

## Using Interactive Inventions

W. Keith Robinson

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## Using Interactive Inventions

### Cover Page Footnote

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# USING INTERACTIVE INVENTIONS

W. Keith Robinson\*

## CONTENTS

INTRODUCTION .....	96
I. CHARACTERISTICS OF INTERACTIVE INVENTIONS .....	104
A. <i>The Connected World</i> .....	105
1. <i>Internet-Age Inventions</i> .....	105
2. <i>Personalized Medicine</i> .....	107
3. <i>The Internet of Things</i> .....	108
B. <i>A “Use” Model for Interactive Inventions</i> .....	110
1. <i>“Use” of Inventions</i> .....	111
2. <i>“Use” of Interactive Inventions</i> .....	111
a. <i>“Use” of Interactive Methods</i> .....	112
b. <i>“Use” of Interactive Systems</i> .....	115
c. <i>An Incoherent “Use” Model for Interactive Inventions</i> .....	117
C. <i>Principles of Multi-Party Liability</i> .....	119
1. <i>The Relationship between the Parties</i> .....	120
2. <i>Concerted Action</i> .....	120
3. <i>Intent</i> .....	121
D. <i>Summary</i> .....	122
II. ENFORCING INTERACTIVE INVENTIONS .....	123
A. <i>The Challenge of Interactive Inventions</i> .....	124
B. <i>The Misstep of Beneficial Use</i> .....	132
C. <i>A Framework for Enforcing Interactive Inventions</i> ..	136
1. <i>Rethinking “Beneficial” Use</i> .....	136
2. <i>Revisiting Possible Infringement of Interactive Systems</i> .....	139
CONCLUSION .....	140

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*Interactive inventions are systems and processes that can be used by multiple actors at the same time. Many interactive inventions are the product of emerging technologies such as the Internet of Things that allow billions of everyday devices to communicate with each other via the Internet. Other interactive inventions are prevalent in the emerging fields of personalized medicine and FinTech (new financial technologies). Unfortunately, the law concerning how to determine liability when a patent directed to an interactive invention is infringed is dissonant across classes of inventions. Specifically, what it means to “use” an interactive system is different from what it means to “use” an interactive method. Why does the law treat these acts differently? Should it?*

*This Article attempts to answer these important questions. Specifically, this Article contends that the current framework for what it means to “use” an interactive system is problematic. Interactive inventions are different than traditional method and system inventions. Unfortunately, courts have too often applied, especially in recent cases involving interactive systems, an outmoded framework to interactive inventions. When interactive inventions are analyzed under the proper framework, it allows for the application of sound legal principles to solve multi-actor liability problems. Specifically, this Article argues that a direct infringer “uses” an interactive system when it controls the system and obtains a benefit from it. This approach is also more consistent with the recently broadened standard for infringement of interactive methods.*

## INTRODUCTION

One purpose of the U.S. patent system is to encourage innovation.<sup>1</sup> When one thinks of innovation, devices that did not exist twenty years ago like the self-driving car may come to mind. Thus, the patent system helps bring into being what did not exist.<sup>2</sup>

It seems ironic then that the Patent Statute of 1952 (the “Patent Statute”) defines only four classes of subject matter that can be pat-

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1. Michael Abramowicz, *Orphan Business Models: Toward a New Form of Intellectual Property*, 124 HARV. L. REV. 1362, 1421 (2011) (explaining that intellectual property protection protects investments in commercializing and experimenting with untested business models); Michael Abramowicz & John F. Duffy, *The Inducement Standard of Patentability*, 120 YALE L.J. 1590, 1624 (2011) (“The possibility of a patent likely will affect the amount and intensity of the grantee’s research and thus can be viewed as a proximate cause of the innovation.”).

2. Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 885 (1990) (discussing the role of pioneering patents in the evolution of industry).

ented.<sup>3</sup> As defined in the statute, inventors may obtain patent protection for a “process, machine, manufacture, or composition.”<sup>4</sup>

“But wait,” you might say. “Haven’t inventors obtained patent protection for software, living organisms, business methods, and other inventions that don’t fit neatly into one of the statutory classes?”<sup>5</sup> The fact is that several types of subclasses of inventions exist.

One such subclass is system inventions. System inventions are a particular type of machine or apparatus.<sup>6</sup> A system is made up of one or more components that work together to perform a function.<sup>7</sup>

As a corollary to subclasses, this Article suggests that a “superclass” of inventions also exists. Interactive inventions are systems and processes that are capable of being used by multiple actors at the same time.<sup>8</sup> This Article uses the term “superclass” to denote that both systems and processes can be interactive inventions. Emerging technologies such as the Internet of Things—which connects such disparate devices as mobile phones, automobiles, thermostats, and refrigerators—are systems. These systems are used to carry out everyday tasks as well as advanced processes. As the number of connected devices continues to far exceed the number of people on the planet,<sup>9</sup> the number of patentable systems that perform patentable processes will continue to grow. Platforms such as the Internet of Things will allow many users to use these innovative systems and processes.

In fact, the ability for multiple actors to use interactive inventions is what makes them unique. Both interactive system and method inven-

3. 35 U.S.C. § 101 (1952).

4. *Id.*

5. Peter S. Menell, *Forty Years of Wondering in the Wilderness and No Closer to the Promised Land: Bilski’s Superficial Textualism and the Missed Opportunity to Return Patent Law to Its Technology Mooring*, 63 STAN. L. REV. 1289, 1291 (2011) (discussing the development of the law concerning the patentability of software and biotechnology).

6. See *In re Walter*, 618 F.2d 758, 762 n.2 (C.C.P.A. 1980), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (“Claims 10-12 and 17-18 are directed to a “system,” i.e., apparatus, and are identical in substance to the method claims with the exception that the term “means for” has been inserted in front of each method step to convert the claims from method to apparatus format.”).

7. *Id.* at 761.

8. Dan L. Burk, *Owning E-Sports: Proprietary Rights in Professional Computer Gaming*, 161 U. PA. L. REV. 1535, 1536 (2013) (“From arcade to console and computer desktop to interactive multiplayer network, the explosion in computer video games has been spurred by Internet accessibility, whether for downloading and updating software, tendering payment, or finding and interacting with other players.”).

9. See Oladayo Bello & Sherali Zeadally, *Intelligent Device-to-Device Communication in the Internet of Things*, 10 IEEE SYS. J. 1172, 1172 (2016) (stating that “[b]y 2010, the number of devices connected to the Internet rose to 12.5 billion while the world’s population increased to 6.8 billion . . .”).

tions are unique in that they may be used by one or more actors.<sup>10</sup> These characteristics are important when trying to determine the type of activity that may give rise to patent infringement.

This Article contends that the law's recent interpretation of what it means to "use" an interactive system is problematic because it applies an outmoded framework to interactive inventions. It argues that interactive inventions should be treated differently from traditional method and system inventions.<sup>11</sup> When interactive inventions are analyzed under the correct framework, it allows for courts to apply sound tort law principles to solve multi-actor liability problems; specifically, that a direct infringer uses an interactive system when it controls the system and obtains a benefit from it. This approach is more consistent with the recently articulated standard for infringement of method claims by multiple actors.

Direct infringement of a patented invention occurs when that invention is made, used, sold, offered for sale in the United States, or imported into the United States without the patent owner's authorization.<sup>12</sup> Thus, by itself, the "use" of a patented invention without the patent owner's authorization is infringement.<sup>13</sup>

Enforcing interactive system claims presents unique challenges for patent law. Specifically, how does the law determine liability for direct infringement when more than one entity uses various components of the claimed system? Over the last decade, the Federal Circuit has

10. See *Centillion Data Sys., LLC v. Qwest Commc'ns Int'l, Inc.*, 631 F.3d 1279, 1283–84 (Fed. Cir. 2011) (addressing infringement for "use" of a system claim that has elements in the possession of more than one party).

11. See Dmitry Karshedt, *Causal Responsibility and Patent Infringement*, 70 VAND. L. REV. 565, 596 (2017); James Bessen & Michael J. Meurer, *The Direct Costs from NPE Disputes*, 99 CORNELL L. REV. 387, 388 (2014); Michael A. Carrier, *Limelight v. Akamai: Limiting Induced Infringement*, 2014 WIS. L. REV. ONLINE 1, 5 (2014) ("The Supreme Court's Akamai decision offers (at least) four lessons, which address: (1) the text of the Patent Act, (2) the Supreme Court's treatment of the Federal Circuit, (3) the question of direct infringement, and (4) policy issues presented by congressional action."); Timothy R. Holbrook, *Method Patent Exceptionalism*, 102 IOWA L. REV. 1001, 1008 (2017) (providing a comprehensive treatment of the unique status of method claims in the patent landscape).

12. 35 U.S.C. § 271(a) (2012).

13. See *Lexmark Int'l, Inc. v. Impression Prods.*, 816 F.3d 721, 732 (Fed. Cir. 2016), *rev'd and remanded*, 137 S. Ct. 1523 ("Congress has . . . prescribed that whoever, 'without authority,' does any one of the listed acts—the making, using, offering to sell, selling, or importing of a patented invention.") (quoting *Global-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 760 (2011)) (citing 5 DONALD S. CHISUM, CHISUM ON PATENTS § 16.01 (2015) ("The exclusive rights are disjunctive: one may infringe by (1) making without selling or using, (2) using without making or selling or (3) selling without making or using."); WILLIAM C. ROBINSON, THE LAW OF PATENTS §§ 903–906 (1890).); see also *Roche Prod., Inc. v. Bolar Pharmaceutical Co., Inc.*, 733 F.2d 858, 861 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 856 (1984) ("It is beyond argument that performance of only one of the three enumerated activities is patent infringement.").

struggled to determine liability for the direct infringement of method claims when more than one entity performs a step of the claimed method.<sup>14</sup>

We should care about the tests used for determining infringement of interactive inventions for several reasons. A great deal of innovation is occurring in this area. Interactive technology has become increasingly prevalent. Growth in demand for financial services and internet retail has been driven in part by innovation and explosive growth in the wireless industry.<sup>15</sup> The United States has more mobile internet users than any other country in the world.<sup>16</sup> “Apps,” or applications that run on smart mobile devices, have also contributed to the growth of the wireless industry.<sup>17</sup> According to Sensor Tower, a leading provider of mobile app data, 2018 mobile app sales generated over \$70 billion dollars in revenue.<sup>18</sup> Thus, the global economy has become dependent upon this interconnected system of wireless devices, internet storefronts, and financial services.<sup>19</sup>

It is also important that inventors of interactive technologies be able to enforce their patents.<sup>20</sup> In addition, commercial actors aware

14. See Mark D. Janis & Timothy R. Holbrook, *Patent Law's Audience*, 97 MINN. L. REV. 72, 117 (2012) (arguing that the modern patent infringement analysis is becoming more unmanageable and complex, and the issue of joint or divided infringement is an example of this trend); see also W. Keith Robinson, *No “Direction” Home: An Alternative Approach to Joint Infringement*, 62 AM. U. L. REV. 59, 109–112, 115 (2012) (arguing for determining if there should be divided infringement liability based on whether multi-party interaction was an innovative concept of the patent). *But see* Mark A. Lemley et al., *Divided Infringement Claims*, 33 AIPLA Q.J. 255, 272–73 (2005) (explaining that claims can be drafted to capture the activity of a single entity and avoid the divided infringement complications that arise when a claim requires the actions of more than one party).

15. See Brief of CTIA—the Wireless Association® and MetroPCS Wireless, Inc. as Amici Curiae in Support of Defendant-Cross Appellant on Rehearing En Banc at 3–4, *Akamai Tech., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301 (Fed. Cir. 2012) (Nos. 06-CV-11109, 06-CV-11585), 2011 WL 4071472 at 3–4 [hereinafter *Wireless Association Brief*] (“Advances in wireless technology have enabled explosive innovation in the last decade. Ten years ago, consumers used cell phones almost exclusively to make voice calls. Five years later, they were texting, sharing pictures, and surfing the Internet.”).

16. *Id.* at 8 (stating that 234 million or more Americans use mobile devices).

17. *Id.* at 4.

18. Mansoor Iqbal, *App Revenue Statistics*, BUSINESS OF APPS (Sept. 13, 2019), <https://www.businessofapps.com/data/app-revenues/#1>.

19. Brief of Amicus Curiae the Financial Services Roundtable in Support of Limelight Networks, Inc. and Affirmance at 4, *Akamai Tech., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301 (Fed. Cir. 2012) (Nos. 2009-1372, 2009-1380, 2009-1416, 2009-1417), 2011 WL 7730148 [hereinafter *Financial Services Brief*].

20. See *McKesson Techs. Inc. v. Epic Sys. Corp.*, 98 U.S.P.Q. 2d (BNA) 1281, 1285–86 (Fed. Cir. 2011) (Newman, J., dissenting) (claiming that the majority’s decision removed all interactive methods from patent eligibility), *sub nom.* *Akamai Techs. Inc. v. Limelight Networks, Inc. (Akamai/McKesson)*, 692 F.3d 1301 (Fed. Cir. 2012) (en banc) (per curiam), *rev’d*, 572 U.S. 915 (2014).

of an interactive patent's claims should be able to understand how to avoid infringing that patent.

If a party "uses" a patented invention without authorization, they infringe the patent under § 271(a) of the Patent Act.<sup>21</sup> The Supreme Court has held that a "use" right means the right to put into service any given invention.<sup>22</sup> Generally, liability for use of an invention also attaches if the invention is used for a purpose that was not envisioned by the patentee.<sup>23</sup> While the Federal Circuit purports to follow these general principles, it has struggled with how to interpret the use of interactive inventions since at least the early 2000s.

For example, divided infringement deals with the question of whether there can be infringement liability when the performance of an interactive method claim is split among multiple parties, actors, or devices.<sup>24</sup> The current rule, recently articulated by the Federal Circuit, is that there may be infringement liability when the steps of a method are performed by multiple parties if a single defendant "exercises 'control or direction' over the entire process such that every step is attributable to the controlling party."<sup>25</sup> There may also be liability "when an alleged infringer conditions participation in an activity or receipt of a benefit upon performance of a step or steps of a patented method and establishes the manner or timing of that performance."<sup>26</sup> Finally, an entity may be liable where actors form a joint enterprise.<sup>27</sup>

The current test for divided infringement represents a significant shift in the law from just ten years ago. In 2007, liability for divided infringement required a showing that one party directed or controlled another to perform the infringed method.<sup>28</sup> The direction and control test was an incredibly high bar to meet. Commentators viewed the test as a "loophole" for infringement.<sup>29</sup> Judge Pauline Newman famously

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21. 5 DONALD S. CHISUM, CHISUM OF PATENTS: A TREATISE ON THE LAW OF PATENTABILITY, VALIDITY AND INFRINGEMENT § 16.02(4)(a)–(b) (LexisNexis 2019) (explaining that use is a discrete act of infringement); see 35 U.S.C. § 271(a) (2012).

22. *Bauer & Cie v. O'Donnell*, 229 U.S. 1, 11 (1913).

23. CHISUM, *supra* note 21, § 16.02(4)(c) ("One does not escape infringement by using a patented invention for a purpose not contemplated or disclosed by the patentee.")

24. See *id.* § 16.02(6)(a).

25. *Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1329 (Fed. Cir. 2008) (citing *BMC Res., Inc. v. Paymentech, LP*, 498 F.3d 1373, 1380–81 (Fed. Cir. 2007)).

26. *Akamai Technologies, Inc. v. Limelight Networks, Inc. (Akamai IV)*, 797 F.3d 1020, 1023 (Fed. Cir. 2015).

27. *Id.*

28. See *BMC Res., Inc. v. Paymentech, L.P.*, 498 F.3d 1373, 1379 (Fed. Cir. 2007).

29. See Long Truong, *After BMC Resources, Inc. v. Paymentech, L.P.: Conspiratorial Infringement as a Means of Holding Joint Infringers Liable*, 103 Nw. U. L. REV. 1897, 1918–19 (2009) (arguing that a legal loophole encourages actors to avoid infringement by entering into conspiracies to avoid liability).



lamented that interactive patents were not patents at all because they could not be enforced under the direction or control test.<sup>30</sup>

Several recent cases indicate that the Federal Circuit has settled on a broader approach to infringement of interactive method claims.<sup>31</sup> Recently, it has turned its attention to infringement of interactive system claims.<sup>32</sup> While the Federal Circuit seems to have broadened the test for determining when an interactive method has been used by one or more parties, the recent cases on use of interactive systems seem to be moving in the opposite direction.<sup>33</sup> This trend is problematic for emerging technologies that will use a system of connected devices to perform simple and complex processes.<sup>34</sup>

For example, to determine what it means to use an interactive system requires interpreting a number of bespoke judicial rules. Generally, to use an invention means to put that invention into service.<sup>35</sup> However, courts have further interpreted the meaning of “use” based on the location of the use and what entity is in possession of particular system components.<sup>36</sup> A system invention is used in the place where it is put into service and beneficial use of the system is obtained.<sup>37</sup> When elements of a system are in the possession of more than one actor, a party uses the system when it controls the system as a whole and obtains a benefit from it.<sup>38</sup> Finally, a party may also infringe a claimed

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30. See *Akamai/McKesson*, 692 F.3d 1301, 1326 (Fed. Cir. 2012) (Newman, J., dissenting).

31. *Travel Sentry, Inc. v. Tropp*, 877 F.3d 1370 (Fed. Cir. 2017); *Eli Lilly & Co. v. Teva Parenteral Medicines, Inc.*, 845 F.3d 1357, 1362 (Fed. Cir. 2017).

32. *Intellectual Ventures I LLC v. Motorola Mobility LLC*, 870 F.3d 1320 (Fed. Cir. 2017); *Grecia v. McDonald’s Corp.*, 724 F. App’x 942 (Fed. Cir. 2018).

33. *Intellectual Ventures*, 870 F.3d at 1329; *Grecia*, 724 F. App’x at 946–47.

34. Michal S. Gal, Niva Elkin-Koren, *Algorithmic Consumers*, 30 HARV. J.L. & TECH. 309, 310–11 (2017) (“Intelligent personal assistants, such as Google Assistant, Amazon Alexa, and Apple’s Siri, perform tasks for individual users, based on users’ inputs (such as scheduling constraints) and a variety of online sources (such as weather or traffic conditions). Consumers can already purchase a washing machine from the W9000 series developed by Samsung and IBM, which uses IBM’s ADEPT (Autonomous Decentralized Peer-to-Peer Telemetry) technology to make autonomous orders and payments to restock detergent, for example, and then update the owner via a smartphone. This technology, revealed in 2015, exemplifies what is known as the Internet of Things (“IoT”), whereby connected devices automatically handle myriad day-to-day tasks.”)

35. *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1319 (Fed. Cir. 2005), *cert. denied*, 546 U.S. 1157 (2006).

36. See *id.* at 1316–18; see generally *N. Am. Philips Corp. v. Am. Vending Sales, Inc.*, 35 F.3d 1576, 1579 (Fed. Cir. 1994); *Decca Ltd. v. United States*, 544 F.2d 1070, 1083 (1976).

37. *NTP*, 418 F.3d at 1317 (citing *Decca*, 544 F.2d at 1083).

38. *Centillion Data Sys., LLC v. Qwest Commc’ns Int’l, Inc.*, 631 F.3d 1279, 1284 (Fed. Cir. 2011).

element that operates in a system environment if the asserted claim contemplates a single infringer.<sup>39</sup>

Recently, the Federal Circuit has narrowed its interpretation of “use.” When elements of a system are in the possession of more than one actor, infringement of the system occurs only if the accused infringer obtained a benefit from each and every element of the system.<sup>40</sup> Further, in a non-precedential opinion, the Federal Circuit suggested that in a situation where an accused infringer does not possess any elements of a claimed system, but must act to put the system into service, “the alleged benefit should be tangible, not speculative, and tethered to the claims.”<sup>41</sup>

This development is troubling for two main reasons. First, it continues a trend of the Federal Circuit applying narrow and invention-specific legal rules.<sup>42</sup> District courts have already begun to apply the beneficial rule test in narrow ways.<sup>43</sup> In addition, basing legal tests on the concepts of location and possession seem futile in the emerging connected and shared economy.<sup>44</sup> Second, the Federal Circuit’s approach with respect to interactive system claims seems to be at odds with its recent broadening of the test for determining infringement of interactive method claims.<sup>45</sup> The test for interactive method claims was broadened, in part, due to a line of cases that made it unlikely that any interactive method could be enforced.<sup>46</sup>

39. *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1309 (Fed. Cir. 2011) (“That other parties are necessary to complete the environment in which the claimed element functions does not necessarily divide the infringement between the necessary parties. For example, a claim that reads ‘An algorithm incorporating means for receiving e-mails may require two parties to function, but could nevertheless be infringed by the single party who uses an algorithm that receives e-mails.’”).

40. *Intellectual Ventures I LLC v. Motorola Mobility LLC*, 870 F.3d 1320, 1329 (Fed. Cir. 2017) (“In an analysis of a system claim under Centillion, proof of an infringing “use” of the claimed system under § 271(a) requires the patentee to demonstrate that the direct infringer obtained “benefit” from each and every element of the claimed system.”).

41. *Grecia v. McDonald’s Corp.*, 724 F. App’x 942, 947 (Fed. Cir. 2018).

42. Ted Sichelman, *Myths of (Un)certainly at the Federal Circuit*, 43 *LOY. L.A. L. REV.* 1161, 1163 (2010) (arguing that the Federal Circuit perpetuates judicial nonuniformity).

43. *Acceleration Bay LLC v. Activision Blizzard, Inc.*, 324 F. Supp. 3d 470, 483 (D. Del. 2018) (“The only “benefits” to which Plaintiff points are general financial benefits and vague technological benefits.”); *Rearden LLC v. Walt Disney Co.*, No. 17-CV-04006-JST, 2018 WL 3031885 (N.D. Cal. June 18, 2018).

44. Erez Aloni, *Pluralizing the “Sharing” Economy*, 91 *WASH. L. REV.* 1397, 1407 (2016) (“The sharing economy can be tagged as what’s mine is still mine but you may use it, access it, and maybe pretend that it is yours for a limited time and under limited conditions.”).

45. *Akamai IV*, 797 F.3d 1020, 1023 (Fed. Cir. 2015).

46. *BMC Res., Inc. v. Paymentech, L.P.*, 498 F.3d 1373, 1375 (Fed. Cir. 2007), *overruled by Akamai Tech., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301 (Fed. Cir. 2012); *see Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1321 (Fed. Cir. 2008); *see also Golden Hour Data Sys.*,

In the last twenty years, much has been written about interactive technology. Scholars have focused on how the legal system will treat these technologies generally.<sup>47</sup> In addition, some scholars have focused on legal decisions involving these technologies.<sup>48</sup> Other scholars have focused on how courts treat method claims differently from system claims.<sup>49</sup> For example, Professor Timothy Holbrook has argued that method claims are treated as “exceptional” and has argued for them to be treated similarly to other inventions.<sup>50</sup>

This Article contributes to the growing body of literature by addressing two important points. First, from a technology standpoint, the line between systems and methods is blurring. In turn, technology is implemented and used in an entirely different way than it was fifty years ago. This has given rise to a superclass of interactive inventions. Second, this Article suggests a framework for addressing enforcement issues that arise from the use of interactive inventions. The need for a coherent framework is evidenced by the differences in the tests applied by the Federal Circuit in its enforcement of interactive system and method claims. The Federal Circuit has spent a little over a decade grappling with the question of how to enforce interactive method claims. This Article suggests that because of the emerging technical proximity of interactive system and method inventions, a great deal can be learned from the Federal Circuit’s struggles to arrive at a workable test for the divided infringement of method claims.

The ideas explored in this Article are useful in a number of contexts. First, for the practitioner, it provides guidance concerning how to define and claim an interactive invention from the perspective of an alleged infringer. Second, this Article sketches a liability conduct model for interactive system and method claims. An immediate use of

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Inc. v. *emsCharts, Inc.*, 614 F.3d 1367, 1369 (Fed. Cir. 2010), *overruled by* *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d 1020 (Fed. Cir. 2015).

47. Corey Field, *Copyright, Technology, and Time: Perspectives on “Interactive” As A Term of Art in Copyright Law*, 50 J. COPYRIGHT SOC’Y U.S.A. 49, 50 (2003) (“Technological interactivity has become one of the most controversial problems facing courts and legislators.”); Burk, *supra* note 8, at 1536 (“From arcade to console and computer desktop to interactive multiplayer network, the explosion in computer video games has been spurred by Internet accessibility, whether for downloading and updating software, tendering payment, or finding and interacting with other players.”).

48. Karshedt, *supra* note 11, at 596; Bessen & Meurer, *supra* note 11, at 388; Carrier, *supra* note 11, at 5 (“The Supreme Court’s *Akamai* decision offers (at least) four lessons, which address: (1) the text of the Patent Act, (2) the Supreme Court’s treatment of the Federal Circuit, (3) the question of direct infringement, and (4) policy issues presented by congressional action.”).

49. Holbrook, *supra* note 11, at 1008 (providing a comprehensive treatment of the unique status of method claims in the patent landscape).

50. *Id.* at 1052.

this model is to understand how interactive method and system claims will be enforced. A broader use of this model may be to help scholars understand how the law reacts to advancements in technology. Finally, this Article suggests a realignment. Specifically, it argues that the perspective taken by the courts with respect to use of interactive invention claims is misaligned. Instead of element-by-element beneficial use, the focus should be on control and beneficial use as a whole, informed by our understanding of how to determine liability when multiple actors are involved.<sup>51</sup> As the lines between interactive systems and methods blur, the legal test for what it means to infringe each type of invention should converge. Convergence may lead to more consistent outcomes across these two technology domains.

Part I of this Article explains what interactive inventions are and defines the current “use” model for interactive system and method claims. Part II suggests changes to the “use” models developed in Part I. These changes acknowledge technological development in the area of interactive technologies and the need for clear rules that provide clarity for acquisition and enforcement of interactive technology patents. Finally, the Article concludes with suggestions for creating a more coherent liability model for interactive inventions.

In sum, this Article identifies interactive inventions as a superclass of inventions and proposes a framework for determining how the law should enforce them. It explains that because of technological advances, the distinction between interactive system and method claims has become less clear from a practical standpoint. This suggests that courts should no longer treat enforcement of patent claims directed to interactive systems and methods as completely separate doctrinal puzzles. Instead, the law can learn from the Federal Circuit’s struggle with interactive method claims to formulate a better approach for how interactive system claims should be enforced.

## I. CHARACTERISTICS OF INTERACTIVE INVENTIONS

How does the law determine when an interactive invention is used and therefore infringed? This part attempts to construct a “use” model for interactive inventions. Then, it compares and contrasts the “use” of interactive systems with that of interactive methods. The interactive use model is then placed in a larger context of multi-actor liability. But first, this part describes some of the technologies that may be classified as interactive inventions.

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51. *Id.* at 1058 (arguing in favor of the control and beneficial use test).

### A. *The Connected World*

Interactive technologies are used in a number of industries including the Internet, financial services businesses, and companies specializing in personalized medicine. In order to provide some practical context for the following theoretical discussion, this Section briefly describes some of the major classes of interactive technologies.<sup>52</sup>

#### 1. *Internet-Age Inventions*

Internet-age inventions can be characterized as inventions that make use of the Internet and its associated technologies—they often involve the participation of multiple parties. Divided infringement has a significant impact on internet-age inventions. In *Akamai/McKesson*, Judge Pauline Newman expressed a preference for formulating a divided infringement test that would allow owners of internet-age inventions to enforce their patents.<sup>53</sup> In contrast, some industry amici feared that too broad a test would unnecessarily put all participants in an internet transaction at risk.<sup>54</sup>

Specific applications of internet-age technology include wireless technology,<sup>55</sup> internet retail,<sup>56</sup> and financial services.<sup>57</sup> The financial services industry provides banking services to consumers<sup>58</sup> who may buy or sell goods using an internet retailer.<sup>59</sup> These industries have exploded in the last decade.<sup>60</sup> Internet retail use continues to grow in the United States with approximately 192 million users visiting, on average, over thirteen retail sites per month.<sup>61</sup> Financial services work globally to facilitate an estimated 10,000 transactions per second quickly and in a secure manner.<sup>62</sup>

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52. This section contains excerpts from: W. Keith Robinson, *Economic Theory, Divided Infringement, and Enforcing Interactive Patents*, 67 FLORIDA L. REV. 1961 (2015).

53. See *Akamai/McKesson*, 692 F.3d 1301, 1326 (Fed. Cir. 2012)(Newman, J., dissenting) (“The court should simply acknowledge that a broad, all-purpose single-entity requirement is flawed, and restore infringement to its status as occurring when all of the claimed steps are performed, whether by a single entity or more than one entity, whether by direction or control, or jointly, or in collaboration or interaction.”).

54. Financial Services Brief, *supra* note 19, at 16.

55. Wireless Association Brief, *supra* note 15, at 2.

56. Amici Curiae Internet Retailers’ Brief in Support of Defendant/Cross-Appellant’s En Banc Response Brief at 2, *Akamai Tech., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301 (Fed. Cir. 2012) (Nos. 2009-1372, 2009-1380, 2009-1416, 2009-1417), 2011 WL 3796786 [hereinafter *Internet Retailers Brief*].

57. See Financial Services Brief, *supra* note 19, at 3.

58. *Id.*

59. See Internet Retailers Brief, *supra* note 56, at 2.

60. *Id.* at 12.

61. *Id.*

62. See Financial Services Brief, *supra* note 19, at 4.

Growth in demand for financial services and internet retail has been driven in part by innovation and explosive growth in the wireless industry.<sup>63</sup> The United States has more mobile internet users than any other country in the world.<sup>64</sup> “Apps,” or applications that run on smart mobile devices, have also contributed to the growth of the wireless industry.<sup>65</sup> Mobile app sales generated over \$70 billion dollars in revenue in 2018.<sup>66</sup>

The global economy has become dependent upon this interconnected system of wireless devices, internet storefronts, and financial services.<sup>67</sup> Different companies and different systems must interact to provide consumers with the services they have come to expect.<sup>68</sup> For example, a credit card transaction can involve six or more participants.<sup>69</sup> Therefore, different companies in different technology areas may partner to provide connected web services.<sup>70</sup> Partnering is more efficient for these companies and allows them to specialize, which can result in higher-quality service.<sup>71</sup>

Due in part to the innovation taking place in this area, internet-age companies are targets of an increasing number of patent-infringement lawsuits.<sup>72</sup> For example, wireless carriers may be sued based on methods that make use of their network.<sup>73</sup> Internet retailers are also sued for patent infringement “based in part on the activities of their customers in visiting their websites.”<sup>74</sup> Because of the interactive and multi-participant nature of internet-age technology, the issue of di-

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63. See Wireless Association Brief, *supra* note 15, at 3–4 (“Advances in wireless technology have enabled explosive innovation in the last decade. Ten years ago, consumers used cell phones almost exclusively to make voice calls. Five years later, they were texting, sharing pictures, and surfing the Internet.”).

64. *Id.* at 8 (stating that 234 million or more Americans use mobile devices).

65. *Id.* at 4.

66. Mansoor Iqbal, *App Revenue Statistics*, BUSINESS OF APPS (Sept. 13, 2019), <https://www.businessofapps.com/data/app-revenues/#1>.

67. Financial Services Brief, *supra* note 19, at 4.

68. Wireless Association Brief, *supra* note 15, at 2.

69. Financial Services Brief, *supra* note 19, at 2.

70. See Wireless Association Brief, *supra* note 15, at 7 (“A good example is Sprint’s partnership with Google and others to launch the Google Wallet app earlier this spring. This app provides a ‘wave and pay’ service through which consumers can pay at stores by simply waving their phones over a scanner. The phones use a near field communications (‘NFC’) chip to communicate with the scanner. The service involved not only Google, but also Samsung (which incorporated the NFC chip in the phone), credit powerhouses Citi and MasterCard, merchant processing provider First Data, and Sprint to provide the necessary network connection.”).

71. *Id.* at 7.

72. Financial Services Brief, *supra* note 19, at 12.

73. Wireless Association Brief, *supra* note 15, at 10.

74. Internet Retailers Brief, *supra* note 56, at 1.

vided infringement is of deep concern to internet-age industry stakeholders.

In sum, although the Internet is no longer “new,” internet-age technology and applications of that technology continue to grow. Stakeholders in this industry must provide technology and applications that facilitate communication between multiple participants. Thus, divided infringement is a concern for this technology area. This is exacerbated by the fact that stakeholders in this area are the frequent targets of lawsuits. The next Section summarizes personalized medicine, another technology area that has seen significant growth and an uptick in legal activity in recent years.

## 2. *Personalized Medicine*

Personalized medicine is a relatively new field and includes a large number of small companies.<sup>75</sup> The stakeholders in personalized medicine technology include pharmaceutical, biotech, and genetic companies, institutions, and organizations.<sup>76</sup> These groups are also involved in the development of everything from agriculture applications to therapeutic healthcare products.<sup>77</sup>

Therapeutic healthcare products rely heavily on diagnostic tests.<sup>78</sup> These tests are used to obtain information about a patient’s molecular and genetic markers<sup>79</sup> associated with the risk of disease, the presence or absence of a disease, what a patient’s response will be to certain drug therapies, and other conditions.<sup>80</sup> Using this information, healthcare providers can provide patient-specific preventive care and treatment regimens that reduce healthcare costs.<sup>81</sup>

In order to provide these personalized services, the healthcare industry has become more efficient; in doing so, it has developed interactive systems and methods for performing certain processes.<sup>82</sup> For

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75. See Corrected Brief of Amicus Curiae Myriad Genetics, Inc., in Support of Neither Party at vii, *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301 (Fed. Cir. 2012) (Nos. 2009-1372, 2009-1380, 2009-1416, 2009-1417), 2011WL 3281836 [hereinafter *Myriad Amicus Brief*] (describing Myriad’s role in the personalized medicine industry).

76. See Amicus Curiae Brief of Biotechnology Industry Organization in Support of Neither Party at 1, *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301 (Fed. Cir. 2012) (Nos. 2009-1372, 2009-1380, 2009-1416, 2009-1417), 2011 WL 3101890 [hereinafter *Biotechnology Industry Amicus Brief*] (describing the role of biotechnology companies).

77. *Id.* at 1.

78. *Myriad Amicus Brief*, *supra* note 75, at 4.

79. *Id.*

80. *Id.*

81. *Id.*

82. Brief of Amicus Curiae Pharmaceutical Research and Manufacturers of America on Rehearing En Banc in Support of Neither Party at 5, *Akamai Techs., Inc. v. Limelight Networks,*

example, it may be more efficient for one actor to perform diagnostic testing and another actor to correlate a marker detected during the diagnostic test with a disease or drug treatment.<sup>83</sup> Similarly, new and innovative methods for medical treatment or drug delivery may require the participation of multiple healthcare providers and patients.<sup>84</sup>

“Interactive” personalized medicine has several real-world applications. For example, the *Prolaris*® test diagnoses a prostate tumor and correlates that diagnostic information with a patient to help healthcare providers decide how to treat prostate cancer.<sup>85</sup> Stakeholders in personalized medicine expect that similar applications—which allow users to store and manage healthcare data online and allow hospitals, insurance carriers, and healthcare providers to interact—will continue to grow.<sup>86</sup> Moreover, future treatment and diagnostic methods will continue to involve multiple actors.<sup>87</sup>

The doctrine of divided infringement is of particular interest to personalized medicine because “[t]he steps of biotechnology method patents are often capable of being practiced by separate entities.”<sup>88</sup> Further, it is extremely time-consuming and costly to develop personalized medicine applications.<sup>89</sup> Generally, the industry can only protect this large investment by claims covering the diagnostic and correlation processes of a personalized medicine product.<sup>90</sup> Personalized medicine stakeholders continue to develop novel and interactive methods for diagnosing and treating medical conditions.<sup>91</sup> An infringement framework that is adverse to the personalized medicine industry could render thousands of patents useless and reduce the incentive to invest in expensive and time-consuming research.<sup>92</sup>

### 3. *The Internet of Things*

In addition to personalized medicine, the Internet of Things (IoT) is an emerging field with numerous interactive applications. The IoT is a

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Inc., 692 F.3d 1301 (Fed. Cir. 2012) (Nos. 2009-1372, 2009-1380, 2009-1416, 2009-1417), 2011 WL 3101889 [hereinafter PhRMA Brief].

83. Myriad Amicus Brief, *supra* note 75, at viii.

84. Biotechnology Industry Amicus Brief, *supra* note 76, at 8–9.

85. Myriad Amicus Brief, *supra* note 75, at 6.

86. PhRMA Amicus Brief, *supra* note 82, at 10.

87. *Id.* at 11–12.

88. Biotechnology Industry Amicus Brief, *supra* note 76, at 8.

89. Myriad Amicus Brief, *supra* note 75, at 8–9.

90. *Id.* at 1–2.

91. PhRMA Brief, *supra* note 82, at 2.

92. *Id.* at 3.



platform of objects connected via a complex network.<sup>93</sup> The IoT has slowly grown as more smart devices become connected to the Internet.<sup>94</sup>

Several IoT technology stakeholders exist. They include, but are not limited to and: integrated circuit manufacturers, manufacturers of sensing equipment, network providers, system integrators, and service providers in addition to customers and users of IoT services.<sup>95</sup> What makes this platform appealing to technology stakeholders is its potential to facilitate human interaction with smart devices.<sup>96</sup> For legal observers, it is the multi-participant, interactive nature of this new platform that makes it important for those concerned with divided infringement issues.

Bruce Sterling, a science-fiction writer, popularized the idea of an IoT.<sup>97</sup> His vision predicted that physical objects connected to the Internet would be traceable in space and time.<sup>98</sup> In 2010, connected devices outnumbered human beings.<sup>99</sup> There were almost two connected devices for every one person.<sup>100</sup> In 2020 there will be an estimated 200 billion connected objects.<sup>101</sup> Technologies such as WiFi allow all these devices to connect and share information.<sup>102</sup> Accordingly, Sterling's vision is close to becoming a reality.

Generally, the IoT is defined as an “infrastructure of networked physical objects.”<sup>103</sup> This is a paradigm shift from the internet-age technology described above.<sup>104</sup> Particularly, instead of simply facilitating human interaction, the IoT allows devices to interact with the physical environment, gather information from that environment, and share that information with other devices, people, or environments.<sup>105</sup> Technologies and equipment—beyond the Internet itself—that pro-

93. Gerd Kortuem et al., *Smart Objects as Building Blocks for the Internet of Things*, IEEE INTERNET COMPUTING, Jan.–Feb. 2010, at 44, 44.

94. See Bello & Zeadally, *supra* note 9, at 1172.

95. Peng-fei Fan & Guang-zhao Zhou, *Analysis of the Business Model Innovation of the Technology of Internet of Things in Postal Logistics*, 2011 IEEE 532, 532.

96. Kortuem et al., *supra* note 93, at 50.

97. See generally BRUCE STERLING, *THE EPIC STRUGGLE OF THE INTERNET OF THINGS* (2014).

98. Kortuem et al., *supra* note 93, at 48.

99. See Bello & Zeadally, *supra* note 9, at 1172.

100. See *id.* (“By 2010, the number of devices connected to the Internet rose to 12.5 billion, while the world’s population increased to 6.8 billion . . .”).

101. *A Guide to the Internet of Things*, INTEL (last visited on Sept. 27, 2019), <https://www.intel.com/content/www/us/en/internet-of-things/infographics/guide-to-iot.html>.

102. Bello & Zeadally, *supra* note 9, at 1172.

103. Kortuem et al., *supra* note 93, at 44.

104. See Bello & Zeadally, *supra* note 9, at 1173 (“Akin to how humans are the users of the Internet, devices (things) are the users of the IoT.”).

105. *Id.* at 1172.

vide the platform for the IoT includes smart objects, information processing equipment, and device sensing equipment.<sup>106</sup>

The Internet has allowed people and things to become interconnected. The true power of the IoT is allowing smart objects to interact and collaborate with each other.<sup>107</sup> In other words, “devices are the users of the IoT network.”<sup>108</sup>

Because of its possible application in many daily activities, the IoT is a tremendous growth area for innovation. New and innovative routing protocols are needed to allow smart objects to communicate in real time.<sup>109</sup> Improvements need to be made in device-to-device communication.<sup>110</sup> Further, there is an opportunity to create business models and business methods that will make use of the IoT platform in new and innovative ways.<sup>111</sup> In sum, with the proliferation of connected devices, the IoT will affect every person from every walk of life.<sup>112</sup>

Stakeholders in IoT technology will most likely seek patents for their inventions. Thus, a coherent infringement framework should be a primary concern to patentees because of the interactive and collaborative nature of IoT.

### B. A “Use” Model for Interactive Inventions

This section attempts to develop a model of “infringement by use” for interactive inventions. The model provides context for the doctrinal problem this Article identifies and attempts to solve. First, this section discusses how “use” of an invention is defined for both interactive methods and systems. Then, this section attempts to synthesize these separate “use” doctrines into a coherent “use” model for interactive inventions. Unfortunately, this section concludes that such an effort proves to be futile.

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106. See Fan & Zhou, *supra* note 95, at 532 (“The Internet of Things which bases on the Internet, uses a variety of information sensing identification device and information processing equipment, such as RFID, GPS, GIS, JIT, EDI, and other devices to combine with the Internet to form an extensive network in order to achieve information and intelligence for Entity.”).

107. Kortuem et al., *supra* note 93, at 49.

108. Bello & Zeadally, *supra* note 9, at 1173.

109. *Id.*

110. See *id.* at 1173–74.

111. See, e.g., Fan & Zhou, *supra* note 95, at 535–36 (explaining that business models are needed to maximize the potential of the IoT in China).

112. *Id.* at 532.

### 1. “Use” of Inventions

Before discussing this Article’s efforts in setting forth a coherent model of “use,” it must describe what it means to “use” an invention generally. Direct infringement of a patented system occurs when a party “without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent . . . .”<sup>113</sup> Unauthorized use of an invention, by itself, is an act of infringement.<sup>114</sup>

Use is defined broadly as an act that puts a given invention into service.<sup>115</sup> This may include a “use” that is not intended or contemplated by the patentee.<sup>116</sup> Under certain circumstances, even a demonstration may constitute use of a claimed invention.<sup>117</sup> In contrast, mere possession of an invention is not use.<sup>118</sup> In sum, almost any non-passive activity is likely to qualify as use of an invention.

### 2. “Use” of Interactive Inventions

The law concerning use appears to be straightforward until one considers interactive inventions. Interactive inventions, broadly defined, are inventions that require interaction between more than one claimed components or the performance of claimed method steps by more than one actor. Interactive inventions have become more prominent in the last several decades with the advancement of the Internet and other connective technologies. Courts, in particular the Federal Circuit, have interpreted the law and created doctrines to explain how interactive inventions should be enforced. In particular, the Federal Circuit has spent a great deal of effort defining when an interactive method is used and therefore infringed.

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113. 35 U.S.C. § 271(a) (2012).

114. See CHISUM, *supra* note 21, § 16.02 (“In listing ‘using’ as one of the patentee’s basic rights, both Section 154(a)(1) and 271(a) use the disjunctive ‘or.’ 2 This codifies the long-standing rule that the use of a patented product without making or selling it will constitute infringement.”)

115. See *Bauer & Cie v. O’Donnell*, 229 U.S. 1, 11 (1913) (“The right to use is a comprehensive term and embraces within its meaning ‘the’ right to put into service any given invention.”); see also *NTP, Inc. v. Res. in Motion, Ltd.*, 418 F.3d 1282, 1319 (Fed. Cir. 2005), *cert. denied*, 546 U.S. 1157 (2006).

116. *Zinn v. Weiss*, 7 F. 914, 915–16 (C.C.E.D.N.Y. 1881).

117. CHISUM, *supra* note 21, § 16.02.

118. *Beidler v. Photostat Corp.*, 10 F. Supp. 628, 635 (W.D. N.Y. 1935), *aff’d*, 81 F.2d 1015 (2d Cir. 1936); see also *Johns Hopkins Univ. v. CellPro Inc.*, 152 F.3d 1342, 1345 (Fed. Cir. 1998).

a. “Use” of Interactive Methods<sup>119</sup>

In the last decade, the Federal Circuit has developed doctrines to address issues concerning inventions to interactive methods. One interesting point about this issue is that it affects the high-tech sector as well as the personalized medicine sector. Interactive methods as defined in this Article, are inventive methods that are performed by more than one actor. Enforcing claimed methods that either require more than one party, or are capable of being performed by one party, give rise to divided infringement problems. At the time of the writing of this Article, one could argue that after several years of fluctuation in the law, the Federal Circuit has arrived at a stable test for determining when an interactive method claim is infringed. It remains to be seen whether such a test will endure.

In interactive technologies, a scenario may arise where the activities of more than one party are involved in possibly infringing a patent. Third-party liability for patent infringement is addressed under the patent statute’s inducement and contributory infringement provisions.<sup>120</sup> However, another highly controversial doctrine referred to as divided infringement may also apply.<sup>121</sup>

Divided infringement deals with the question of whether there can be infringement liability when the performance of steps of a method claim is split among multiple actors.<sup>122</sup> The current rule states that there may be infringement liability when the steps of a method are performed by multiple actors if a single defendant “exercises ‘control or direction’ over the entire process such that every step is attributable to the controlling party.”<sup>123</sup> There may also be liability when an alleged infringer “conditions participation in an activity or receipt of a benefit upon performance of a step or steps of a patented method and establishes the manner or timing of that performance.”<sup>124</sup> Finally, an entity may be liable where actors form a joint enterprise.<sup>125</sup>

The current test for divided infringement represents a significant shift in the law from just over ten years ago. In 2007, liability for di-

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119. This section contains excerpts from W. Keith Robinson, *Emerging Technologies Challenging Current Legal Paradigms*, 19 MINN. J. L. SCI. & TECH. 355 (2018).

120. See 35 U.S.C. § 271(b)–(c) (2012).

121. See *Akamai/McKesson*, 692 F.3d 1301, 1325 (Fed. Cir. 2012) (Newman, J., dissenting) (acknowledging the doctrinal difficulties that arise when the acts of more than one party allegedly combine to infringe a method claim).

122. See *id.*

123. *Muniauction Inc. v. Thomson Corp*, 532 F.3d 1318, 1329 (Fed. Cir. 2008) (citing *BMC Res., Inc. v. Paymentech, LP*, 498 F.3d 1373, 1380–81 (Fed. Cir. 2007)).

124. *Akamai IV*, 797 F.3d 1020, 1023 (Fed. Cir. 2015).

125. *Id.*

vided infringement required a showing that one party directed or controlled another to perform the infringed method.<sup>126</sup> This “direction or control” test proved difficult to satisfy. Commentators viewed the test as a “loophole” for infringement.<sup>127</sup> Judge Newman famously lamented that interactive patents were unenforceable under the “direction or control” test.<sup>128</sup>

Two factors likely contributed to the court’s evolution. First, interactive technology has become increasingly prevalent. Second, the United States Patent and Trademark Office’s (USPTO) patent quality initiatives have influenced the Federal Circuit to expand the enforcement capability of valid interactive patents.<sup>129</sup> Currently, the USPTO’s Patent Trial and Appeal Board (PTAB) conducts hearings for reviewing and challenging granted patents on a number of grounds.<sup>130</sup> For example, inter partes review (IPR) is a proceeding for reviewing the patentability of one or more claims on novelty or non-obviousness grounds.<sup>131</sup> The post grant review (PGR) proceeding reviews the patentability of one or more claims of a granted patent on any ground of patentability, including eligibility under § 101 and whether the claims comply with the written description and enablement requirements.<sup>132</sup> Finally, the transitional program for covered business method patents (CBM) is a proceeding for reviewing the patentability of one or more claims in a business method patent.<sup>133</sup>

In combination with the *Alice Corporation v. CLS Bank International* decision, the threat of PTAB proceedings may have caused the quality of asserted interactive patents to rise.<sup>134</sup> Recent statistics sug-

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126. See *BMC Res.*, 498 F.3d at 1381.

127. See Long Truong, *After BMC Resources, Inc. v. Paymentech, L.P.: Conspiratorial Infringement as a Means of Holding Joint Infringers Liable*, 103 Nw. U. L. REV. 1897, 1918–19 (2009) (arguing that a legal loophole encourages actors to avoid infringement by entering into conspiracies to avoid liability).

128. See *Akamai/McKesson*, 692 F.3d 1301, 1326 (Fed. Cir. 2012) (Newman, J., dissenting).

129. *Patent Process Overview*, UNITED STATES PATENT AND TRADEMARK OFFICE (Nov. 11, 2014), <https://www.uspto.gov/patents-getting-started/patent-process-overview#step2>.

130. *Patent Trial and Appeal Board*, UNITED STATES PATENT AND TRADEMARK OFFICE (Mar. 20, 2018), <https://www.uspto.gov/patents-application-process/patenttrialandappealboard>.

131. *Inter Partes Review*, UNITED STATES PATENT AND TRADEMARK OFFICE (July 17, 2014), <https://www.uspto.gov/patents-application-process/appealing-patent-decisions/trials/inter-partes-review>.

132. *Post Grant Review*, UNITED STATES PATENT AND TRADEMARK OFFICE (July 17, 2014), <https://www.uspto.gov/patents-application-process/appealing-patent-decisions/trials/post-grant-review>.

133. *Business Methods*, UNITED STATES PATENT AND TRADEMARK OFFICE (May 29, 2019), <https://www.uspto.gov/patents-getting-started/patent-basics/types-patent-applications/utility-patent/patent-business.html>.

134. See 573 U.S. 208, 221 (2014) (concluding that method claims requiring generic computer implementation did not transform an abstract idea into a patent-eligible invention).

gest that PGR and CBM petitions challenging patent claims on patent eligibility grounds have a high likelihood of being granted.<sup>135</sup> Few, if any, claims challenged on patent eligibility grounds have survived CBM review.<sup>136</sup>

In sum, the law concerning enforcement of interactive claims has changed rapidly over the last decade. Patentees of IoT inventions face a higher bar of patentability. However, valid interactive patents are now more likely to be found infringed because of the Federal Circuit's expansion of the divided infringement doctrine.

Two observations contribute to the "use" model for interactive method inventions. First, it appears that the current test for divided infringement of method claims addresses both situations where claims are written to be infringed by more than one party and where claims are directed to a single infringer but can be performed by more than one party. In other words, the "use" model for interactive method claims focuses less on the intended use of the claimed method and more on whether all the claimed steps were performed by one or more parties. Second, the "use" model relies on the relationship between the parties to determine liability.

In determining the relationship between two or more parties, the Federal Circuit has established several criteria for determining when such a relationship might give rise to liability for direct infringement.<sup>137</sup> For example, a joint enterprise may occur where "there is (1) an agreement, express or implied, among the members of the group; (2) a common purpose to be carried out by the group; (3) a community of pecuniary interest in that purpose, among the members; and (4) an equal right to a voice in the direction of the enterprise, which gives an equal right of control."<sup>138</sup> Accordingly, the Federal Circuit has identified disfavored conduct and relationships that will give rise to liability when an interactive method claim is infringed. The next Section explores the law concerning use of system inventions and defines a framework for how infringement by use of system inventions is defined.

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135. *Patent Trial and Appeal Board Statistics*, UNITED STATES PATENT AND TRADEMARK OFFICE (Mar. 2017), [https://www.uspto.gov/sites/default/files/documents/AIA%20Statistics\\_March2017.pdf](https://www.uspto.gov/sites/default/files/documents/AIA%20Statistics_March2017.pdf).

136. *Id.*

137. *Akamai/McKesson*, 692 F.3d 1301, 1349 (Fed. Cir. 2012) (Linn, J., dissenting).

138. *Id.* (quoting RESTATEMENT (SECOND) OF TORTS § 491 cmt. c (1965)).

b. “Use” of Interactive Systems

Similar to interactive methods, much of the development in the law regarding interactive systems has involved technology that emerged after the Internet Age. This Section attempts to define a “use” model for interactive systems. In order to develop this model, this Section first describes the history of system inventions. It then examines how the courts have enforced interactive system inventions. This Section concludes by defining a model for use of interactive systems.

A system is a type of apparatus.<sup>139</sup> An apparatus is synonymous with a machine.<sup>140</sup> Thus, a system is a type of machine, i.e., a combination of tangible elements or components that work in concert to carry out a particular function.<sup>141</sup> One difference between a system and a machine is that a system’s components can exist in different locations.<sup>142</sup> The Federal Circuit has held that a system is used where “the system as a whole is put into service, i.e., the place where control of the system is exercised and beneficial use of the system obtained.”<sup>143</sup>

An interactive system is a system that is capable of being used by more than one actor. This may include (1) a system that requires multiple actors to function<sup>144</sup> or (2) a system where one or more components of the claimed system are not in the possession of the same actor.<sup>145</sup>

Similar to interactive method claims, interactive system claims invoke the divided infringement problem.<sup>146</sup> Courts have acknowledged that one way patentees can avoid divided infringement issues is to draft claims directed to a single actor.<sup>147</sup> In cases where the claims are

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139. *In re Walter*, 618 F.2d 758, 762 n.2 (C.C.P.A. 1980) (discussing claims directed to a seismic processing system); *see also* *Ex parte Fressola*, 27 [U.S.P.Q.2d] 1608, 1611 (Bd. Pat. App. & Int’f 1993) (“A ‘system’ is an ‘apparatus.’”).

140. 1 DONALD S. CHISUM, CHISUM ON PATENTS: A TREATISE ON THE LAW OF PATENTABILITY, VALIDITY AND INFRINGEMENT § 1.02 (LexisNexis 2019).

141. *In re Walter*, 618 F.2d at 762 n.2 (explaining that the system claim at issue was identical in substance to a method claim included in the same patent); *see also* *NTP, Inc. v. Res. in Motion, Ltd.*, 418 F.3d 1282, 1319 (Fed. Cir. 2005), *cert. denied*, 546 U.S. 1157 (2006) (explaining that the components of a system are used collectively).

142. *NTP*, 418 F.3d at 1317.

143. *Id.*

144. *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1309 (Fed. Cir. 2011).

145. *Centillion Data Sys., LLC v. Qwest Commc’ns Int’l, Inc.*, 631 F.3d 1279, 1283 (Fed. Cir. 2011).

146. *See* CHISUM, *supra* note 21, § 16.02 (6)(a)(iii).

147. *Uniloc*, 632 F.3d at 1309 (“That other parties are necessary to complete the environment in which the claimed element functions does not necessarily divide the infringement between the necessary parties. For example, a claim that reads ‘An algorithm incorporating means for receiving e-mails’ may require two parties to function, but could nevertheless be infringed by the single party who uses an algorithm that receives e-mails.”).

not drafted in this manner, the Federal Circuit has crafted a series of bespoke judicial rules to address varying factual scenarios.

As mentioned above, a unique characteristic of systems is that the components can operate in different locations. In *NTP, Inc. v. Research In Motion, Ltd.*, the Federal Circuit had to determine where a claimed system was used when part of the accused system was located in a foreign country.<sup>148</sup> The court found that a claimed system is used in the place where it is put into service and beneficial use of the system is obtained.<sup>149</sup>

Another factual issue may arise when the alleged infringer possesses one component of a multi-component system. For example, in *Centillion Data Systems, LLC v. Qwest Communications Intern., Inc.*, the patent at issue concerned a system that allowed telephone companies to deliver billing information to users.<sup>150</sup> The information was formatted so that the users could access that information via a personal computer.<sup>151</sup> The Federal Circuit found that where an alleged infringer possesses one part of a multi-part system, that system is infringed by an actor that puts the invention into service, controls the system, and receives a benefit from its operation.<sup>152</sup> However, the court also explained that an infringer did not have to have control over all the elements of a system in order to use the system.<sup>153</sup> Under this factual scenario, the Federal Circuit has recently narrowed its interpretation of use. Now when elements of a system are in the possession of more than one actor, infringement of the system occurs only if the accused infringer obtained a benefit from each and every element of the system.<sup>154</sup>

A third factual scenario that helps define the use model for interactive inventions is where the alleged infringer does not possess any part of the accused system but must act to put it into service. In a non-precedential opinion, the Federal Circuit suggested that in a situation where an accused infringer does not possess any elements of a claimed

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148. 418 F.3d 1282, 1313–14 (Fed. Cir. 2005).

149. *NTP*, 418 F.3d at 1317.

150. 631 F.3d 1279, 1281 (Fed. Cir. 2011).

151. *Centillion*, 631 F.3d at 1281.

152. *Id.* at 1285.

153. *Tech. Patents LLC v. T-Mobile UK, Ltd.*, 700 F.3d 482, 501 (Fed. Cir. 2012).

154. *Intellectual Ventures I LLC v. Motorola Mobility LLC*, 870 F.3d 1320, 1329 (Fed. Cir. 2017) (“In an analysis of a system claim under *Centillion*, proof of an infringing ‘use’ of the claimed system under § 271(a) requires the patentee to demonstrate that the direct infringer obtained ‘benefit’ from each and every element of the claimed system.”).



system but must act to put the system into service, “the alleged benefit should be tangible, not speculative, and tethered to the claims.”<sup>155</sup>

Based on the foregoing examples, we can develop a model for use of an interactive system claim that rises to the level of infringement. Interactive systems contemplate that each component will not be in the possession of the same actor. In addition, interactive systems contemplate that the system will require more than one actor to put into operation. The ultimate determinant of infringement of an interactive system claim appears to be whether the alleged infringer obtains a benefit from the system. Recent cases suggest that that benefit must be linked to each component of the system and be tangible.<sup>156</sup>

### c. An Incoherent “Use” Model for Interactive Inventions

This section briefly compares the “use” models the Article has thus far developed for interactive system and method claims. This section illustrates that the “use” models for interactive system and method claims are misaligned. Next, it discusses what implications we might draw from this misalignment. This section concludes that while differing doctrines for method and system claims is a logical result, the convergence of method and system claims due to interactive technologies makes this disparate treatment more problematic for inventions directed toward emerging technologies, such as the IoT.

Before reaching that conclusion, this Section must first explain the misalignment. Under the recently-minted *Akamai* framework, to determine when an interactive method claim is directly infringed, a threshold issue is whether each element of the asserted method claim is performed.<sup>157</sup> Next, the court looks at the multiple parties involved and determines liability based in part on the relationship between the alleged direct infringer and other actors.<sup>158</sup> If that relationship between them gives rise to liability under one of the established tests, then the accused infringer is liable for direct infringement. Several types of relationships may give rise to liability, including an agency relationship or a joint enterprise.<sup>159</sup> Thus, the law examines the collective conduct of all actors and then examines the relationship between them.

In contrast, the test for determining use of interactive systems is less concerned with the relationship between the actors required to use

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155. *Grecia v. McDonald’s Corp.*, 724 F. App’x 942, 947 (Fed. Cir. 2018).

156. *Id.*

157. *See Akamai IV*, 797 F.3d 1020, 1020 (Fed. Cir. 2015).

158. *Id.*

159. *Id.* at 1023.

the system. Instead, the court's analysis focuses on the accused infringer.<sup>160</sup> In doing so, the Federal Circuit explained that the accused infringer will only be liable for direct infringement if they used each and every component of the system and received a benefit from each and every component.<sup>161</sup> Thus, in contrast to the test for interactive method claims, the test for interactive system claims focuses only on the accused infringer.

As evidenced from the discussion above, the test for determining infringement liability when an interactive system is used by multiple actors is different from the test used for interactive method claims. Why might this be a problem and why should we care? In interactive method cases, a key focus is on the relationships between the alleged direct infringer(s). In interactive system cases, the court seems unconcerned with the relationships between actors that resulted in the offending conduct. This misalignment flows from the nature of the inventions and our understanding that system and method claims are treated differently.<sup>162</sup> However, the misalignment in the tests reveals a problem the courts will undoubtedly have to deal with in the future.

Interactivity is the future. The IoT is an example of emerging interactive technology that will blur the line between systems and methods. This Article does not argue that the tests should be consistent or the same. Instead, it argues first that the jurisprudence on the use of interactive system claims can be informed by the Federal Circuit's ten-year experience with divided infringement litigation. Note that "informed" does not necessarily mean "followed." Instead, this Article suggests that some useful insights from the divided infringement problem can be applied to the use of interactive systems. Second, this Article suggests that both tests for use of interactive system and method claims should evolve around a set of predictable principles.

This section described a use model for interactive inventions. Specifically, it defined a use model for both interactive method and system inventions. This section then explained how the use models for infringement of interactive methods and systems are different. Finally, Section A explained reasons why the use models might be different and suggested a path forward that may lead to more coherency between the two models. Next, in an attempt to arrive at more coherency between the two models, Section C discusses the tort origins of secondary liability. This brief detour will provide the reader with the necessary tools for supporting this Article's argument for a more uni-

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160. *Centillion*, 631 F.3d 1279 at 1285.

161. *Intellectual Ventures*, 870 F.3d at 1329.

162. *Holbrook*, *supra* note 11, at 1003.

form approach to enforcement of interactive patents against multiple actors.

### C. Principles of Multi-Party Liability

In resolving infringement issues, patent law often draws upon tort law.<sup>163</sup> A guiding principle is that a plaintiff will not be barred from recovery because of the acts of a third party.<sup>164</sup>

For example, in crafting its divided infringement doctrine, the Federal Circuit relied on principles of vicarious liability. Specifically, in *Muniauction, Inc. v. Thomson Corp*, the court held that a party that partly performs steps of a claimed method may be liable for direct infringement if it would be vicariously liable for the actions of one or more parties that completed the steps of the claimed method.<sup>165</sup>

The dissent in *Akamai/McKesson* proposed an alternative approach that nevertheless found its roots in tort law. According to Judge Newman's proposed test, one or more parties infringe a method claim if all its steps are performed.<sup>166</sup> After having determined that there was infringement, Judge Newman proposed that liability for infringement by multiple parties should be assessed using tort principles of apportionment.<sup>167</sup> The apportionment calculus would consider factors such as an entity's relative contribution to the injury, the economic benefit received by the infringer, and the knowledge or culpability of the contributory infringer.<sup>168</sup>

This Section briefly summarizes how tort law concepts influenced the development of common law contributory infringement. Common law contributory infringement provided the earliest framework for dealing with multi-actor liability problems. Before the Patent Act of 1952, courts categorized patent infringement as (1) direct infringement or (2) contributory infringement under a theory of joint

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163. Ted Sichelman, *Patent Law Revisionism at the Supreme Court?*, 45 LOY. U. CHI. L.J. 307, 313 (2013) ("Drawing on principles from the common law of torts, the court found that the defendants 'have done this for the express purpose of assisting, and making profit by assisting, in a gross infringement of the complainants' patent.'").

164. RESTATEMENT (SECOND) OF TORTS, § 485 (1979).

165. 532 F.3d 1318, 1329–30 (Fed. Cir. 2008) (citing *BMC Res., Inc. v. Paymentech, LP*, 498 F.3d 1373, 1380–81 (Fed. Cir. 2007)).

166. *Akamai/McKesson*, 692 F.3d 1301, 1326 (Fed. Cir. 2012) (Newman, J., dissenting) ("The court should acknowledge that an all-purpose single-entity requirement is flawed, and restore direct infringement to its status as occurring when all of the claimed steps are conducted, whether by a single entity or in interaction or collaboration.").

167. *Id.* at 1331.

168. *Id.* ("Remedy for infringement may be apportioned on such traditional tort factors as the relative contribution to the injury to the patentee, the economic benefit received by the tortfeasor, and the knowledge and culpability of the actor.").

tortfeasance.<sup>169</sup> What are now known as inducement and contributory infringement were conceptualized as just contributory infringement.<sup>170</sup> Under this early formulation of contributory infringement, “one who intentionally caused, or aided and abetted, the commission of a tort by another was jointly and severally liable with the primary tortfeasor.”<sup>171</sup> As illustrated below, factors that assisted early courts in determining whether there was contributory infringement were concerted action, intent, and the nature of the relationship between the parties.

### 1. *The Relationship between the Parties*

As early as 1824, the Supreme Court recognized that the relationship between alleged joint tortfeasors was a factor in determining infringement liability.<sup>172</sup> In *Keplinger v. De Young*, the Supreme Court agreed with a lower court instruction that there could be no infringement if the defendant had no other connection with a user of the patented machine than a purchase contract.<sup>173</sup> However, the Court acknowledged the possibility that there might be liability if there was evidence of more of a connection than the purchase contract or if the parties involved were attempting to evade the law.<sup>174</sup> Thus, in addition to the relationship between relevant actors, an inquiry as to whether the parties were attempting to evade the law suggests that the Supreme Court would consider other factors related to how or why infringement occurred.<sup>175</sup>

### 2. *Concerted Action*

Before the Patent Act of 1952, most courts adhered to the principal that (1) whoever uses a patent without permission is an infringer and (2) whoever contributes to such use is an infringer.<sup>176</sup> *Wallace v. Holmes* is a notable case that applies common law principles of joint tortfeasance in the context of patent infringement.<sup>177</sup> The plaintiff in *Wallace* alleged that the defendant infringed a patent for an improve-

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169. See *Hewlett-Packard Co. v. Bausch & Lomb*, 909 F.2d 1464, 1469 (Fed. Cir. 1990).

170. *Global-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 761 (2011) (“Before 1952, both the conduct now covered by § 271(b) (induced infringement) and the conduct now addressed by § 271(c) (sale of a component of a patented invention) were viewed as falling within the overarching concept of ‘contributory infringement.’”).

171. *Hewlett-Packard*, 909 F.2d at 1469.

172. See *Keplinger v. De Young*, 23 U.S. 358 (1825).

173. *Id.* at 363.

174. See *id.*

175. See *id.*

176. See CHISUM, *supra* note 21, § 17.02.

177. 29 F. Cas. 74 (C.C.D. Conn. 1871); see also *id.*

ment of a lamp.<sup>178</sup> The patent claimed a burner and a chimney that were combined to form the improved lamp.<sup>179</sup> The defendants asserted that they did not infringe any of the claims of the patent on the grounds that they only made and sold some of the parts of the lamp.<sup>180</sup> Specifically, the defendants manufactured the lamp burner and left it to purchasers of the burner to supply the chimney.<sup>181</sup> The defendants argued, “where a patent is for a combination merely, it is not infringed by one who uses one or more of the parts, but not all, to produce the same results, either by themselves, or by the aid of other devices.”<sup>182</sup> The court acknowledged that the rule articulated by the defendant was well settled.<sup>183</sup> However, the court rejected application of the rule to the facts at issue.<sup>184</sup> Instead, the court stated that if, in concert, the defendant made the burner and a third party provided the chimney then they must be deemed joint infringers.<sup>185</sup> The court noted that while there was no evidence that the defendants prearranged with a third party to combine its burner with a chimney, every sale of the burner made by the defendant was a proposal to the purchaser to supply the chimney.<sup>186</sup> In turn, the purchaser, by purchasing the burner, consented to supplying or causing the chimney to be supplied to the burner.<sup>187</sup> Thus, based solely on their actions, the court concluded that the manufacturer of the burner and the customer purchasing the burner for combination with a chimney were “active parties to the whole infringement.”<sup>188</sup>

### 3. *Intent*

Alternatively, in other early contributory infringement cases, courts considered the intent of the relevant actors.<sup>189</sup> Generally, these cases concerned the sale of generic components for use in a patented article.<sup>190</sup> One early case dealing with contributory infringement, *Henry v. A.B. Dick Co.*, held that there must be some intent (inferred or other-

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178. *Wallace v. Holmes*, 29 F. Cas. 74, 77 (C.C.D. Conn. 1871).

179. *Id.* at 78–79.

180. *Id.*

181. *Id.* at 79–80.

182. *Id.* at 80.

183. *Id.*

184. *Wallace v. Holmes*, 29 F. Cas. 74, 80 (C.C.D. Conn. 1871).

185. *Id.*

186. *Id.*

187. *Id.*

188. *Id.*

189. *See Henry v. A.B. Dick Co.*, 224 U.S. 1, 32–33 (1912).

190. *Id.*; *see Chisum*, *supra* note 21, § 17.02; *Thomson-Houston Electric Co. v. Ohio Brass Co.*, 80 F. 712, 723 (6th Cir. Ohio 1897).

wise) on the part of a seller to have the sold article used in an infringing way.<sup>191</sup> Subsequent cases found no liability where a component sold by an alleged infringer had other uses in addition to being used in a patented combination.<sup>192</sup>

However, this principle was limited by the court in *Thomson-Houston Electric Co. v. Ohio Brass Co.*<sup>193</sup> There, the court stated that liability could be found if the plaintiff could affirmatively show that the defendant seller intended to assist in the infringement.<sup>194</sup> The court said that intent could be shown by knowledge or indifference by the defendant as to the consequences of its act.<sup>195</sup> Subsequent decisions found contributory infringement where the sale of components was accompanied by active inducement in the form of instructions, advertising, or other steps indicating intent by the defendant that the component be used in an infringing fashion.<sup>196</sup>

In sum, early courts considered the actions of the parties, intent of the parties, and the nature of the relationship between the parties as factors in determining whether more than one party infringed a patent. Congress codified the common law in the Patent Act of 1952.<sup>197</sup> While some of the general principles established by the courts remained, Congress narrowed their application to specific situations.<sup>198</sup>

#### D. Summary

This part began by describing examples of interactive technology. Many interactive inventions are directed to emerging industries such as the IoT and personalized medicine. These technologies represent huge growth opportunities for existing companies as well as fertile ground for new startups.

This part then attempted to define a “use” model for interactive inventions. The model describes how the law determines when a claim to an interactive invention is infringed by use. Then, it compared and contrasted “use” of interactive systems with that of interactive methods. The interactive “use” model was then placed in a larger context of multi-actor liability.

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191. See *Henry*, 224 U.S. at 17; CHISUM, *supra* note 21, § 17.02; *Thomson-Houston*, 80 F. Cas. at 723.

192. See CHISUM, *supra* note 21, § 17.02.

193. *Thomson-Houston*, 80 F. Cas. at 723.

194. *Id.*

195. See *Thomson-Houston*, 72 F. Cas. at 1018.

196. See CHISUM, *supra* note 21, § 17.02.

197. See 35 U.S.C. § 271 (2012).

198. See *id.* § 271 (b)–(c) including the words “knowingly” and “actively.”

This Part observed that the Federal Circuit’s interpretation of “use” of an interactive system is problematic. This problem is caused by the court’s attempt to apply an outmoded framework to interactive inventions. Part II further explores this tension and suggests a more consistent approach for defining use of a distributed system invention. Inconsistency in how interactive inventions will be enforced could, in part, stifle these burgeoning industries.

## II. ENFORCING INTERACTIVE INVENTIONS

As identified in this Article above, interactive inventions are systems or methods that are capable of being infringed by one or more actors. Part I defined the current infringement framework for interactive inventions. This framework is ill-suited to deal with these particular types of inventions. Specifically, requiring that an alleged infringer benefit from each element of a system claim severely weakens system patents.

The goal of Part II is to suggest a more coherent approach for analyzing multi-actor infringement liability of interactive system inventions. In order to do this, Part II first argues for a shift in perspective. That is, it is time to view interactive inventions as different and apart from traditional method or system inventions. Similar to interactive method claims, interactive system claims present unique challenges to courts given the statutory infringement framework. Despite presenting similar problems for multi-actor infringement, current jurisprudence narrowing enforcement opportunities for interactive system patents is at odds with the broadening of enforcement parameters for interactive method claims.

Second, Part II proposes a framework for treating problems that arise from multi-actor liability in a manner that balances the notice function of patents with the ability to enforce interactive inventions. The proposed framework, informed by the Federal Circuit’s last decade of divided infringement decisions, relies on traditional principles for multi-actor liability. As a result, Part II argues that a direct infringer uses a system when it controls the system and obtains a benefit from it. Further, both the “use” and “benefit” requirements should be evaluated under existing principles for multi-actor liability. This approach is more consistent with the Federal Circuit’s recent expansion of the divided infringement doctrine for interactive method claims. Consistency in the court’s understanding of what it means to use interactive methods and systems is valuable because the line between system and method claims is blurring.

### A. *The Challenge of Interactive Inventions*

Interactive inventions exist in a doctrinal void. Interactive system claims present unique challenges to courts given the statutory infringement framework. Interactive system claims can be used by one or more users, but the infringement statute contemplates a single user.<sup>199</sup> Third-party liability as defined in the statute does not apply to multi-party users of an interactive system. The growing number of cases where the court has to make up new rules is evidence of these new challenges. This section, provides evidence in support of the aforementioned reasons.<sup>200</sup>

Interactive system claims can be used by one or more users but the infringement statute contemplates a single user.<sup>201</sup> The “single entity” rule states that direct infringement under § 271(a) requires a showing that a single party practiced each and every element of the claimed invention.<sup>202</sup> The “single entity” rule is closely related to the “All-Limitations” rule and is used in direct infringement determinations.<sup>203</sup> One commentator has asserted that the “single entity” or “Single Actor” rule is a corollary to the “All-Limitations” rule and that the “whoever” in the language of § 271 “refers to only a single, individual entity.”<sup>204</sup> Thus, under the “single entity” rule, “whoever” refers to only a single, individual entity for the purposes of direct infringement.<sup>205</sup>

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199. *Id.*

200. This section contains excerpts from W. Keith Robinson, No “Direction” Home: An Alternative Approach to Joint Infringement, 62 AM. U. L. REV. 59 (2012), and W. Keith Robinson, *Only a Pawn in the Game: Rethinking Induced Patent Infringement*, 32 SANTA CLARA H. TECH. L. J. 1 (2015).

201. 35 U.S.C. § 271 (2012).

202. See *BMC Res., Inc. v. Paymentech, L.P.*, 498 F.3d 1373, 1380 (Fed. Cir. 2007) (“Infringement requires, as it always has, a showing that a defendant has practiced each and every element of the claimed invention.”), *overruled by Akamai Tech., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301 (Fed. Cir. 2012) (en banc) (per curiam).

203. See Joshua P. Larsen, Seminar Article, *Liability for Divided Performance of Process Claims After BMC Resources, Inc. v. Paymentech, L.P.*, 19 DEPAUL J. ART TECH. & INTELL. PROP. L. 41, 49–50 (2008) (examining the importance of the “All Limitations Rule” which defined the scope of a patent by requiring that each step be performed to prove infringement).

204. See *id.* at 50–51 (arguing that the “single actor” and “All-Limitations” rules act as corollaries for direct infringement cases); see also 35 U.S.C. § 271(a) (“[W]hoever without authority makes, uses, offers to sell, or sells any patented invention, . . . infringes the patent.”); *BMC Res.*, 498 F.3d at 1378–79 (“Direct infringement requires a party to perform or use each and every step or element of a claimed method or product. For process patent or method patent claims, infringement occurs when a party performs all of the steps of the process.”) (internal citations omitted).

205. *Id.*



Direct infringement requires a party to perform or use each and every step or element of a claimed method or product.<sup>206</sup> Since direct infringement is a strict liability offense, a showing of intent and/or knowledge of the patent is not required.<sup>207</sup> That is, under direct infringement, independent creation is not a defense and the infringement may be unintentional and inadvertent.<sup>208</sup>

*BMC Resources, Inc. v. Paymentech, L.P.*, held that indirect infringement (inducement and contributory infringement) requires a finding that a party amongst the accused actors has committed the entire act of direct infringement.<sup>209</sup> Further, to succeed in an action for inducement or contributory infringement, *BMC* held that a plaintiff must first show that direct infringement under § 271(a) has occurred.<sup>210</sup> In *Akamai II* the Federal Circuit overruled the portion of *BMC* that applied the “single entity” rule to the determination of infringement based on an inducement theory.<sup>211</sup> However, it is important to note that the Federal Circuit’s decision in *Akamai II* seems to have left the “single entity” rule intact with respect to direct infringement.<sup>212</sup> Accordingly, since the “single entity” rule still applies to direct infringement, it is important to study its origin.

In formulating the “single entity” rule, the court in *BMC* relied on language in several cases that was not necessarily applicable to identifying a single infringer.<sup>213</sup> For example, *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*,<sup>214</sup> stands for the proposition that the doctrine of equivalents, like literal infringement, must be tested element

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206. See *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997) (requiring an “objective inquiry on an element-by-element basis”); *Joy Techs., Inc. v. Flakt, Inc.*, 6 F.3d 770, 773 (Fed. Cir. 1993) (finding that merely selling the equipment to perform the step in a process is insufficient to prove infringement and requiring the infringer to perform the process as well).

207. See *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1519 (Fed. Cir. 1995) (en banc) (per curiam), *rev’d on other grounds*, 520 U.S. 17 (1997) (the infringer does not even have to know of the existence of the patent); see *Warner-Jenkinson*, 520 U.S. at 35 (noting that knowledge may be considered as part of damages but not liability for infringement).

208. See *Blair v. Westinghouse Elec. Corp.*, 291 F. Supp. 664, 670 (D.D.C. 1968) (emphasizing that independent design elements or modifications may show the infringer intended to avoid liability), *aff’d per curiam sub nom. Blair v. Dowd’s, Inc.* 438 F.2d 136, 136 (D.C. Cir. 1970).

209. 498 F.3d at 1378–79.

210. *Id.*

211. *Akamai/McKesson*, 692 F.3d 1301, 1308–09 (Fed. Cir. 2012).

212. *Id.* (stating that there can be liability for induced infringement where all the steps are not performed by a single entity).

213. See *BMC Res., Inc. v. Paymentech, L.P.*, 498 F.3d 1373, 1378 (evaluating the facts under a looser standard and coming to the same conclusion), *overruled by Akamai Tech., Inc. v. Lime-light Networks, Inc.*, 692 F.3d 1301 (Fed. Cir. 2012) (en banc) (per curiam).

214. 520 U.S. 17, 40 (1997).

by element.<sup>215</sup> Courts have repeatedly held that a process claim is directly infringed when the process is performed.<sup>216</sup> In *Dennison Manufacturing Co. v. Ben Clements & Sons, Inc.*,<sup>217</sup> the court stated that the test of infringement is whether the claimed process is utilized by the infringer.<sup>218</sup> Accordingly, none of these cases explicitly state that a “single entity” must perform each and every step of a claimed method to be a direct infringer.

Further, in an attempt to weaken the “single entity” rule, one amicus curiae in *Akamai II* asserted that the word “whoever” in § 271 can mean more than one person.<sup>219</sup> Statutory interpretation may indirectly support this definition. Specifically, “whoever invents” refers to more than one inventor.<sup>220</sup> Further, § 1 of the United States Rules of Construction states that, “words importing the singular include and apply to several persons, parties, or things.”<sup>221</sup> Accordingly, one could conclude that the word “whoever” should not be limited to mean a single entity.<sup>222</sup>

Despite the “all elements” and “single entity” rules seemingly requiring the identification of a single infringer for direct infringement, courts have recognized that some form of joint infringement may occur, and, therefore, joint liability should be assigned. For example, the court in *Heaton-Peninsular Button-Fastener Co. v. Eureka Specialty Co.*, stated that when patent infringement is brought about by a “con-

215. *Id.* (“The determination of equivalence should be applied as an objective inquiry on an element-by-element basis.”).

216. *Dennison Mfg. Co. v. Ben Clements & Sons, Inc.*, 467 F. Supp. 391, 427 (S.D.N.Y. 1979); see *Joy Techs., Inc. v. Flakt, Inc.*, 6 F.3d 770, 773 (Fed. Cir. 1993) (“The sale of the apparatus in *Standard Havens* was not a direct infringement because a method or process claim is directly infringed only when the process is performed.”); see also *Atl. Thermoplastics Co. v. Faytex Corp.*, 970 F.2d 834, 836 (Fed. Cir. 1992) (holding that a defendant who did not manufacture a product could not infringe a product-by-process claim).

217. *Dennison*, 467 F. Supp. at 427.

218. *Id.* at 427 (“To be a direct infringer of the method claims, defendant must be found to have used the attachments in question in the manner prescribed in the method claims.”).

219. Brief of Amicus Curiae Pharmaceutical Research and Manufacturers of America on Rehearing En Banc in Support of Neither Party, *Akamai Tech., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301 (Fed. Cir. 2012) (No. 2010-1291), 2011 WL 3101831, at \*18–19 [hereinafter Amicus Brief for Neither Party] (arguing that “whoever” in § 271(a) must be able to mean more than one person).

220. See *id.* (asserting that 1 U.S.C. § 1 and common dictionary definitions strongly suggest that “whoever” must have a possible plural interpretation).

221. 1 U.S.C. § 1 (2006).

222. *Amicus Brief for Neither Party*, *supra* note 219, at 18–19 (“On its face, this statutory prohibition is directed to ‘whoever’ has engaged in infringing conduct and says nothing about whether such conduct is to be carried out by a single entity or a group of entities acting in concert with one another.”). But see *Akamai/McKesson*, 692 F.3d 1301, 1347–48 (Fed. Cir. 2012) (Linn, J., dissenting) (arguing that the use of the word “whoever” simply means that more than one entity can be independently liable for direct patent infringement).

cert of action,” all parties engaged directly and intentionally are joint infringers.<sup>223</sup> In addition, several courts have recognized that joint liability may be imposed when infringement is the result of the participation and combined actions of defendants.<sup>224</sup> Moreover, courts have held that infringement of a patented method cannot be avoided by defendants that have another party perform a step of the method on their behalf.<sup>225</sup>

Third-party liability is defined in the Patent Statute as either inducement or contributory infringement.<sup>226</sup> In 1952, Congress defined how a patent could be indirectly infringed by enacting § 271 (b) and (c) of the Patent Act. Both sections (b) and (c) codified pre-1952 case law concerning indirect infringement.<sup>227</sup> An important right conferred with a patent is the capability of enforcing the patent against indirect infringers.<sup>228</sup> The purpose of indirect infringement as a cause of action “is to provide a remedy for patent holders when it is impossible or inefficient for them to sue direct infringers, and to deter parties from engaging in behavior that may result in the infringement of a patent.”<sup>229</sup> For example, in some cases the direct infringer is a purchaser or user who is judgment proof or a future consumer.<sup>230</sup> Therefore, it is economically and commercially infeasible for the patent owner to sue this type of consumer for direct infringement.<sup>231</sup> However, the party

223. 77 F. 288, 297 (6th Cir. 1896).

224. See, e.g., *Mahurkar v. C.R. Bard, Inc.*, 75 U.S.P.Q.2d (BNA) 1125, 1129 (N.D. Ill. Feb. 13, 2003) (agreeing that the joint infringer theory is viable under § 271(a)); see *McDermott v. Omid Int'l*, 723 F. Supp. 1228, 1236 (S.D. Ohio 1988) (holding that the defendants are jointly liable when the infringement was the result of the “participation and combined actions of the defendants”), *aff'd per curiam sub nom.*, *McDermott v. Omid Int'l*, 883 F.2d 1026, 1026 (6th Cir. 1989).

225. *Shields v. Halliburton Co.*, 493 F. Supp. 1376, 1389 (W.D. La. 1980), *aff'd*, 667 F.2d 1232 (5th Cir. 1982); see also *Crowell v. Baker Oil Tools, Inc.*, 143 F.2d 1003, 1004 (9th Cir. 1944) (“It is obvious that one may infringe a patent if he employ an agent for that purpose or have the offending articles manufactured for him by an independent contractor.”); *Metal Film Co. v. Metlon Corp.*, 316 F. Supp. 96, 110 n.12 (S.D.N.Y. 1970) (“That defendants choose to have the vacuum metallizing, which was a conventional step . . . done by outside suppliers does not mitigate their infringement of the overall process.”).

226. 35 U.S.C. § 271(b)–(c) (2012).

227. *CHISUM*, *supra* note 21, § 17.04(3).

228. See Michael N. Rader, *Toward a Coherent Law of Inducement to Infringe: Why the Federal Circuit Should Adopt the Hewlett-Packard Standard for Intent Under § 271(b)*, 10 FED. CIR. B.J. 299, 300 (2000).

229. Jason A. Rantanen, *An Objective View of Fault in Patent Infringement*, 60 AM. U. L. REV. 1575, 1591 (2011); see also Mark A. Lemley, *Inducing Patent Infringement*, 39 U.C. DAVIS L. REV. 225, 228 (2005) (“The goal of secondary liability is to give patent owners effective protection in circumstances in which the actual infringer either is not the truly responsible party or is impractical to sue.”).

230. Odin B. Roberts, *Contributory Infringement of Patent Rights*, 12 HARV. L. REV. 35, 39 (1898).

231. See Rader, *supra* note 228, at 306.

who encouraged or aided in the direct infringement may be more culpable than the end consumer and direct infringer.<sup>232</sup>

Because of the nature of a cause of action under indirect infringement, certain scienter standards must be met by the indirect infringer to support a finding of liability. The scienter standard codified in the statute is based on historical precedent.<sup>233</sup> While ambiguous on its face, the Supreme Court has held that liability under both § 271(b)<sup>234</sup> and (c)<sup>235</sup> require that the accused indirect infringer have had knowledge of the patent.<sup>236</sup> Further, commentators and the Supreme Court have characterized inducement as having an even greater scienter requirement than contributory infringement because liability under § 271(b) also requires that the alleged inducer have intended to cause the infringement.<sup>237</sup>

As mentioned above, the law characterizes indirectly infringing activities as either inducement or contributory infringement.<sup>238</sup> Contributory infringement generally concerns selling or providing a component that is then used to infringe a patent.<sup>239</sup>

Contributory infringement is defined in § 271(c) of the Patent Act.<sup>240</sup> In contrast to the inducement statute, § 271(c) defines the conduct that could subject an alleged contributory infringer to liability in detail.<sup>241</sup> For example, the statute specifies that the selling or importation of a component (1) of a patented item or (2) for use in a patented

232. See Lemley, *supra* note 229, at 226.

233. See Sichelman, *supra* note 163, at 309 (“[C]ourts have read both indirect infringement provisions as including scienter thresholds.”).

234. 35 U.S.C. § 271(b) (2012) (“Whoever actively induces infringement of a patent shall be liable as an infringer.”).

235. *Id.* § 271(c) (“Whoever offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer.”).

236. See Sichelman, *supra* note 163, at 309–10.

237. See *id.* at 341; see also *Commil USA, LLC v. Cisco Sys. Inc.*, 135 S. Ct. 1920, 1926–28 (2015) (clarifying that liability for inducement requires proof that the defendant knew her acts infringed the asserted patent).

238. See Sichelman *supra* note 163, at 309 (“Contributory infringement and inducement of infringement fall under the general rubric known as ‘indirect infringement.’”).

239. See Lemley, *supra* note 229, at 227.

240. See 35 U.S.C. § 271(c) (“Whoever offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer.”).

241. *Id.*

process is contributory infringement if the component constitutes a material part of the invention and is not a staple article of commerce.<sup>242</sup> Further, the alleged infringer is required to know that the component was especially made or adapted for use in infringing the asserted patent.<sup>243</sup>

The concept of contributory infringement was fleshed out at common law well before it was codified in the Patent Act. In *Wallace v. Holmes*, a court held, for the first time, that a defendant could be liable for infringement by supplying a component for use in an infringing device.<sup>244</sup> The patent at issue covered a 19th century lamp which included a burner and a chimney. The defendants only made and sold the burner, which had no other use than to be combined with a chimney.<sup>245</sup> Customers purchased the burner and combined it with a chimney, the combination of which infringed the asserted patent.<sup>246</sup>

While the court stated that simply selling the burner was not infringement, it nevertheless held the defendants liable for aiding and abetting infringement of the patent.<sup>247</sup> One reason the defendants were found to be liable was because they had the intent to make the burner so that it would be combined with a component supplied by consumers.<sup>248</sup> However, as one commentator has argued, it is questionable whether the court in *Wallace* also required knowledge of the patent.<sup>249</sup>

Later courts have fleshed out the scienter requirements for contributory infringement. Liability for contributory infringement now requires an examination of the alleged contributory infringer's knowledge and intent.<sup>250</sup> In *Aro Mfg. Co. v. Convertible Top Replacement Co.*, (*Aro II*) the Supreme Court determined that for there to be liability for contributory infringement, the defendant must have known about the patent and, by their actions, intended to infringe the

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242. *Id.*

243. *Id.*

244. 29 F. Cas. 74, 80 (C.C.D. Conn. 1871).

245. *See id.* at 79; *see also* Rader, *supra* note 228, at 305 (“Contributory infringement was Congress’s response to the problem of *Wallace v. Holmes*, in which the intent of the defendant to infringe is manifest from the fact that the product sold has no substantial non-infringing uses.”).

246. *See Wallace*, 29 F. Cas. at 79–80.

247. *See id.*; *see Rantanen, supra* note 229, at 1593.

248. *See Wallace*, 29 F. Cas. at 80; Roberts, *supra* note 230, at 37.

249. *See Sichelman, supra* note 163, at 313 (“Although the *Wallace* court’s test might casually be read to require knowledge of the patent, the court held that scienter turned on the ‘certain knowledge that such burners are to be used, as they can only be used, by the addition of a chimney.’”).

250. *DSU Med. Corp. v. JMS Co. Ltd.*, 471 F.3d 1293, 1306 (Fed. Cir 2006) (“[I]nducement requires that the alleged infringer knowingly induced infringement and possessed specific intent to encourage another’s infringement.”).

patent.<sup>251</sup> That is, the defendant must have intended to cause the actual infringement.<sup>252</sup>

While contributory infringement is designed as an alternative way in which a patentee can enforce their patent rights, the concept of contributory infringement does present some interesting challenges. Most of the technology that is the subject of complex Internet Age patents had yet to be conceived when both *Wallace* and *Aro II* occurred.<sup>253</sup> Further, Internet Age technology did not exist in the 1950s when Congress wrote the statute. Thus, as one commentator has argued, the statute seems “ill-equipped” to handle modern day technologies.<sup>254</sup>

In contrast to contributory infringement, induced infringement is much broader. It encompasses any behavior where one party encourages or assists another to directly infringe a patent.<sup>255</sup> However, as discussed below, that breadth has led to difficulty in interpreting the requirements for induced infringement.

Theoretically, any conduct that is not captured by contributory infringement that was actionable before 1952 is now covered by inducement under § 271(b) of the Patent Act.<sup>256</sup> Induced infringement imposes liability on an actor who causes another to directly infringe a patent.<sup>257</sup> Examples of inducement can include providing advice or instructions that assists in direct infringement, repairing infringing devices, or otherwise controlling another’s infringing activities.<sup>258</sup> The plaintiff must show (1) that the induced conduct constitutes direct infringement and (2) that the defendant had the requisite intent.<sup>259</sup> The requisite intent includes a showing that the defendant had knowledge

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251. See 377 U.S. 476, 525 (1964) (Black, J., dissenting); see Josh Rychlinski, *Interactive Methods and Collaborative Performance: A New Future for Indirect Infringement*, 20 MICH. TELECOMM. & TECH. L. REV. 215, 221 (2013).

252. See Timothy R. Holbrook, *The Intent Element of Induced Infringement*, 22 SANTA CLARA COMPUTER & HIGH TECH. L.J. 399, 408 (2005).

253. See Rychlinski, *supra* note 251, at 241.

254. *Id.*

255. See Sichelman, *supra* note 163, at 308–09.

256. Note, *Section 271(b) of the Patent Act of 1952: Confusion Codified*, 66 YALE L.J. 132, 139 (1956) [hereinafter *Confusion Codified*]; see Rantanen, *supra* note 229, at 1598 (explaining that 271(b) is open-ended language that covers various activities).

257. See Lemley, *supra* note 229, at 228 (defining induce as causing a person to do something he would not have done otherwise); Karthick Kumar, *Of Deep-Fryers and (Semiconductor) Chips: Why Ignorance of a Patent is No Excuse for its Indirect Infringement*, 40 AIPLA Q.J. 727, 748 (2012) (“In 1952, the term ‘induce’ meant ‘[t]o lead on; to influence; to prevail on; to move by persuasion or influence.’ In the context of the Patent Act, the adverb ‘actively’ suggests ‘the inducement must involve the taking of affirmative steps to bring about the desired result.’”).

258. *Confusion Codified*, *supra* note 256, at 139; see Rantanen, *supra* note 229, at 1598.

259. See Rader, *supra* note 228, at 308.

of the patent or was willfully blind to its existence and intended to cause the infringement of the patent.<sup>260</sup>

The primary purpose of inducement is to provide a mechanism for a patent holder to enforce her patent against third parties that the law has deemed should be liable for causing infringement of the asserted patent.<sup>261</sup> The broad language of the inducement statute even has the power to impose liability on the seller of a component with substantially non-infringing uses.<sup>262</sup> That is, inducement can be viewed as a “catchall” provision that captures activities that contributory infringement does not.<sup>263</sup> Further, inducement allows a plaintiff to recover against someone other than direct infringers that may be difficult to sue and judgment proof.<sup>264</sup>

It is well settled that liability for inducement cannot be imposed without a finding of direct infringement.<sup>265</sup> Thus, inducement involves two actors—an inducer and a direct infringer.<sup>266</sup> For example, in *Luten v. Town of Lee*, the court stated that direct infringement must have occurred for there to be inducement.<sup>267</sup> In that case, there was no finding of inducement because actual direct infringement did not occur.<sup>268</sup> One commentator has concluded that inducement is hard to prove because a plaintiff must show that direct infringement occurred and, in addition, must show that the defendant had the requisite intent and knowledge of the patent.<sup>269</sup>

260. See *Global-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 766 (2011).

261. See Rader, *supra* note 228, at 306–07.

262. See *id.* at 305.

263. See Rantanen, *supra* note 229, at 1596.

264. See Holbrook, *supra* note 11, at 1017.

265. See, e.g., *DSU Med. Corp. v. JMS Co. Ltd.*, 471 F.3d 1293, 1303 (Fed. Cir. 2006) (“[T]he patentee always has the burden to show direct infringement for each instance of indirect infringement.”). See CHISUM, *supra* note 21, at § 17.04(1) (“In *Limelight Networks, Inc. v. Akamai* (2014), the Supreme Court confirmed that a person may not “be liable for inducing infringement of a patent under 35 U. S. C. § 271(b) when no one has directly infringed the patent under § 271(a) or any other statutory provision; liability for inducement under Section 271(b) depends on a showing that the conduct being induced constitutes direct infringement”); Charles Miller, *Some Views on the Law of Patent Infringement by Inducement*, 53 J. PAT. OFF. SOC’Y 86, 102 (1971) (“Liability under 35 U.S.C. 271(b) requires the existence of direct infringement by another party which is actionable under 35 U.S.C. 271(a).”).

266. Erwin Basinski, *Some Comments on Contributory and Induced Patent Infringement: Implications for Software Developers*, 81 J. PAT. & TRADEMARK OFF. SOC’Y 777, 778 (1999).

267. See 206 F. 904, 905 (D. Mass. 1913); see also Miller, *supra* note 265, at 104; Basinski, *supra* note 266, at 778 (“It is important to understand that, without ‘direct infringement of the patent claims there can be neither contributory infringement . . . nor inducement of infringement.’”).

268. See Miller, *supra* note 265, at 104 (explaining that direct infringement, existing or threatened, is a prerequisite to a finding of induced infringement).

269. See Gary N. Frischling & Miriam Bitton, *Grokking Grokster: Has the Supreme Court Changed Inducement Under Patent Law?*, 34 AIPLA Q.J. 265, 273 (Summer, 2006); see also Con-

Although the language of the inducement statute is considerably shorter than that of contributory infringement, several difficult questions about how the law should interpret § 271(b) exist.<sup>270</sup> Section 271(b) is ambiguous and thus has been interpreted both broadly and narrowly.<sup>271</sup> These varying interpretations are an attempt to balance the idea of deterring infringing conduct against the use of patents to stifle competition.<sup>272</sup>

Specifically, there continues to be some debate about what the law requires regarding the intent and knowledge of the inducer.<sup>273</sup> These issues go to a broader question of how involved the law requires an inducer to be in the infringement of the asserted patent.<sup>274</sup> The Supreme Court has held that both inducement and contributory infringement require that the defendant have knowledge of the asserted patent.<sup>275</sup> Further, a plaintiff must show that the defendant possessed specific intent to encourage infringement.<sup>276</sup> Part of that difficulty has been that in some instances the law requires an inquiry into the state of mind of a corporation.<sup>277</sup>

Given the above doctrinal challenges, the Federal Circuit has struggled in the last decade to craft rules for determining when interactive inventions are infringed. The next section discusses a recent example specific to interactive systems.

### B. *The Misstep of Beneficial Use*

This section discusses recent developments concerning the enforcement of interactive inventions. It contends that the Federal Circuit's recent decisions unnecessarily constrict the ability for patentees to enforce interactive system inventions. Specifically, the Federal Circuit's

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fusion Codified, *supra* note 256, at 140 (“[T]he patentee suing under paragraph (b) must prove that defendant’s conduct actually culminated in a direct infringement by a third party, and that defendant intended this result. Even with this guide, however, it will often be difficult, particularly with reference to paragraph (b), to determine whether defendant’s conduct violates the statute.”).

270. See Lemley, *supra* note 229, at 226 (“despite the venerable nature of inducement in patent law, the actual requirements for inducement liability have remained something of a mystery”).

271. Confusion Codified, *supra* note 256, at 138; see also Rychlinski, *supra* note 251, at 220 (“§ 271(b) has been under attack since its very enactment. Some wrote that the section is merely a nebulous statute which will create difficulties with deciding which activities violate the statute. Others believed that it would ‘produce new interpretative problems.’”).

272. See Rantanen, *supra* note 229, at 1591.

273. See Lemley, *supra* note 229, at 226.

274. See *id.* at 231.

275. See *Global-Tech*, 563 U.S. 754; see also Rychlinski, *supra* note 251, at 228.

276. *DSU Med. Corp. v. JMS Co.*, 471 F.3d 1293, 1305 (Fed. Cir. 2006).

277. See Rantanen, *supra* note 229, at 1610.



most recent pronouncement that an alleged infringer must receive a benefit from each and every component of a system is problematic.<sup>278</sup> Further, the requirement that an infringer receive a benefit from each and every component seems at odds with the Federal Circuit's characterization of systems—that components are used collectively.<sup>279</sup>

The requirement that for a system to be infringed, each and every component of the system must be used, is well established within patent law doctrine. First, it is well established that use of a patented invention by itself is infringement.<sup>280</sup> Second, the “All Elements” rule specifies that for a patent claim directed to a machine to be infringed, each and every element of the claimed invention must be present in the accused device.<sup>281</sup> Similarly, an accused infringer of a method claim is liable for infringement only if they performed each and every step of the asserted method claim.<sup>282</sup> It follows that for a system patent to be infringed, each and every component of the claimed system must be present in the accused system. When the infringing activity is use, this requirement becomes that each and every element of the claimed system must be used by an accused infringer.<sup>283</sup> In sum, the use requirement for system patent claims finds sound footing in the fundamental principles of patent law. Further, the test is clear and easy to apply. The inquiry is simply whether the accused infringer put each component of a claimed system into service.<sup>284</sup>

For system inventions, there also exist an expectation that the use of a system invention be beneficial.<sup>285</sup> In *Centillion*, the Federal Circuit held that to infringe a system by use, an accused infringer must use each and every element of a system and benefit from putting the sys-

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278. *Intellectual Ventures I LLC v. Motorola Mobility LLC*, 870 F.3d 1320, 1329 (Fed. Cir. 2017) (“In an analysis of a system claim under *Centillion*, proof of an infringing ‘use’ of the claimed system under § 271(a) requires the patentee to demonstrate that the direct infringer obtained ‘benefit’ from each and every element of the claimed system.”); *Grecia v. McDonald’s Corp.*, 724 F. App’x 942, 947 (Fed. Cir. 2018).

279. *NTP, Inc. v. Res. in Motion, Ltd.*, 418 F.3d 1282, 1318 (Fed. Cir. 2005), *cert. denied*, 546 U.S. 1157 (2006) (explaining that the components of a system are used collectively).

280. *CHISUM*, *supra* note 21, § 16.02 (explaining that use of a patented product without making or selling it will constitute infringement).

281. *Sunrise Med. Hhg v. Airsep Corp.*, 95 F. Supp. 2d 348, 441 (W.D. Pa. 2000) (“Under the ‘All Elements’ or ‘All Limitations’ rule, literal infringement requires that each and every element of a claim or its substantial equivalent be found in the accused device. Omission of even a single claimed element precludes a finding of either literal infringement or infringement under the doctrine of equivalents.”).

282. *Centillion Data Sys., LLC v. Qwest Commc’ns Int’l, Inc.*, 631 F.3d 1279, 1284 (Fed. Cir. 2011) (citing *NTP*, 418 F.3d at 1317).

283. *See id.*

284. *Id.*

285. *Decca Ltd. v. United States*, 544 F.2d 1070, 1083 (Ct. Cl. 1976) (explaining that actual beneficial use of a system in the U.S. contributed to a finding of infringement liability).

tem into service.<sup>286</sup> In this case, the Federal Circuit did not require that a receipt of a benefit by the accused infringer be identified for each component used.<sup>287</sup> Instead, the *Centillion* court's conception of beneficial use seems to be based on the idea that a system is used collectively.<sup>288</sup> Accordingly, an early understanding of benefit acquired from use of the system would be a collective benefit, not one that flows from each and every component of the system.

However, as was observed with the introduction of multi-party infringement in the interactive method context, once this problem is introduced for interactive systems, it seems the Federal Circuit's first impulse is to make it more difficult to enforce these types of claims. Recently, the Federal Circuit has made further modifications to its use standard for interactive system inventions. In *Intellectual Ventures I LLC v. Motorola Mobility LLC*, the Federal Circuit interpreted *Centillion* and *NTP* to define use of a system as to control and benefit from it.<sup>289</sup> In addition, the *Intellectual Ventures* court held that where components of a system could be used by different actors, an accused infringer had to make a beneficial use of each and every component.<sup>290</sup>

The *Intellectual Ventures* court made several leaps in defining "use" with little to no justification. First, the court found that to use a system a person must control, directly or indirectly, each claimed component.<sup>291</sup> This pronouncement directly contradicts the Federal Circuit's discussion in *Centillion*, where it rejected a definition of use that required direct control over each individual element of a system.<sup>292</sup> Instead, the *Centillion* court defined "use" of an element as not a matter of control but instead defined "use" as where the user made each claimed element "work for their patented purpose."<sup>293</sup> Second, the *Intellectual Ventures* court incorrectly required that the "receipt of a benefit" requirement applied to each claimed component of a system. The court did this partly in response to an argument presented by In-

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286. *Centillion*, 631 F.3d at 1284.

287. *Id.*

288. *NTP, Inc. v. Res. In Motion, Ltd.*, 418 F.3d 1282, 1318 (Fed. Cir. 2005) (explaining that use of system components is accomplished collectively, not individually).

289. *Intellectual Ventures I LLC v. Motorola Mobility LLC*, 870 F.3d 1320, 1329 (Fed. Cir. 2017) (citing *Centillion*, 631 F.3d at 1284; *NTP*, 418 F.3d at 1317).

290. *Intellectual Ventures*, 870 F.3d at 1329 ("it follows that, to use a system, a person must control (even if indirectly) and benefit from each claimed component").

291. *Id.*

292. *Centillion Data Sys., LLC v. Qwest Commc'ns Int'l, Inc.*, 631 F.3d 1279, 1284 (Fed. Cir. 2011) ("To accept the district court's interpretation of 'use' would effectively overturn *NTP* because the predicate "use" in that case would no longer fall under the definition of 'use.'").

293. *Id.*

Intellectual Ventures that an accused infringer must only benefit from use of the system as a whole.<sup>294</sup> The *Centillion* court only held that to “use” a system, a party must control the system as a whole and obtain benefit from it.<sup>295</sup> Thus, the language in *Centillion* requires neither the coupling of a benefit to each component of a system nor requires a user to experience a benefit from the system as a whole.

The Federal Circuit’s beneficial use standard as articulated in *Intellectual Ventures* is unworkable for several reasons. First, benefit is not clearly defined. Second, it may be easier to show how an accused infringer benefited from a system as a whole and more difficult to determine the benefit obtained from use of a single component. Third, it is unclear how the court might evaluate a scenario where an actor uses a component but does not benefit from that use. For example, perhaps the benefit is obtained by a third party or the use of the component causes another component to be put into service that will bestow a benefit on the user.

Moreover, the Federal Circuit’s beneficial use test makes it more difficult to enforce interactive system inventions. This trend seems to be at odds with the court’s current direction with respect to enforcement of interactive method claims. Professor Timothy Holbrook has argued that method claims be treated similarly to other claims.<sup>296</sup> Therefore, this Article argues that interactive system claims should be treated in a similar fashion since the court’s jurisprudence is more developed in the area of interactive method claims. This Article does not suggest that the court should adopt similar complex rules as it did for interactive methods. Instead, the principles of multi-actor liability that undergird the courts development of interactive method claims should be applied to interactive systems.

In sum, the current test for determining when an interactive system is infringed by use is misguided. This inconsistency is caused in part by demarcation between various direct infringement scenarios. If a system requires multiple parties to function, a single party may still directly infringe the claimed system by using the system.<sup>297</sup> If the alleged infringer possesses at least one element of a multi-party system, then “use” requires that the accused infringer “put the invention into service, [i.e.] [sic] control[led] the system as a whole and obtain[ed] a

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294. *Intellectual Ventures*, 870 F.3d at 1329 (“The district court held (and IV argues on appeal) that *Centillion* requires only that the infringer benefit from the ‘system as a whole,’ such that a benefit derived from any claimed component of the claimed system would suffice to demonstrate an infringing ‘use.’”).

295. *Centillion*, 631 F.3d at 1284.

296. See Holbrook, *supra* note 11, at 1008.

297. *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1309 (Fed. Cir. 2011).

benefit from it.”<sup>298</sup> However, for a finding of liability, the alleged infringer must do more than just benefit from any element or component of the claimed system.<sup>299</sup> Instead, “use” of a system occurs if the alleged infringer benefits from each and every claim element.<sup>300</sup> The benefit must be linked to the claims and be tangible.<sup>301</sup>

Requiring the beneficial use of each component of a claimed system is at odds with the definition of a system as the collective use of various components. Further, it is unclear what will satisfy the beneficial use test and whether, in some cases in which use is present, whether a benefit will also be present. Finally, beneficial use unnecessarily conflates the act of use and the question of liability. Thus, this Article recommends an alternate framework for addressing the enforcement of interactive system inventions.

### C. *A Framework for Enforcing Interactive Inventions*

Given the shortcomings of the beneficial use test, this section proposes a framework for analyzing infringement of interactive system claims. The Federal Circuit’s divided infringement decisions provide a precarious, but nevertheless workable path forward. Over the last decade the Federal Circuit has struggled with the divided infringement problem. The court’s current test for divided infringement liability borrows from principles of multi-actor liability. These sound principles should also be applied to the problem of determining liability for infringing interactive system claims. Relying on these principles, this section explains an approach for determining multi-actor liability in interactive system claims and suggests how this approach might result in more consistent enforcement of interactive inventions as a whole.

#### 1. *Rethinking “Beneficial” Use*

Current jurisprudence narrowing enforcement opportunities for system patents is at odds with the broadening of enforcement parameters for interactive method claims. Recent Federal Circuit decisions appear to narrow the opportunities for interactive system inventions to be enforced against multi-party actors.<sup>302</sup> In contrast, over the last decade, the Federal Circuit has broadened its divided infringement

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298. *Centillion Data Sys., LLC v. Qwest Commc’ns Int’l, Inc.*, 631 F.3d 1279, 1284 (Fed. Cir. 2011).

299. *Intellectual Ventures I LLC v. Motorola Mobility LLC*, 870 F.3d 1320, 1329 (Fed. Cir. 2017).

300. *See id.*; *Grecia v. McDonald’s Corp.*, 724 F. App’x 942 (Fed. Cir. 2018).

301. *Grecia*, 724 F. App’x at 947.

302. *Intellectual Ventures*, 870 F.3d at 1329 (“In an analysis of a system claim under *Centillion*, proof of an infringing ‘use’ of the claimed system under § 271(a) requires the patentee to

doctrine, which has resulted in more enforcement opportunities for patentees of interactive method claims.<sup>303</sup> There does not appear to be a clear reason for the expansion in one area and the narrowing in another.

The current use model for interactive systems is undesirable. The beneficial use test is unmoored from established principles for dealing with multi-actor liability. This leads to inconsistent treatment between interactive method and system inventions.

In order to remedy this inconsistency, the framework for determining multi-actor liability for interactive system inventions must be expanded. In order to expand, the court must find a middle ground between its interpretation of beneficial use in *Centillion* and *Intellectual Ventures*.<sup>304</sup> That is, liability must attach for something more than obtaining a benefit from using a system as a whole<sup>305</sup> but should not require that an alleged infringer benefit from each and every element of an interactive system.<sup>306</sup> A middle ground between these two extremes may provide the court with a more flexible approach.

The proposed framework suggests that for there to be liability for infringement of an interactive system, the accused infringer must have used each and every element of the claimed system and benefited from that use. This approach finds support in both *NTP* and *Centillion*.<sup>307</sup> Next, where the system is used by multiple actors, the determination of whether a party's use and benefit of the interactive system gives rise to infringement liability should be based on the conduct of the parties, the nature of their relationships, and intent.

The conduct inquiry examines whether accused infringers have engaged in unauthorized conduct. In the case of interactive system inventions, unauthorized conduct is the use of each and every component of the claimed system.<sup>308</sup> The components of interactive

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demonstrate that the direct infringer obtained 'benefit' from each and every element of the claimed system.”).

303. See *Grecia*, 724 F. App'x at 942 (Fed. Cir. 2018); see also *BMC Res., Inc. v. Paymentech, L.P.*, 498 F.3d 1373, 1375 (Fed. Cir. 2007), *overruled by Akamai Techs., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301 (Fed. Cir. 2012); see also *Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1321 (Fed. Cir. 2008); see also *Golden Hour Data Sys., Inc. v. emsCharts, Inc.*, 614 F.3d 1367, 1369 (Fed. Cir. 2010), *overruled by Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d 1020 (Fed. Cir. 2015).

304. See *Centillion Data Sys., LLC v. Qwest Commc'ns Int'l, Inc.*, 631 F.3d 1279, 1284 (Fed. Cir. 2011); see also *Intellectual Ventures*, 870 F.3d at 1329.

305. *Centillion*, 631 F.3d at 1284.

306. *Intellectual Ventures*, 870 F.3d at 1329.

307. *NTP, Inc. v. Res. In Motion, Ltd.*, 418 F.3d 1282, 1317 (Fed. Cir. 2005).

308. *Centillion*, 631 F.3d at 1284 (“We agree that direct infringement by ‘use’ of a system claim requires a party . . . to use each and every . . . element of a claimed [system].”).

system claims are used collectively.<sup>309</sup> Thus, this Article proposes that the test for “use” should focus on the collective conduct of the parties involved. This involves a two-step process. First, did the collective conduct as a whole result in the use of each and every component of the claimed system? Second, if each component was used, what were the circumstances that lead to that use? In other words, what was the reason that each component was used? To answer this second prong accurately requires the law to examine the relationships between the alleged infringers.

When more than one actor uses each and every component of an invention, the accused infringers’ liability for infringement should depend on whether the acts of one are attributable to the accused infringer, such that a single entity is responsible for the infringement.<sup>310</sup> This analysis depends in part on the relationship between the actors.

A relationship between multiple parties that rises to the level of infringement is defined in the Federal Circuit’s *Akamai IV* decision.<sup>311</sup> There, the court held that “an entity is responsible for others’ performance of method steps in two sets of circumstances: (1) where that entity directs or controls the others’ performance, and (2) where the actors form a joint enterprise.”<sup>312</sup> The court defined a joint enterprise as an arrangement between the parties requiring proof of:

- (1) an agreement, express or implied, among the members of the group;
- (2) a common purpose to be carried out by the group;
- (3) a community of pecuniary interest in that purpose, among the members; and
- (4) an equal right to a voice in the direction of the enterprise, which gives an equal right of control.<sup>313</sup>

Both the direction or control and joint enterprise tests are derived from multi-party tort liability principles.

An alternative approach to the test set forth in *Akamai IV* may be to rely on the principle of causal responsibility as suggested by professor Dmitry Karshedt.<sup>314</sup> This principle suggests that an alleged infringer is responsible for the actions of other parties that they have caused.<sup>315</sup> Here, the inquiry will involve determining whether the use of a component of a claimed system caused a second party to use a second component of the claimed system. Similar to focusing on the

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309. *NTP*, 418 F.3d at 1318 (explaining that use of a system as a whole occurs when the components are used collectively, not individually).

310. *Akamai IV*, 797 F.3d 1020, 1022 (Fed. Cir. 2015).

311. *Id.*

312. *Id.*

313. *Id.* at 1023.

314. Karshedt, *supra* note 11, at 571.

315. *See id.*

relationship between multiple actors, the causal responsibility inquiry focuses on activity that has traditionally given rise to multi-party liability.

In sum, this section has proposed an alternative way to think about infringement of interactive system inventions. The proposed framework shifts the focus away from examination of the beneficial use of every system component. Instead, it suggests that to determine liability, courts examine the relationship between the actors involved with the alleged infringing system. The next section applies this framework to a recent decision that relied on the absence of beneficial use to find no evidence of infringement.

## 2. *Revisiting Possible Infringement of Interactive Systems*

This Section applies the framework suggested above for analyzing infringement of interactive system claims to a recent non-precedential Federal Circuit decision. In *Grecia v. McDonald's Corp.*, the Federal Circuit identified a gap in its jurisprudence concerning the use of interactive system claims.<sup>316</sup> Specifically, under what circumstances a party might be liable for infringement when that party uses the system but does not possess any components of the claimed system.<sup>317</sup> Relying on *Intellectual Ventures*, the court concluded that such a party is liable for infringement if it receives a benefit from each and every claimed component of the system.<sup>318</sup> The court did not elaborate on what type of evidence might be required to satisfy its “beneficial use” test.

How would this case be resolved if instead of focusing on “beneficial use”, the court applied basic multi-party liability principles described above? The key inquiry would be the relationship between the alleged infringer, McDonald’s, and the provider of the allegedly infringing system components. On the facts of this case, the provider of the system components would include a credit card company such as Visa or Mastercard.<sup>319</sup> Here, the plaintiff would need to present evidence that McDonald’s worked in concert with Visa to infringe the claimed system. An arms-length transaction between the parties would not rise to the level of liability. Instead, Grecia would have to present evidence to support a conclusion that McDonald’s directed or

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316. *Grecia v. McDonald's Corp.*, 724 F. App'x 942, 946 (Fed. Cir. 2018) (explaining that the court has not found controlling precedent to answer the question presented).

317. *Id.* at 945–46.

318. *Id.* at 947.

319. *Grecia v. McDonald's Corp.*, 724 F. App'x 942, 944 (Fed. Cir. 2018).

controlled Visa's activities or that the parties worked as a joint enterprise to infringe the claimed system.<sup>320</sup>

Whether that occurred in this particular case is beyond the scope of this Article. Instead, what is important is to note that the proposed test provides a clear framework grounded in basic tort principles of multi-actor liability. No new rules are created. Further, the broader and clearer test will likely adapt better to unforeseen factual situations.

### CONCLUSION

This Article observes that the Federal Circuit's recent interpretation of "use" of a system is problematic. This problem is caused by the court's attempt to apply an outmoded framework to interactive inventions. This Article suggests that interactive inventions should be treated differently from traditional method and system inventions. Further, it argues that a direct infringer uses an interactive system when it controls the system and obtains a benefit from it. When interactive inventions are analyzed under the correct framework, it allows for courts to apply sound legal principles to solve multi-actor liability problems. This approach is more consistent with the recently articulated standard in *Akamai IV* for divided infringement of method claims.

Given the proliferation of interactive technologies, it is important to understand what type of "use" of an interactive system or method will give rise to liability for infringement. In recent years, the Federal circuit has expanded how to define use of an interactive method claim through its divided infringement doctrine. In contrast, recent decisions by the Federal Circuit have seemed to make it harder to enforce interactive system claims. This inconsistency is troubling given the emergence of technology like the IoT.

For interactive system and method claims, key concepts include (1) possession, (2) control, and (3) receipt of benefits. An alleged infringer need not be in possession of an entire system to infringe a system claim. However, an alleged infringer must control the system. Finally, recent Federal Circuit decisions seem to suggest that an alleged infringer must receive a benefit from each and every claimed element of the system. The element-by-element benefit test makes it more difficult to enforce interactive system claims. This trend seems to be at odds with other Federal Circuit decisions that have expanded the test for how a distributed method claim might be infringed.

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320. *Akamai IV*, 797 F.3d 1020, 1022 (Fed. Cir. 2015).



What explains this divergence of enforcement? Is it that the Federal Circuit is less lenient with how claims will be drafted in system inventions? Is it that distributed method claims impact more than just the high-tech sector whereas most litigated system cases are just in the high tech industry? This Article suggests that the inconsistency is due to the lack of a framework for treating interactive inventions differently from traditional system and method claims.

One implication of recognizing that interactive inventions should be treated differently is that it frees courts from attempting to apply a rigid statutory framework. Instead, it allows courts to look to a broader framework based on sound tort principles of multi-actor liability. One avenue for further research might include examining how district courts have applied the Federal Circuit's latest interpretations of "use." Another inquiry might be to examine a case where both infringement of a system claim and method claim of an invention was at issue and determine how the court navigated the issue of "use."

It is important that the law provide predictability across technologies and types of claims. Interactive inventions can be used by more than one actor. The fact that the courts have had to make doctrinal adjustments over the last decade suggests that the current statutory framework is not well equipped to deal with interactive inventions. Once we acknowledge this new category, we no longer have to attempt to deal with its unique problems using method or system claims as a framework. Instead, all that is required is a shift in perspective. Once we view an invention as interactive, we can employ a framework for dealing with multi-actor liability. This framework is based in sound principles of tort law, is predictable, and provides for consistent enforcement of both interactive method and system inventions.

