, Tender No ENTR/09/015, Final Report, April 2011, available at: http://www.iplytics.com/download/docs/studies/ipr_study_final_report_en.pdf.

10. *The Open Source Definition*, OPEN SOURCE INITIATIVE, <https://opensource.org/osd>.

11. Making matters more complicated, OSS contributions can implicate non-SEPs such as patents that may be used (but are not mandatory) to facilitate implementation of a particular standard. Given this likelihood, the contribution of OSS under restrictive copyleft licenses can compel innovators to relinquish innovations beyond those essential to the standard, forcefully discouraging contributions at all levels for fear of having valuable investments reduced to giveaways.

12. LERNER & SCHANKERMAN, *supra* note 4, at 37.

applicable open source software. The only requirements accompanying redistribution under a Berkeley Software Distribution (BSD) license, for instance, are to provide the copyright notice, reproduce the license language and refrain from using the original software developer's name in any derivative works without written permission.¹³ Other popular permissive licenses include the MIT license and the ISC license.

A few other licenses can be categorized as neither permissive nor copyleft. For example, the Apache 2.0 license does not require distribution under the same license for any modifications or derivative works, but does require distribution under the same license for any unmodified components. Apache 2.0 also differs from many permissive licenses in its grant of a royalty-free patent license.¹⁴ The Apache License's grant of a royalty-free patent license on all contributions to Apache licensed software does conflict with FRAND principles, because it does not give innovators an avenue for fair compensation.¹⁵ However, this problem only arises from a small subset of OSS licenses.

Permissive licenses account for the vast majority of OSI's approved licenses and are fully compatible with FRAND licensing. An empirical study of all available OSI approved licenses in 2011 showed that only two of the eight most popular OSS licenses and seven of the 67 then approved OSS licenses had terms conflicting with FRAND.¹⁶ These statistics flatly contradict any contention that OSS cannot be reconciled with FRAND. To the contrary, OSS is readily compatible with FRAND by simply choosing a permissive open source license for code submitted to standards bodies developing FRAND standards.

IV. FALSE CONFLICTS CREATED BY THOSE SEEKING SHORT TERM ECONOMIC GAIN MUST BE MANAGED FOR WHAT THEY ARE: UNACCEPTABLE

SEPs and OSS spur innovation, both together and separately. Moreover, there are clearly many viable open source licenses that allow SDOs to utilize OSS without a resulting conflict between the

13. *The BSD 2-Clause License*, THE OPEN SOURCE INITIATIVE, <https://opensource.org/licenses/bsd-license.php>.

14. *Apache License*, Version 2.0, January 2004, <https://www.apache.org/licenses/LICENSE-2.0>.

15. This becomes a key difficulty where such software must be modified by innovators so that it can be used by others to implement a standard.

16. Kesan, *supra* note 8.

open source license and the FRAND license. So why are critics claiming the systems are incompatible?

The answer is partly ideological, but mostly about business models. The ideological component is driven by the free software movement, which sprang from the early “hacker” culture of software engineering and has advocated for free software since the early 1980s. The free software community opposes any royalty-based licensing or proprietary software on principle and believes software developers should instead seek economic incentives through warranties, maintenance or other non-royalty based channels.¹⁷ Many of the copyleft licenses incompatible with FRAND licensing were developed within this community at times, some have argued, explicitly to frustrate FRAND licensing.¹⁸

However, another potent force in propagating the myth of FRAND and OSS incompatibility has been interested parties who seek to reduce their licensing costs. The ubiquity of OSS in standards means that any policy removing OSS components from being factored into a royalty-bearing license would significantly reduce implementer component costs and thus improve the bottom line for implementers.¹⁹ This is a natural competitive point of view and not objectionable per se—every implementer of technology wants to reduce its input costs. But for those SDOs seeking to maintain the delicate balance that encourages innovators to contribute cutting edge technology, the gambit must be taken for what it is—economic self-interest by those seeking access to others' innovation investments for free. To take this bait will inevitably drive innovators away and leave standards to the moribund contributions of those who don't, or can't, innovate.

Some see OSS as the next opportunity to devalue SEPs after successfully pushing through the controversial amendments to the Institute of Electrical and Electronics Engineers' (IEEE) patent policy.²⁰ A major change, and one vehemently protested by SEP holders, was the prohibition of SEP holders from seeking an injunction against infringers until after first-level appellate review has been concluded, significantly tilting the balance between innovators and implementers, and emboldening implementers to

17. *What is free software?*, GNU OPERATING SYSTEM, <https://www.gnu.org/philosophy/free-sw.html>.

18. Kesan, *supra* note 8, at 19.

19. Kesan, *supra* note 8, at 20.

20. See *supra* note 1.

infringe the patents of innovators rather than taking licenses.²¹ While the amendment's long-term effects remain to be seen, there is widespread concern that cheapening the value of SEPs will result in less investment in and development of effective standards.

Likewise, amending SDO policies to require the use of FRAND-incompatible OSS licenses could also result in less innovative standards and a diminished industry role for the implementing SDO. When SDOs are considering specific software submissions for inclusion in standards, it is natural that software associated with highly innovative features will include proprietary licenses. Furthermore, many of these software submissions will be adjunct to highly innovative hardware, circuitry or algorithms. Insistence on a FRAND-incompatible license will prevent the adoption of both highly innovative software and its associated technology, sending a message that the SDO is willing to prioritize "free" over innovation.

The answer to the false choice between OSS and FRAND in standard development is simple: continue to allow, as has historically been the practice, contributors of OSS to make their contributions under permissive open source licenses. To those seeking to create an innovation-hostile climate in SDO operations by forcing software under copy-left licenses or licenses with royalty-free patent grants, just say no.

V. WHEN OPEN MEANS CLOSED

The recent press to weaken innovation incentives in standards development by changing the approach to accepting OSS code comes cloaked in pleasantries like "open" and "free". Policymakers, however, should remain wary. Terms like "open standards", "free" and "sharing" evoke egalitarian ideals that belie a more complicated truth. The current system has been remarkably successful in balancing the needs of OSS users and developers with the interests of SEP holders through appropriate permissive licenses.

In contrast, moving to incompatible licenses for FRAND standards submissions weakens innovation incentives and discourages innovators from participating in standardization efforts. For standards development organizations, this means abdicating

21. *Clause 6 of the SASB Bylaws*, IEEE-SA Standards Board Bylaws, <http://standards.ieee.org/develop/policies/bylaws/sect6-7.html>.

technical leadership to those who prioritize commodity implementations above innovative standards.²²

Before SDOs change their historically successful policies on the treatment of OSS in standards, they should consider the evidence of whether their policies are actually broken. The kid with the \$100 smartphone playing Pokémon Go would say, “probably not.”

22. In addition, impairing the FRAND paradigm would shift the economics of innovation away from a patent disclosure-based regime to favor a trade-secret based regime. A trade secret regime with its barriers to sharing can cause secrecy-shrouded exclusivity in perpetuity and tragically inefficient allocation of resources, a giant step backwards for innovation and the downfall of standards development, which relies so heavily on disclosure, transparency and sharing.