

# WHAT HAPPENS IN THE CLOUD: SOFTWARE AS A SERVICE AND COPYRIGHTS

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## ABSTRACT

What happens in the cloud? Copyright owners are concerned. Users of cloud services upload, share, and download copies of software and other files without their owners' permission and access copyrighted works beyond or in violation of access limitations. Also, copyright owners find it hard to keep up with initiatives of cloud service providers, which constantly introduce new technologies that make copyrighted works available in new formats and business models.

What happens in the cloud stays in the cloud. In the cloud, software is no longer commercialized by distributing physical copies to users. Instead, users remotely access and use software copies that remain on the cloud provider's servers. Software copies stay in the cloud. This raises questions as to if and how copyright law protects the interests of software copyright owners, users, and the public in the cloud. Answering such questions requires an understanding of exactly what happens in the cloud in terms of copying software. This is the focus of the Article.

Although cloud offerings are often global and multi-jurisdictional, the copyright laws governing the services remain territorial and national. This Article examines primarily U.S. copyright law, which applies where companies have been most innovative and active in developing cloud offerings, but also briefly takes a look at copyright laws in the EU, the second most developed and active jurisdiction with respect to software copyrights.

After Part I provides a general introduction to the topic, Part II gives a technological overview. Part III assesses in detail when and how the exclusive statutory rights under U.S. copyright law are implicated in a number of typical software-as-a-service scenarios. Part IV analyses the same scenarios under copyright laws in Europe for comparison purposes. Part V briefly looks at the complexities of cross-border scenarios and Part VI concludes with an outlook regarding potential legal and policy implications of what happens in the cloud to software copies.

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### I. INTRODUCTION

What happens in the cloud? Copyright owners are concerned.<sup>1</sup> Users of cloud services upload, share, and download copies of software and other files

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1. See, e.g., *Global Cloud Computing Scorecard*, BUSINESS SOFTWARE ALLIANCE, <http://cloudscorecard.bsa.org/2012/countries.html> (last visited Jan. 21, 2014); Graeme McMillan, *The Future of Online Movie Piracy is Grim, Experts Warn*, DIGITAL TRENDS (Mar. 20, 2013), <http://www.digitaltrends.com/international/the-future-of-online-movie-piracy-is-grim>

without their owners' permission and access copyrighted works beyond or in violation of access limitations.<sup>2</sup> Also, copyright owners find it hard to keep up with initiatives of cloud service providers, which constantly introduce new technologies that make copyrighted works available in new formats and business models.<sup>3</sup>

What happens in the cloud stays in the cloud. In the cloud, software is no longer commercialized by distributing physical copies to users. Instead, users remotely access and use software copies that remain on the cloud provider's servers. Software copies stay in the cloud. This raises questions as to if and how copyright law protects the interests of software copyright owners, users, and the public in the cloud and whether the complex system of rights, defenses, and exceptions that courts developed in the context of software distribution can function in the cloud.<sup>4</sup> Answering such questions requires an understanding of exactly what happens in the cloud in terms of copying.

This Article examines what happens technically in the cloud to help determine whether copyright law can continue to work well for software. Although cloud offerings are often global and multi-jurisdictional, the copyright laws governing the services remain territorial and national. This Article focuses on U.S. copyright law, which applies where companies have been most innovative and active in developing cloud offerings, but also briefly examines analogous copyright laws in the European Union, the second most developed and active jurisdiction with respect to software copyright. Part II begins with a technological overview. Part III assesses when and how the exclusive statutory rights under U.S. copyright law are implicated in a software-as-a-service context. Part IV examines the situation under copyright laws in Europe for comparison purposes. Part V briefly looks at the complexities of cross-border scenarios. Part VI concludes with a review of practical implications.

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-experts-warn/; *The Law*, RIAA, [http://www.riaa.com/physicalpiracy.php?content\\_selector=piracy\\_online\\_the\\_law](http://www.riaa.com/physicalpiracy.php?content_selector=piracy_online_the_law) (last visited Jan. 21, 2014).

2. THE DEP'T OF COMMERCE INTERNET POLICY TASK FORCE, COPYRIGHT POLICY, CREATIVITY, AND INNOVATION IN THE DIGITAL ECONOMY 47 (2013).

3. *See id.* at 78–80.

4. *See generally* Lothar Determann & David Nimmer, *Software Copyright's Oracle from the Cloud* (forthcoming 2014), available at <http://ssrn.com/abstract=2331537>.

## II. WHAT HAPPENS, TECHNICALLY SPEAKING, TO SOFTWARE AND COPIES IN THE CLOUD?

The term “cloud” has recently become the industry’s term of choice for certain service-based software and technology commercialization models.<sup>5</sup> This choice of terminology is remarkable: the expression “clouds on the horizon” traditionally has a negative connotation, and data privacy advocates and regulators consider it a problem that data disappears into a “cloud” with reduced visibility for corporate data controllers and data subjects. Nevertheless, the term “cloud” is used around the world by enthusiasts and critics alike<sup>6</sup> and shall be used also throughout the remainder of this Article.

In cloud business models, providers usually retain physical possession of their software copies (and the hardware on which the software runs) while enabling users to remotely access and use the software functionality.<sup>7</sup> Providers use different labels for such offerings, including application service providers (“ASP”), infrastructure-as-a-service (“IaaS”), platform-as-a-service (“PaaS”), and software-as-a-service (“SaaS”).<sup>8</sup>

What cloud providers offer is distinctly different from traditional service offerings. Unlike providers of data entry, word processing, or accounting services, for example, cloud providers do not themselves create work product for their customers. They merely make the software tools available with which their customers create the work product. But unlike in a lease or sales context, cloud providers do not part with physical possession of such tools. Users of cloud services only receive limited remote access to certain functionality and only for a defined time period. In traditional software distribution models, the user pays a fee, receives a software copy, and keeps work product and data. In the cloud context, the user pays a fee and the provider keeps the software copy as well as work product and data.

Cloud providers offer a variety of commercial terms and technological deployments. These offerings depend on the provider’s business model, such as whether the provider primarily develops its own software or uses programs made by other companies, as well as other factors including

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5. Lothar Determann, *Data Privacy in the Cloud—Myths and Facts*, 121 PRIVACY LAWS & BUS. INT’L REP. 17 (2013).

6. See, for example, the “Cloud for Europe” project, supported by the EU Commission and various European organizations, despite concerns under data protection laws expressed elsewhere. EUROPEAN COMM’N, CLOUD FOR EUROPE (2013), available at [https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/C4E\\_Factsheet\\_v4\\_0.pdf](https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/C4E_Factsheet_v4_0.pdf).

7. Michael P. Widmer, *Application Service Providing, Copyright, and Licensing*, 25 J. MARSHALL J. COMPUTER & INFO. L. 79, 93 (2007).

8. *Id.* at 83.

software functionality, industries, and targeted user groups (enterprise, consumers, prosumers,<sup>9</sup> etc.). One cloud provider may offer third-party software-application products like Microsoft Word or PowerPoint or Adobe Acrobat to enterprise and consumer customers in the United States.<sup>10</sup> Another provider may host computer games, or components thereof, made by third parties.<sup>11</sup> Yet other providers develop and host their own enterprise applications for customer relationship management (“CRM”), human resources systems (“HRIS”) or enterprise resource planning (“ERP”).<sup>12</sup>

For clarity of analysis, this Article will refer to a simplified technical scenario: The cloud provider acquires software copies by developing them or via purchase, lease, or other transaction from a software supplier. Then, the cloud provider creates the cloud offering by combining application programs with operating system software, drivers, and programs that facilitate the remote access. It installs this software combination on the hard disks of servers in remote locations with connections to the Internet. When the cloud provider turns the cloud service on, the installed software copy is reproduced in the random access memory (“RAM”) of one or more servers where its customers then use the additional software copy in RAM.

Customers enter into an agreement with the cloud provider, pay a recurring fee, and receive access credentials (like user IDs and passwords). Customers can then access the cloud offering with general-purpose web browsers (like Internet Explorer or Firefox). The customer types in an Internet address (for example, cloudprovider.com) and its computer sends a request to the cloud provider’s server.<sup>13</sup> The cloud provider’s server responds to browser requests by sending HTML code and session cookies back to the

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9. Professionals who buy and use software in their individual capacity for use in enterprises or unincorporated businesses or professional practices operate in a gray zone where consumer protection laws may or may not apply.

10. *See, e.g.*, ONLIVE, [www.OnLive.com](http://www.OnLive.com) (last visited Jan. 21, 2014).

11. *See, e.g.*, MDY Indus. LLC v. Blizzard Entm’t, Inc., 629 F.3d 928, 935–36 (9th Cir. 2011).

12. *See, e.g.*, NETSUITE, [www.netsuite.com](http://www.netsuite.com) (last visited Jan. 21, 2014); SALESFORCE, [www.salesforce.com](http://www.salesforce.com) (last visited Jan. 21, 2014); SUGARCRM, [www.sugarcrm.com](http://www.sugarcrm.com) (last visited Jan. 21, 2014); WORKDAY, [www.workday.com](http://www.workday.com) (last visited Jan. 21, 2014).

13. Some cloud providers design their offerings in a way that requires or enhances access through proprietary “client software” (also known as “apps”) that have to be first downloaded onto users’ computers, such as desktops, laptops, tablets, or smartphones. *See, e.g.*, Google Sheets, *available at* <http://www.google.com/sheets/about/> (requiring users to download the Google Sheets application in order to edit Google Sheets documents on mobile devices). From a copyright law perspective, this involves a more traditional form of distribution of apps in addition to the service-based cloud model.

customer's computer.<sup>14</sup> As the user sends additional requests and the web server responds, there is not usually any persistent connection,<sup>15</sup> but cookies enable the web server to simulate a persistent session. Cookies are not programs in and of themselves, but are small data files that websites will save in the remote browser's workspace to identify the user or to store information about the user's activity.<sup>16</sup> A cookie gives the user's web browser identifying information for each server or application that chooses to use cookies, creating a record of what happened the last time the server interacted with the user's remote computer. The web server also keeps some data corresponding to the cookie so that it knows where to start the next time the same computer sends a request. To the user, it appears as if the computer has a continuous connection to a cloud application, even though none exists.

The web-browser software on the user's computer executes the HTML code and displays the graphical user interface ("GUI") for the cloud application. For example, if the cloud offering makes Microsoft Word available, the GUI might look exactly like the GUI a user sees when she has a copy of Microsoft Word on her computer. But, in the cloud scenario, the copy of the Microsoft Word code resides only on the cloud provider's server, not on the user's computer (neither in RAM nor on the hard disk of the local computer). In light of this, the cloud provider can also make arrangements to cause a different GUI to be displayed to end users, with different labels on command lines (e.g., "reproduce" instead of "copy," "wipe" instead of "delete," etc.) and different graphics, yet relaying the same kinds of commands to the underlying software operating on the remote web server.

When the customer utilizes the cloud offering, each command (such as: insert text, save document, format page layout) results in a request to the

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14. Communications over the Internet occur in the form of a series of requests and responses; the Internet does not support ongoing sessions. When an individual uses network protocols like Telnet or SSL to remotely log into a system, or works in a desktop scenario, there is a separate process with context and content that persists until the session ends. The web does not work that way. When a user communicates with a web server via an "http:" or "https:" URL, the user's computer sends the server a query and the web server sends back data and that is the end of the communication. So, when a user thinks she is on the web with Amazon.com, she is actually just sending Amazon a sequence of requests, which Amazon.com answers immediately.

15. Sometimes, a connection is held for a short time to handle a few requests in rapid sequence, such as loading a web page and then all of the pictures that it includes, but this is just for optimization rather than a required part of the protocol.

16. For the official specification of a cookie, see ADAM BARTH & INTERNET ENGINEERING TASK FORCE, RFC 6265: HTTP STATE MANAGEMENT MECHANISM (2011), available at <http://tools.ietf.org/html/rfc6265>.

application that resides on the cloud provider's server. In response to the request, the cloud provider's server executes part of the code in the central processing unit ("CPU") of the server. To do so, the relevant portions of code from the RAM copy are reproduced in various levels of cache memory and registers (i.e., smaller, faster memory segments on the server).<sup>17</sup> This can create several partial reproductions of a program fragment, plus additional excerpts in the CPU's instruction queue and registers.<sup>18</sup> Each higher level is more ephemeral (smaller excerpts of code, stored for smaller fractions of seconds) than the one below it. These fractional copies are created in different memory spaces of web servers even if only one user accesses the cloud offering. Computers create these copies in the interest of functional efficiency because storage capacity in faster memory spaces is more expensive and the CPU never needs the entire program code that is stored on hard disk or in RAM. In terms of copying, what happens on the web server is not entirely unlike what happens to software copies installed on a personal computer: one permanent copy is installed on the hard drive; when the user opens the application, another copy is uploaded into RAM and additional excerpts are created in cache memory; and as the user executes the program, excerpts are also created in the CPU instruction queue and registers. But a key difference is that in the traditional scenario a copy is commonly used by one person at a time, whereas in cloud scenarios one copy can be used by multiple users simultaneously.

Cloud providers can configure their software so that one RAM copy and process serves multiple users. In a multi-tenant, multi-threaded setup, hundreds or thousands of users are using the same RAM copy without needing to create additional copies of the application software that provides the program functionality to the remote users' computers. With the Java computing language, for example, a pool of processes can handle user requests.<sup>19</sup> There can also be a pool of multiple hardware servers handling

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17. Modern CPUs have more than one level of cache. For example, Intel Core i7 "Nehalem" has three levels and a total of thirteen caches on a four-core processor. See Fedy Abi-Chahla, *Intel Core i7 (Nehalem): Architecture by AMD?*, TOM'S HARDWARE (Oct. 14, 2008, 12:40 AM), <http://www.tomshardware.com/reviews/Intel-i7-nehalem-cpu,2041-10.html>. L3 is 8MB and is shared by all processor cores on the same chip. Each processor core has a 256KB L2 cache, and an L1 cache that is split in half: 32KB for instructions (I-cache) and 32KB for data (D-cache). These caches are hierarchical and only L3 has access to RAM; the others copy from the next lower level cache.

18. For example, the order of copying from RAM to the CPU could be hard disk → RAM → L3 cache → L2 cache → L1 cache → CPU. In this scenario, at least six partial copies of the program would be created.

19. See DAVID J. ECK, INTRODUCTION TO PROGRAMMING USING JAVA 12 (6th ed. 2011), available at <http://math.hws.edu/eck/cs124/javanotes6/index.html>.

requests such that the user makes requests to many different servers. In this situation, a modern cloud application sends several files of JavaScript from the cloud provider's server to the browser on the user's computer. The remote browser then caches (i.e., temporarily stores) the JavaScript so that subsequent requests can refer to cached scripts.<sup>20</sup>

The work product that the customer creates with the cloud offering consists of data (for example in the form of a PowerPoint slide deck or Word document) stored on the cloud provider's server. The customer can view the work product via the GUI reproduced on the user's computer. If the customer downloads (i.e., copies) work product to its own computer, the cloud provider's server may deliver the work product in files that also contain standard file format specifications to enable the user to process the files on that computer. If the cloud provider's offering includes objects for inclusion into work product (e.g., clip art for PowerPoint slides), then customers can view or download copies of such objects, too.

Counting copies for purposes of this copyright law analysis, one finds the following: the cloud provider creates on its server one permanent copy of the underlying code on hard disk and one RAM copy in the working memory. In response to access requests from customers, the cloud provider sends copies of HTML markup, JavaScript code, and other elements necessary to render the GUI in a web browser, as well as data (cookies and output) to each remote computer for purposes of facilitating the remote access and displaying an image of the GUI on each remote computer. When customers access the cloud offering, numerous fractional excerpts of the RAM copy are reproduced in cache memory spaces and the CPU of the cloud provider's computer, whether one or multiple users access the same RAM copy. Customers can never see the underlying code; it stays hidden on the cloud provider's server (e.g., on the hard disk, in RAM, or in the CPU cache).

For purposes of this copyright analysis, it is helpful to distinguish a few scenarios and permutations:

**Scenario 1—single user:** The cloud provider buys software copies from the software developer (who owns and retains copyrights). The software code contains copyrightable protection, but either it

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20. See, e.g., Raul F. Chong, *Designing a Database for Multi-Tenancy on the Cloud*, DEVELOPERWORKS (Jun. 5, 2014, 9:00 PM), <http://www.ibm.com/developerworks/data/library/techarticle/dm-1201dbdesigncloud/>; HP, HP CLOUDSYSTEM ENTERPRISE (2012), available at [h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-3697ENW.pdf](http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-3697ENW.pdf); Pat Garrehy, *Multi-Tenant vs. Hosted Cloud ERP—Pros and Cons*, ERP CLOUD NEWS (Feb. 11, 2013), <http://www.erpccloudnews.com/2013/02/multi-tenant-vs-hosted-cloud-erp—pros-and-cons/>.

has no GUI or the GUI is not copyrightable (because it is too functional or commonplace), or the cloud provider creates its own GUI and designs the offering so that its GUI completely masks and replaces the software developer's original GUI. The cloud provider buys one software copy for each cloud user. A user accessing the cloud service cannot see any of the underlying code or source code of the hosted software, only the GUI which the software displays on the computer. The user cannot make or download any copies of the underlying code.

**Scenario 2—multiple users:** All facts as in scenario 1, but the cloud provider makes one software copy in the server's random access memory ("RAM") available to multiple users (consumers or enterprise customers' employees) for simultaneous access in a multi-tenant, multi-threaded set-up. When users access the same single RAM copy, they either do not cause any additional copies to be created, or only duplicate extremely small excerpts of code for fractions of seconds.

**Scenario 3—substantial cache copies:** All facts as in scenario 2, but users cause amounts of code to be reproduced in cache that are significant and exist for several minutes or hours on servers.

**Scenario 4—licensed copies:** All facts as in scenarios 1, 2, or 3, but the software copyright owner parts with copies only subject to agreements according to which software copies are not sold, only licensed, for an indefinite term and a one-time fee, subject to prohibitions of resale, territorial relocation, and use for service bureau activities.

**Scenario 5—creative, static GUI:** All facts as in previous scenarios, but the original GUI designed by the software copyright owner contains protectable expression, including text and graphics, and is visible to users of the cloud offering.

**Scenario 6—video:** All facts as in previous scenarios, and the GUI also displays video footage (e.g., as in computer games).

**Scenario 7—downloadable items:** All facts as in previous scenarios, plus users have to download JavaScripts, apps or client software, or other code to their computers in order to establish the remote session, and users can download clip art and other objects from the underlying software to their computers.

### III. WHAT HAPPENS IN THE CLOUD TO THE SOFTWARE OWNER'S RIGHTS UNDER U.S. COPYRIGHT LAW?

A copyright owner has separate exclusive rights to reproduction, adaptation (derivative works), distribution, public performance, and public

display.<sup>21</sup> The analysis must distinguish between the underlying program code and its output in the form of GUIs and user-generated work product.<sup>22</sup>

A. CLOUD PROVIDER DOWNLOADS SOFTWARE

If the software supplier delivers software copies on physical disks to the cloud provider, then the supplier exercises distribution rights. The cloud provider does not exercise any rights under the U.S. Copyright Act by acquiring disks containing software.

If the cloud provider acquires the software copies by downloading them from a website, it has exercised reproduction rights. Whether the supplier would exercise distribution rights in the download context is subject to debate.<sup>23</sup> Under § 106(3) of the Copyright Act, the copyright owner has the exclusive right “to distribute copies . . . of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or lending.” The distribution right relates to a particular copy of a copyrighted work and covers transactions that involve transferring possession of such copy.<sup>24</sup> In the download context, the supplier enables the acquirer to create and take possession of a new copy, which implicates the copyright owner’s reproduction right, but the supplier does not give up possession of the copy that it makes available.<sup>25</sup>

B. CLOUD PROVIDER INSTALLS SOFTWARE

If the cloud provider uses physical disks to install copies of the software on its servers, it also exercises the reproduction right under § 106(1).

In Scenarios 1 through 3, the cloud provider acquires the software copies through a sale and becomes the lawful owner of those copies. The cloud provider is therefore entitled to install the software copies in permanent storage (on a hard drive and/or in Read-Only Memory, ROM) under § 117(a) and the first sale doctrine.<sup>26</sup> Section 117(a) allows a cloud provider to make a

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21. 17 U.S.C. § 106 (2012).

22. *See supra* Part II.

23. R. Anthony Reese, *The Public Display Right: The Copyright Act’s Neglected Solution to the Controversy over RAM “Copies,”* 2001 U. ILL. L. REV. 83, 128–30.

24. *Id.*; *Nat’l Car Rental Sys., Inc. v. Computer Assocs. Int’l, Inc.*, 991 F.2d 426, 430 (8th Cir. 1993).

25. Some courts have extended the distribution right to any “making available for copying,” but this is not aligned with the wording or context of § 106 of the Copyright Act. *See, e.g.*, *Playboy Enters., Inc., v. Frena*, 839 F. Supp. 1552, 1556 (M.D. Fla. 1993). This issue does not, however, relate specifically to the cloud context.

26. *See* Jean Braucher, *Contracting out of Article 2 Using a “License” Label: A Strategy That Should Not Work for Software Products*, 40 LOY. L.A. L. REV. 261 (2006); Brian W. Carver, *Why License Agreements Do Not Control Copy Ownership: First Sales and Essential Copies*, 25 BERKELEY

new copy on two conditions, namely that “such a new copy . . . is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner.” The first condition (“essential step”) is met relatively easily. It is relatively uncontroversial that § 117(a) permits software users to copy software from a DVD or other storage media to their computers.<sup>27</sup> As for the second condition (“used in no other manner”), in the cloud context, the new copy installed on the cloud provider’s server will be used not only on that machine but also on the remote machines from which users access the copy. Such use materializes when users start accessing the software and will, therefore, be discussed further below.

In Scenario 4, the cloud provider does not own any copies of the software under U.S. copyright law and would therefore exercise reproduction rights. It would need a license to install the software.<sup>28</sup>

### C. CLOUD PROVIDER MAKES SOFTWARE AVAILABLE TO USERS

#### 1. *Reproduction Rights (§ 106(1)) Regarding the Underlying Code*

When the cloud provider turns the cloud offering on to make the software available for remote access by customers, the software copy that the cloud provider installed on its server’s hard drive is reproduced in RAM.

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TECH. L.J. 1887, 1893 (2010); Andrew Chin, *Antitrust Analysis in Software Product Markets: A First Principles Approach*, 18 HARV. J.L. & TECH. 1, 59–71 (2004); Lothar Determann, *Importing Software and Foreign Copyright*, 30 COMPUTER & INTERNET LAW. 32, 35–40 (2013); Lothar Determann & Aaron Xavier Fellmeth, *Don’t Judge a Sale by Its License: Software Transfers Under the First Sale Doctrine in the United States and the European Community*, 36 U.S.F. L. REV. 1, 35–36 (2001); William W. Fisher III, *When Should We Permit Differential Pricing of Information?*, 55 UCLA L. REV. 1 (2007); Nancy S. Kim, *The Software Licensing Dilemma*, 2008 BYU L. REV. 1103; Michael J. Madison, *Reconstructing the Software License*, 35 LOY. U. CHI. L.J. 275 (2003); Gregory E. Maggs, *The Waning Importance of Revisions to U.C.C. Article 2*, 78 NOTRE DAME L. REV. 595 (2003); Christian H. Nandan, *Software Licensing in the 21st Century: Are Software “Licenses” Really Sales, and How Will the Software Industry Respond?*, 32 AIPLA Q.J. 555, 563 (2004); Raymond T. Nimmer, *Copyright First Sale and the Overriding Role of Contract*, 51 SANTA CLARA L. REV. 1311, 1330–31 (2011); David A. Rice, *Copyright and Contract: Preemption After Bowers v. Baystate*, 9 ROGER WILLIAMS U. L. REV. 595 (2004); John A. Rothchild, *The Incredible Shrinking First-Sale Rule: Are Software Resale Limits Lawful?*, 57 RUTGERS L. REV. 1, 22–23 (2004).

27. MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 8.08[B][1][b] (2013).

28. Most EULAs allow such installation copies, but tend to expressly prohibit use for cloud deployment or service bureau activities. See *Nat’l Car Rental Sys., Inc. v. Computer Assocs. Int’l Inc.*, 991 F.2d 426 (8th Cir. 1993); Microsoft Office 2013 Desktop Application Software License Agreement, MICROSOFT, available at <http://office.microsoft.com/en-us/products/microsoft-software-license-agreement-FX103576343.aspx>.

Creating an additional RAM copy implicates the reproduction right under § 106(1).<sup>29</sup>

If the cloud provider does not own the software copy,<sup>30</sup> then the cloud provider again needs to rely on a license to permit this upload, as it already relies with respect to the copy installed on the hard disk.<sup>31</sup> The cloud context does not add any complexity in this respect.

If the cloud provider owns the copy, however, then the creation of a RAM copy could be permitted under 17 U.S.C. § 117(a). This is the case in a pure desktop deployment because the software copy must be uploaded into RAM to be used.<sup>32</sup> In cloud scenarios, the question is again, as with the copies on hard disk,<sup>33</sup> whether the scope of § 117(a) is exceeded because the RAM copy does not serve the cloud provider alone but also benefits the cloud user, and the RAM copy is used not only on the cloud provider's server but also via the remote user's computer.<sup>34</sup> According to its legislative history, § 117(a) was intended to benefit the lawful owner of the copy.<sup>35</sup> Its wording, however, does not preclude benefits to third parties. Most enterprise and office software users acquire software to provide services or products to their customers more or less directly: law firms use Microsoft's Office suite to write legal memos; accounting firms prepare Excel spreadsheets; professors present PowerPoint slideshows to their students; computer maintenance services providers access software remotely to provide technical support.<sup>36</sup> The RAM copy being utilized does not leave the machine on which it is created, namely the cloud provider's server. In the context of cloud offerings, the provider and users utilize the RAM copy only in conjunction with the machine on which it is stored. Users cannot copy any elements of the software to other machines in Scenarios 1–3. Users use other machines to access the RAM copy remotely, but in more traditional software distribution models, users also use additional connected machines to use software copies, e.g., printers or dual screens. So long as the RAM copies are

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29. *MAI Sys. Corp. v. Peak Computer, Inc.*, 991 F.2d 511, 518–19 (9th Cir. 1993).

30. As in Scenario 4, *supra* Part II.

31. *Marobie-FL, Inc. v. Nat'l Ass'n of Fire Equip. Distribs.*, 983 F. Supp. 1167, 1173 (N.D. Ill. 1997).

32. NIMMER & NIMMER, *supra* note 27, § 8.08[B][1][b].

33. See *supra* Section III.B.

34. Widmer, *supra* note 7.

35. FINAL REPORT OF THE NAT'L COMM'N ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS 13 (1979).

36. See, e.g., *Hogan Sys., Inc. v. Cybresource Int'l, Inc.*, 158 F.3d 319 (5th Cir. 1998).

not further reproduced on other machines, § 117(a) applies and allows RAM copies to be created in the cloud context.<sup>37</sup>

When users access software, the cloud provider's server may create additional partial reproductions in various cache memory spaces as it executes specific command lines (excerpts of the RAM copies). If and to the extent such reproductions are substantial and permanent enough to qualify as copies for copyright law purposes, § 117(a) permits such reproduction as an "essential step in the utilization of the computer program."<sup>38</sup> Such reproductions are created on the machine where the software is installed, namely the cloud provider's server. If in Scenario 3 the cloud context causes more copies to be created than would otherwise be necessary, one could argue that then the defense under § 117(a) may not be available on the ground that the copies do not constitute an essential step. Creating additional copies on additional machines for convenience is not covered by § 117(a).<sup>39</sup> But, even in Scenario 3, the underlying code remains on the cloud provider's server where it is installed. The size and number of reproductions in cache and registers depends on the activity of a user and could be higher in the case of one very active user compared to hundreds of connected but inactive users. It is ultimately only the RAM copy that is being executed, and this occurs only on the cloud provider's server. Therefore, § 117(a) would seem to apply, providing a defense in Scenario 3. In Scenarios 1 and 2, a defense under § 117(a) is not needed for copies in cache, since there are no additional copies made that could implicate reproduction rights. This is because the ephemeral code excerpts in the cache either consist of purely functional code segments that do not benefit from copyright protection, are too small to represent the copyrighted work,<sup>40</sup> or are too fleeting to constitute copies.<sup>41</sup>

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37. *But see* Widmer, *supra* note 7.

38. *See* NIMMER & NIMMER, *supra* note 27, § 8.08[B][1][b] (quoting 17 U.S.C. § 117(1) (2012)).

39. *See, e.g.*, Wall Data Inc. v. L.A. Cnty. Sheriff's Dep't, 447 F.3d 769, 785 (9th Cir. 2006); NIMMER & NIMMER, *supra* note 27, § 1.114.

40. *Cartoon Network LP, LLLP v. CSC Holdings, Inc.*, 536 F.3d 121 (2d Cir. 2008); *accord* *CoStar Grp., Inc. v. LoopNet, Inc.*, 373 F.3d 544, 551 (4th Cir. 2004) ("While temporary electronic copies may be made in this transmission process, they would appear not to be 'fixed' in the sense that they are 'of more than transitory duration . . . .'"); *Advanced Computer Servs. of Mich., Inc. v. MAI Sys. Corp.*, 845 F. Supp. 356, 363 (E.D. Va. 1994) (holding that program copy embodiment in a computer's RAM "arguably would be too ephemeral to be considered 'fixed' or a 'copy'" if it exists only for "seconds or fractions of a second" after loading).

41. *See* *Cartoon Network LP*, 536 F.3d at 129 (noting that reproduction rights are not implicated if "only a single second of a much longer work was placed in the buffer in isolation. In such a situation, it might be reasonable to conclude that only a minuscule portion of a work, rather than 'a work' was embodied in the buffer."); *Advanced Computer*

Courts have held in a number of cases that providing remote access to a work or program does not, in itself, establish that the remote user caused a copy to be made.<sup>42</sup> In Scenario 4, the copyright owner's license terms govern and § 117 is not applicable because neither the cloud provider nor its users are lawful owners of software copies.

## 2. *Reproduction Rights (§ 106(1)) Regarding GUIs*

In Scenarios 5 and 6, the existence of copyrightable GUIs adds another dimension. The analysis regarding GUIs follows the analysis regarding the underlying code in principle with one distinction: in the cloud context, an image of the GUI is reproduced on screens by multiple machines that may be far away from the cloud provider's servers, namely the cloud customer's and its end users' computers.

The geographic distance alone may not negate the applicability of § 117(a): if only a single user accesses each copy made available as part of the cloud offering, the copy of the GUI is necessary as an essential step in the utilization of the computer program in conjunction with the machine on which it is installed (the cloud provider's server), and it is used in no other manner. The fact that an image of the GUI copy appears on the screen of a user's computer does not seem to differ materially from desktop scenarios, as most common application software programs accommodate the use of multiple computer screens (e.g., dual screen set-ups or display on a laptop and connected wide screens for presentations of PowerPoint slides to a larger audience). Thus, if the cloud provider owns the software copies and makes each copy available to only one user, the cloud provider would not exercise reproduction rights with respect to a GUI in Scenarios 5 or 6.

If, however, the cloud offering allows multiple end users to connect to the software and view the GUI on their computers, this may exceed what is

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*Sems. of Michigan*, 845 F. Supp. at 363 (finding that program copy embodiment in a computer's RAM was too ephemeral to be fixed if it exists only for "seconds or fractions of a second" after loading); *accord* *Perfect 10, Inc. v. Amazon.com, Inc.*, 508 F.3d 1146, 1156 (9th Cir. 2007); *Miller v. Facebook, Inc.*, No. C 10-00264 WHA, 2010 WL 2198204 (N.D. Cal. May 28, 2010).

42. See RAYMOND NIMMER, *LAW OF COMPUTER TECHNOLOGY* § 1:14 n.7 (3d ed. 2006); see also, e.g., *Hogan Sys., Inc. v. Cybresource, Int'l, Inc.*, 158 F.3d 319 (5th Cir. 1998) (regarding remote servicing of software); *NLFC, Inc. v. Devcom Mid-America, Inc.*, 45 F.3d 231 (7th Cir. 1995) (stating that remote access does not prove unauthorized copying); *Nat'l Car Rental Sys., Inc. v. Computer Assocs.*, 991 F.2d 426, 434 (8th Cir. 1993) (holding that using a copy for benefit of a customer may constitute breach of contract, but does not create a presumption of copyright infringement; even if it is alleged that defendant "distributed the functionality" of its program, such a claim would not protect a right equivalent to one of the exclusive rights in copyright.).

necessary as an essential step to utilize the software on the cloud provider's server. In Scenarios 5 and 6, this is where courts may draw the line and find that additional copies requiring licenses have been created.

3. *Reproduction Rights (§ 106(1)) Regarding Downloadable Items*

In Scenario 7, users create and store on the cloud provider's server and their remote computers copies of copyrightable items, such as JavaScripts, clip art, and other objects embedded in software. In this context, users exercise reproduction rights.<sup>43</sup> So long as clip art and similar items are included in work product and remain on the cloud provider's servers, this is usually necessary as an essential step for the utilization of the software and therefore covered by § 117(a). Thus, if the cloud provider purchased the software, the copyright owner's reproduction rights are not exercised. But if and when work product which includes objects or Java scripts is downloaded to remote computers and disseminated onwards, § 117(a) may no longer apply, and a license from the copyright owner may be required for the downloaded copies.

4. *Adaptation or Derivative Work Rights (§ 106(2))*

In some cases, a cloud provider may have to modify code that was not originally written for cloud deployment. If the cloud provider can deploy the remote access functionality with independently created programs, however, then neither cloud providers nor end users would implicate adaptation rights under § 106(2) by merely providing or using software. Whatever combinations or modifications occur in RAM or CPU cache do not usually reach sufficient levels of creativity or fixation to amount to adaptation.<sup>44</sup> Thus, if the software supplier delivers software in 'cloud-ready' form, or the cloud provider can achieve 'cloud-readiness' with programs that it creates independently or licenses, then the cloud provider would not implicate adaptation or derivative works rights with respect to the underlying programs. Also, if it wanted to avoid exercising reproduction rights regarding the

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43. See, e.g., *Marobie-FL, Inc. v. Nat'l Ass'n of Fire Equip. Distribs.*, 983 F. Supp. 1167, 1173 (N.D. Ill. 1997) (holding that placing hard copies of clip art onto a hard drive infringes on reproduction rights); *Playboy Enters., Inc. v. Frena*, 839 F. Supp. 1552, 1556 (M.D. Fla. 1993) (holding that providing on an online "bulletin board" digital copies of copyrighted magazine photographs for download by subscribers constitutes copying).

44. See generally Lothar Determann, *Dangerous Liaisons—Software Combinations as Derivative Works? Distribution, Installation, and Execution of Linked Programs Under Copyright Law, Commercial Licenses, and the GPL*, 21 BERKELEY TECH. L.J. 1421 (2006). The court in *Dun & Bradstreet Software Servs., Inc. v. Grace Consulting, Inc.*, 307 F.3d 197, 204 (3d Cir. 2002) reached the opposite conclusion, but its position is not widely shared and would apply equally to traditional desktop-type software deployments.

copyright owner's GUI in Scenarios 5 and 6, the cloud provider could interject an independently created or licensed GUI between the underlying code and remote user's screens so that the remote users never see the GUI that the underlying software would normally cause to be displayed.

5. *Distribution Rights* (§ 106(3))

Under § 106(3), the copyright owner has the exclusive right “to distribute copies . . . to the public by sale or other transfer of ownership, or by rental, lease, or lending.” Sales, rentals, leases, and lending all require a transfer of possession of copies.<sup>45</sup> In the Internet context, this means a “transfer of a file from one computer to another.”<sup>46</sup> In Scenarios 1 through 6, the cloud provider does not transfer software copies to the customer's computer—neither complete copies stored on ROM, nor partial copies in RAM or cache. All copies remain on the cloud provider's server. Distribution, in the sense of transferring copies, does not occur.

With respect to pictures, clip art, and movie files uploaded to file-sharing platforms, however, courts have held that the copyright owner's distribution right can be implicated even if the person who uploads the copies does not transfer possession but merely enables others to make and download copies.<sup>47</sup> This implicates reproduction rights but not distribution rights because the uploader does not part with her copy and therefore possession of copies does not transfer.<sup>48</sup> Additionally, in the cloud context, customers do not even gain possession of new copies of the software itself. Customers can only download the output that they create with the software (e.g., Word documents, PowerPoint slides, Excel spreadsheets), not copies of the software that runs on the cloud provider's servers to create the output (e.g., the Microsoft Word, PowerPoint, or Excel applications). Thus, even if distribution rights under § 106(3) can be implicated by enabling the creation of new copies, they are not implicated in the cloud context with respect to the code that provides the cloud offering.<sup>49</sup>

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45. *See, e.g.,* Flava Works, Inc. v. Gunter, 689 F.3d 754, 756 (7th Cir. 2012) (holding that facilitating distribution of links to hosted files does not constitute distribution if the hosted files stay on the server).

46. Perfect 10 v. Google, Inc., 416 F. Supp. 2d 828, 844 (C.D. Cal. 2006), *aff'd in relevant part sub nom.* Perfect 10, Inc. v. Amazon.com, Inc., 508 F.3d 1146 (9th Cir. 2007); *see also* MyPlayCity, Inc. v. Conduit Ltd., No. 10 Civ. 1615(CM), 2012 WL 1107648, at \*12 (S.D.N.Y. Mar. 30, 2012); Arista Records, Inc. v. MP3Board, Inc., No. 00 CIV. 4660(SHS), 2002 WL 1997918, at \*4 (S.D.N.Y. Aug. 29, 2002); Reese, *supra* note 23, at 128.

47. *Marobie-FL, Inc.*, 983 F. Supp. at 1173; *Playboy Enters., Inc.*, 839 F. Supp. at 1556.

48. *See* Reese, *supra* note 23.

49. Widmer, *supra* note 7.

Cloud providers also do not distribute copies of the software's GUI. Customers can view the GUI while they utilize the software, but they cannot download copies of the code that generates the GUI or copy the GUI to their own computers.<sup>50</sup> They could theoretically copy the GUI by other means (e.g., by taking a photo or screenshot), but this is possible in the context of any software commercialization model and always implicates the copyright owner's reproduction right. Given that the cloud providers do not authorize such copying and that users do not usually engage in such copying, this possibility alone does not amount to an exercise of distribution rights regarding GUIs.

In Scenario 7, the software underlying the cloud solution includes objects or scripts that the cloud provider purposefully makes available for download, such as clip art for slide shows. If a customer includes clip art in work product, the customer acquires possession of new copies of that clip art. Possession does not transfer from the cloud provider because the cloud provider retains possession of the copy on its server, and therefore distribution rights are not implicated. But, even accepting the view that making copies available for reproduction equals distribution,<sup>51</sup> the making available of clip art or other graphical elements for download would not normally occur "by sale or other transfer of ownership, or by rental, lease, or lending"<sup>52</sup> in the cloud context. Cloud providers typically insist that customers shall not acquire ownership to the software or any portions thereof, instead obtaining only a non-exclusive license subject to sales-atypical restrictions. This will usually rule out a sale. Also, the cloud provider will not typically impose any temporal limitations on the customer's rights to retain downloaded clip art or other graphics. This rules out "rental, lease, or lending" as these kinds of commercial transactions require temporal limitations.<sup>53</sup> Therefore, the copyright owner's distribution right is not usually implicated in cloud offerings even where the cloud provider allows the download of clip art or similar copyrighted materials as part of a cloud offering.<sup>54</sup>

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50. Except, possibly, in a Scenario 7 situation if the cloud provider includes elements of the software that generates the GUI in an app or client software that the user downloads to a local device.

51. *Marobie-FL, Inc.*, 983 F. Supp. at 1173.

52. 17 U.S.C. § 106(3) (2012).

53. *Cf. Perfect 10*, 416 F. Supp. 2d 828, 844 (C.D. Cal. 2006), *aff'd in relevant part sub nom. Perfect 10, Inc. v. Amazon.com, Inc.*, 508 F.3d 1146 (9th Cir. 2007).

54. The copyright owner's reproduction right, however, would be implicated, because additional copies of copyrighted clip art or other materials would be created. *See Marobie-FL, Inc.*, 983 F. Supp. at 1173.

For the same reasons, the copyright owner's distribution right would also not be implicated if the architecture and functionality of the software providing the cloud offering requires the download and storage of some code elements in a local computer cache.<sup>55</sup> Users who access cloud offerings working with JavaScripts, for example, are usually required to accept a download of some JavaScripts to their local computer memory. Such code is generally owned by third parties and often publicly available free of charge from third-party sources. The delivery of such scripts involves copying and transmitting copyrighted code. If users receive a license to keep such copies without temporal restrictions, but no ownership, the copyright owner's reproduction right would be implicated, but not its distribution right.<sup>56</sup>

6. *Public Performance Rights* (§ 106(4))

Under § 106(4), the copyright owner has the exclusive right to, “in the case of literary, musical, dramatic, and choreographic works, pantomimes, and motion pictures and other audiovisual works, perform the copyrighted work publicly.” Software source and object code typically qualifies as a literary work because it consists of numbers and letters. When executed, it causes computers to display user-generated output—which the software copyright owner does not own—and a GUI—which the software copyright owner typically does own. GUIs contain words, numbers, and graphics and qualify as literary, pictorial, or graphic works under § 102(a). GUIs do not “consist of a series of related images which are intrinsically intended to be shown”; thus, they do not qualify as audio-visual works.<sup>57</sup> Section 106(4) does not cover pictorial and graphic works in its enumeration of protected works.<sup>58</sup> Thus, the right to public performance under § 106(4) cannot apply to Scenarios 1 through 5 or 7, unless the literary works elements of the underlying code or GUI are “performed.”

“To ‘perform’ a work means to recite, render, play, dance, or act it, either directly or by means of any device or process or, in the case of a motion picture or other audiovisual work, to show its images in any sequence or to

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55. *See* Perfect 10, Inc. v. Amazon.com, Inc., 508 F.3d 1146, 1156 (9th Cir. 2007); *Miller v. Facebook, Inc.*, No. C 10-00264 WHA, 2010 WL 2198204, at \*5 (N.D. Cal. May 28, 2010).

56. There would be no distribution by sale (due to lack of purchase price payment) or other transfer of ownership (due to an express clause to the contrary), or by rental, lease, or lending (due to perpetual conveyance of possession). *See* 17 U.S.C. § 106(3) (2012).

57. *But see* NIMMER, *supra* note 42, § 1.81 (suggesting that an “interface” can contain copyrightable content).

58. *Id.* § 8.14[A].

make the sounds accompanying it audible.”<sup>59</sup> The enumerated activities (recite, render, play, dance, act) all require as a common feature that the work be presented to a human audience in a manner that the work can be perceived visually or audibly.<sup>60</sup> The execution of code internally within a computer does not cause or allow perception by a human audience and thus does not constitute performance.<sup>61</sup> The text elements of a GUI are displayed statically for viewing and interacting with the program, but usually not shown in a sequence or made audible. Therefore, software as such is not susceptible to public performance under § 106(4).

Some exceptions are conceivable: programs can have features that allow command lines or usage instructions to be read aloud by the computer. Also, in Scenario 7, video games cause sequential audio-visual elements to be displayed on the computer screen. This could be viewed as a rendering of those portions of the code that cause the video sequences to be displayed.<sup>62</sup> The Ninth Circuit Court of Appeals held in *Allen v. Academic Games League* that public performance rights could not be implicated by the mere playing of interactive video games in public because the concept of *playing as performance* had been narrowly interpreted to apply only to films and music.<sup>63</sup> Allowing owners of copyrights in games to control if and where games are played would unreasonably strengthen copyright owners at the expense of the public’s interest in access to games.<sup>64</sup>

A narrow interpretation of “play” takes some use of games outside the scope of § 106(4), but games could still be performed by way of “rendering”

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59. 17 U.S.C. § 101 (2012).

60. *United States v. Am. Soc’y of Composers, Authors and Publishers*, 627 F.3d 64, 73 (2d Cir. 2010).

61. *Id.*; NIMMER, *supra* note 42, § 8.14[B][1].

62. *Miller v. Facebook, Inc.*, C 10-00264 WHA, 2010 WL 2198204, at \*5 (N.D. Cal. May 28, 2010). The court stated:

At best, defendant Yeo’s alleged publication of the ChainRxn video game for play by Facebook users constituted a public *performance* of plaintiff’s copyrighted work under 17 U.S.C. 106(4). Just as Congress considered the “reading a literary work aloud” as a performance rather than display of a literary work, the reading of Boomshine’s copyrighted source or machine code by a computer (resulting in the presentation of the video game to the user) could be seen as an analogous performance of the underlying work. *See* H.R. REP. NO. 94-1476, at 63 (1976). Admittedly, this area of the law is still developing.

*Id.*

63. *Allen v. Academic Games League of Am., Inc.*, 89 F.3d 614, 616 (9th Cir. 1996).

64. *Id.* at 617.

or “reciting”—as video footage in games is shown to a public audience.<sup>65</sup> Trying to take video games completely outside the scope of performance rights would be difficult to align with the wording of the Copyright Act. Section 106(4) expressly refers to performance of “motion pictures and other audiovisual works” without limitation to particular types of audiovisual works. Also, § 109(e) provides a very limited exception to § 106(4) for public performance of games in coin-operated machines, which would not be necessary if § 106(4) did not cover games.

Yet, many games provide only a basic framework for an audiovisual performance so that the players generate most or all of the copyrightable expression that could trigger performance rights (if and when fixed). For example, sellers of puppets cannot claim copyright ownership to puppet show performances unless they also supply the plot. Similarly, sellers of board games cannot claim copyright ownership to board game performances. Equally, makers of video recording or display software cannot claim copyrights in films recorded or played by users of their software. Makers of movie-like video games that place the player in a fantasy world with pre-determined video-footage that each player manipulates may be able to claim public performance rights in the movie-like elements of their games, but not the game-playing as such.<sup>66</sup>

Even if one accepts the possibility of implicating public performance rights by video game rendering, however, this is not particularly relevant in most cloud scenarios. Cloud applications do not typically produce any sequential footage. It is conceivable that software applications could recite or play text, e.g., stream video or audio tutorials. But such video or audio recordings would be objects within software programs. They might be linked with computer programs and could play within an application (e.g., a movie within a PowerPoint presentation). But the movie or audio files are separate on a logical level from the software that causes them to be played, just as a DVD is logically separate from the DVD player hardware, software, and firmware with which the DVD is played. Movie and audio files are created separately (typically by way of a recording) and often have a different copyright owner than the software that plays them.

For these reasons, the copyright owner’s right to public performance is not typically implicated in the cloud context. If a cloud offering were to include video or audio tutorials, or other audio-visual works, as in Scenario 6,

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65. Jihan Joo, Note, *Public Video Gaming as Copyright Infringement*, 39 AIPLA Q.J. 563, 577 (2011).

66. See, e.g., *Atari Games Corp. v. Oman*, 979 F.2d 242 (D.C. Cir. 1992); *Red Baron-Franklin Park, Inc. v. Taito Corp.*, 883 F.2d 275, 279 (4th Cir. 1989).

the question would arise whether their performance would be *public*. This question will be examined in the next Section in the context of the public display right, which uses the same definition of “public.”

7. *Public Display Rights* (§ 106(5))

The public display right was added to the U.S. Copyright Act in 1976 to reserve control for the copyright owner over transmission of works in lieu of distribution of copies.<sup>67</sup> Under 17 U.S.C. § 106(5), the copyright owner has the exclusive right “in the case of literary, musical, dramatic, and choreographic works, pantomimes, and pictorial, graphic, or sculptural works, including the individual images of a motion picture or other audiovisual work, to display the copyrighted work publicly.” Section 109(c) allows the owner of a lawful copy to display that copy publicly to viewers present at the place where the copy is located. For example, restaurants and other businesses can display poster copies of paintings without infringing the copyright owner’s right to public display. But, § 109(c) does not provide a defense in a cloud setting, because cloud users are usually far from the location of the software copy they are using.

Cloud providers make GUIs, including pictorial, graphic, and text elements, visible to end users. However, many such GUIs consist of commonly used command lines and highly functional graphical elements that are not susceptible to copyright protection.<sup>68</sup> For example, a U.S. court denied copyright protection for command line arrangements in office software products on the basis that these constitute methods of operation and are thus excluded from copyright protection under § 102(b).<sup>69</sup> Similarly, commonly used icons and symbols lack sufficient originality or are dictated by extrinsic factors (user expectations and familiarity).<sup>70</sup> For this reason alone, the public display right is not often implicated in practice in the context of cloud offerings.

To the extent GUIs are copyrightable, the software copyright owner’s display rights can only be implicated with respect to the displayed elements of the GUI, not the underlying code that resides on the cloud provider’s servers and causes the GUI to be displayed on the user’s computer. An exercise of display and performance rights requires that copyrightable

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67. See Reese, *supra* note 23, at 86.

68. See, e.g., *Lotus Dev. Corp. v. Borland Int’l, Inc.*, 49 F.3d 807 (1st Cir. 1995).

69. *Id.* (finding that a menu command hierarchy is not copyrightable).

70. *Apple Computer, Inc. v. Microsoft Corp.*, 35 F.3d 1435, 1445 (9th Cir. 1994).

content is made visible to a human audience.<sup>71</sup> The display of a GUI would not constitute a display of the underlying code.<sup>72</sup> Occasionally, the underlying code is made visible to users, for example, in the context of web pages that are written in HTML or where code is posted online for sharing purposes.<sup>73</sup> In most cases, however, the underlying code remains on the cloud provider's server, carefully hidden from any user's eyes.<sup>74</sup> In such circumstances, the underlying code is not displayed. The code and its output (the GUI) are separate works and only the output is displayed.<sup>75</sup>

Where copyrightable material is displayed as part of GUIs, however, the analysis turns on whether such display is *public*. Copyright owners have enforced their public display or performance rights with success regarding highly creative artwork, such as paintings, videos, and audio recordings.<sup>76</sup> Movies constitute audio-visual works and can be performed publicly by way of transmission.<sup>77</sup> In a number of cases, copyright owners have enforced their public performance rights to copyrighted movies against hotel operators in commercial scenarios that bear some similarity with cloud offerings as far as the public nature of the provisioning of the work was concerned.<sup>78</sup> Office

71. *United States v. Am. Soc'y of Composers, Authors & Publishers*, 627 F.3d 64, 85 (2d Cir. 2010).

72. *Miller v. Facebook, Inc.*, C 10-00264 WHA, 2010 WL 2198204, at \*5 (N.D. Cal. May 28, 2010). The decision has limited precedential value, because the court designated it as 'not for publication.' *Id.* (citations omitted).

73. *State v. Perry*, 697 N.E.2d 624, 629 (Ohio 1998).

74. Sophisticated hackers occasionally circumvent technical protection measures and access servers unlawfully to make and download unauthorized copies of software in violation of the Computer Fraud and Abuse Act, 18 U.S.C. § 1030 (2012), and other computer interference and trespass laws. But, as a general matter, cloud offerings minimize the risk of traditional forms of software piracy greatly.

75. *Miller*, 2010 WL 2198204, at \*4. The court stated:

[C]opyright protection of a computer program is principally derived from treating the underlying source code as a literary work. . . . While the public display right covers literary works, the proposed complaint contains no allegation that copies of the protected work were ever publicly displayed within the meaning of the statute. . . . Stated differently, the proposed complaint does not allege that the literary work itself—meaning the source or machine code for Boomshine—was ever displayed publicly.

*Id.* (citations omitted).

76. *See Flava Works, Inc. v. Gunter*, 689 F.3d 754 (7th Cir. 2012); *Am. Soc'y of Composers*, 627 F.3d at 73.

77. *Flava Works, Inc.*, 689 F.3d 754.

78. *See, e.g.*, *Profl Real Estate Investors, Inc. v. Columbia Pictures Indus.*, 508 U.S. 49 (1993) (defendants (hotel) installed videodisc players in hotel rooms and assembled a library of movies for guests for in-room viewing); *Warner Bros. Entm't, Inc. v. WTV Sys., Inc.*, 824 F. Supp. 2d 1003 (C.D. Cal. 2011) (defendant offered DVD rental via central consoles over the Internet); *On Command Video Corp. v. Columbia Pictures Indus.*, 777 F. Supp. 787

and enterprise software products do not normally contain or qualify as audiovisual works, however, and therefore cloud offerings are usually not at risk of implicating public performance rights.<sup>79</sup> Yet GUIs could be susceptible to public display rights, so some of the cases concerning movies are instructive.

To perform or display a work “publicly” means (1) to perform or display it at a place open to the public or at any place where a substantial number of persons outside of a normal circle of a family and its social acquaintances is gathered; or (2) to transmit or otherwise communicate a performance or display of the work to a place specified by clause (1) or to the public, by means of any device or process, whether the members of the public capable of receiving the performance or display receive it in the same place or in separate places and at the same time or at different times.<sup>80</sup> A performance or display can be public if the audience is geographically or temporarily dispersed.<sup>81</sup> The performance or display has to be open to the public, though, which occurs when display or performance is open to a substantial number of persons outside a normal circle of family and friends. If a cloud provider makes software available as a service to consumers, the public performance right will be implicated if a substantial number of consumers have access to the same copy even if each consumer individually accesses the copy at different times and if such copy streams videos as part of its operation.<sup>82</sup> If the cloud provider sets up its offering in a manner, however, whereby each copy of the software is only accessible to one consumer (or an insubstantial number of customers), then the public display right would not be implicated.<sup>83</sup>

When a cloud provider makes enterprise applications available such that each software copy is only accessible to a single enterprise, it is questionable whether the public performance or display right is implicated. And courts have yet to provide clear guidance on this point. One court has addressed a situation where a legal entity (in this case, a union) showed video footage to individuals. In this context, the court counted the number of union members individually as opposed to focusing on the fact that all individuals were

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(N.D. Cal. 1991) (hotel occupants could watch videos from their room transmitted from central console); *Entm't & Sports Programming Network, Inc. v. Edinburg Cmty. Hotel, Inc.*, 735 F. Supp. 1334 (S.D. Tex. 1986) (defendant received programs by way of satellite earth station without paying).

79. *See supra* Section III.C.6.

80. 17 U.S.C. § 101 (2012).

81. *NIMMER & NIMMER, supra* note 27, § 8.14[C][2].

82. *See Flava Works, Inc.*, 689 F.3d 754.

83. *See Cartoon Network LP, LLLP v. CSC Holdings, Inc.*, 536 F.3d 121, 138 (2d Cir. 2008).

members of only one legal entity (the union).<sup>84</sup> This seems appropriate for situations where individual members or employees of an organization view videos in their own interest and in their capacity as individual persons. Similarly, in *Merrill v. County Stores, Inc.*, employees of a store listened to a centralized music system, which was also available to the store's customers.<sup>85</sup> The court held that while the transmission of the music to the store's customers was a violation of the public performance right, the performance to the employees alone was also sufficient to constitute infringement of public performance rights. In support of its holding, the court stated, "the legislative history of the Act makes it clear that the transmission of a performance in the workplace for the benefit of employees is a 'public performance' subject to copyright control."<sup>86</sup> The court continued that the defendant's purpose in providing employee benefits was "not charitable" and was meant to "increase employee productivity."<sup>87</sup>

But, in situations where enterprise application software is used by employees of a corporation solely on the corporation's behalf and for the corporation's benefit, only the legal person—the corporation—has an original interest in the work. The enterprise customer does not provide access to application software for the employees' benefit; on the contrary, it requires employees to use the applications solely for its own purposes and benefit. Therefore, it would seem that only the number of *legal* persons (i.e., enterprises) should count for purposes of determining whether a substantial number of persons have access to the work. In *Community Broadcasting Co. v. Time Warner Cable, LLC*, the court's count included individual consumer customers of a cable company but not its employees who delivered films, even though the cable company employees could see the films too in the process of delivering them.<sup>88</sup> Where employees of an enterprise view a user screen or video tutorial on how to use enterprise software, they are acting on behalf of the enterprise, not as individuals. Therefore, it should arguably not matter for purposes of the public performance right how many *employees* have access to such a tutorial, only how many *enterprises*. Such cases have not yet been brought, and it is possible that courts would take a different view, also perhaps based on a "slippery slope" argument, given that it can be difficult to determine at times who benefits from access to a particular piece of software.

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84. *Los Angeles News Serv. v. Reuters Television Int'l*, 942 F. Supp. 1265, 1270–71 (C.D. Cal. 1996).

85. *Merrill v. Cnty. Stores, Inc.*, 669 F. Supp. 1164, 1170 (D.N.H. 1987).

86. *Id.* (citing H.R. Rep. No. 94-1476, at 64 (1976)).

87. *Id.*

88. *Cmty. Broad. Co. v. Time Warner Cable, LLC*, 598 F. Supp. 2d 154, 161 (D. Me. 2009).

Nevertheless, it seems defensible to argue that if a cloud provider designs its offering such that each software copy is only accessible to one enterprise customer, the public performance and display rights are not implicated even if a substantial number of employees have access to the software and the software contains protectable pictorial, graphic, or audiovisual elements (such as GUIs with non-functional elements or video/audio files). As discussed, there is little or no copyright protection for GUIs, and software copyright owners are usually content to rely on their reproduction right to protect their interests in copyrighted software.

As for consumer software and related cloud offerings, the copyright owner's right to public display could be implicated with respect to GUIs in Scenarios 5 and 6 if multiple consumers gained access to the GUI of the same copy of the software but not if each consumer accessed a separate software copy and GUI. In Scenarios 1 through 4, display and performance rights are not implicated because the GUI is not copyrightable and the underlying code is not made visible to any users.

#### D. SUMMARY

In the cloud context, the cloud provider typically implicates the copyright owner's reproduction right by installing software copies on the hard drives of servers and uploading copies into RAM. The creation of a copy of the GUI on the user's computer can also implicate reproduction rights. If the cloud provider acquires software copies by way of sale, § 117(a) permits deployment without a separate license from the copyright owner.

The copyright owner's distribution right is typically not implicated in the cloud context because software copies are not transferred to the user's computer. Images of GUIs are reproduced on the user's computer, but only for the duration of access sessions and without a change in possession of the software that generates the GUI (which remains on the cloud provider's server). Objects like clip art and ancillary code like JavaScripts can be reproduced permanently on the user's computer, but they are typically not provided in a sales- or rental-like manner.

Performance rights are also not usually implicated by cloud services offering office software because such software does not typically qualify as an audio-visual work. Video games or video files embedded in software can be exceptions, but cloud offerings of office software tend not to involve video games or files; even if they do, the video would not be performed *publicly* if the cloud provider makes each copy available to only one user. For the same reason, this scenario also does not implicate public display rights.

Where a cloud provider makes one copy of office software available to one enterprise for access by multiple employees, one could argue that the

resulting display of GUIs is not public because only one legal person (the enterprise) is accessing the display. But the cloud provider cannot yet rely on court precedent here, and it is possible that courts might count the number of employees with access to an enterprise cloud offering for purposes of determining whether public display rights are implicated.

Even if courts count the number of employees to determine whether public display occurred, it is possible that display rights under the U.S. Copyright Act are not implicated because GUIs of enterprise software programs often lack sufficient originality or are excluded from copyright protection altogether as methods of operation. Only where sufficiently expressive GUIs or video files included in software copies are made available as part of a cloud offering could display or performance rights under copyright law be implicated.

Applied to the seven Scenarios introduced at the end of Part II, *supra*, the copyright owner's rights under § 106 are implicated only as follows:

**Scenarios 1–3** (sale of copy, single- or multiple-user deployment, no copyrightable GUI): The cloud provider can claim § 117(a) and does not need a license from the copyright owner.

**Scenario 4** (licensed copies): The cloud provider needs a license for any deployment of the software and the copyright owner can allow or prohibit cloud deployments by adjusting the license scope.

**Scenario 5** (creative, static GUI): In a single user deployment, the GUI deployment does not implicate *public* display rights and any implication of the reproduction right is covered by § 117(a). In a multi-user deployment, § 117(a) may not cover the reproduction of the GUI for multiple users. Unless users are employees of one legal entity accessing one software copy only on behalf of such entity, *public* display rights would also be implicated.

**Scenario 6** (video): The cloud provider would exercise the public performance right in each deployment situation where the public display right is exercised in Scenario 5.

**Scenario 7** (downloadable items): Depending on the software functionality and intended use, the reproduction of downloadable items may be covered by § 117(a) if the cloud provider acquires the software by way of a sale and keeps the software copy as well as work product embodying all items originating from the software copy (such as clip art) on its own servers. If the cloud provider does not own the copies, it would need a license to use the software because such use would implicate the copyright owners' reproduction rights.

All in all, the software copyright owner's control over what happens in the cloud is much diminished in comparison to its rights to control more traditional forms of software commercialization via distribution. To keep some degree of control based on U.S. copyright law, software copyright owners have to avoid sales of software copies—either by strictly characterizing any sales as sales of licenses only, or, even better, by keeping their software copies in their own cloud from the outset.

#### IV. WHAT HAPPENS IN THE CLOUD TO THE SOFTWARE OWNER'S RIGHTS UNDER EUROPEAN COPYRIGHT LAW?

##### A. EU COPYRIGHT LAW FRAMEWORKS FOR SOFTWARE AND OTHER WORKS

In the thirty-one member states of the European Economic Area (“EEA”),<sup>89</sup> copyright law is partially harmonized by European Union directives, particularly the EU Software Directive<sup>90</sup> and the EU Copyright Directive.<sup>91</sup> The EU member states are required to implement the Directives into national law; for purposes of this analysis, this Article assumes that they have done so and refers to the EU Directives in lieu of the national laws that directly apply to copyright owners, cloud providers, and users.

###### 1. *EU Software Directive*

The EU Software Directive grants copyright protection to computer programs as literary works.<sup>92</sup> Like U.S. copyright law,<sup>93</sup> the EU Software Directive only protects creative elements of computer programs—not functionality, technical interfaces, programming language, or data file formats.<sup>94</sup> It does not cover GUIs as such.<sup>95</sup> Unlike the code that creates it, a

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89. The EEA consists of the twenty-eight EU Member States plus Norway, Iceland, and Liechtenstein.

90. Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs, 2009 O.J. (L 111) 16 [hereinafter EU Software Directive].

91. Council Directive 2001/29/EC of 22 May 2001 on the Harmonisation of Certain Aspects of Copyright and Related Rights in the Information Society, 2001 O.J. (L 167) 10 [hereinafter EU Copyright Directive].

92. *Id.* art. 1(1).

93. 17 U.S.C. § 102(a)–(b) (2012).

94. EU Copyright Directive, *supra* note 91, art. 1(2); Case C-406/10, SAS Inst. Inc. v. World Programming Ltd. 2012 EUR-Lex CELEX, ¶ 46 and ¶ 1 of the operative part of the judgment.

95. Case C-393/09, *Bezpečnostní softwarová asociace—Svaz softwarové ochrany v. Ministerstvo kultury*, 2010 E.C.R. I-13971 ¶ 42.

GUI itself does not constitute a computer program.<sup>96</sup> A GUI can be covered by other copyright laws, including the EU Copyright Directive, but only if and to the extent it is sufficiently original and not merely dictated by functional requirements.<sup>97</sup>

The copyright owner receives an exclusive right to reproduce, adapt, and distribute software under the Software Directive,<sup>98</sup> as under U.S. copyright law,<sup>99</sup> but no right to public display or public performance. In principle, a software user needs authorization from the copyright owner for “the permanent or temporary reproduction of a computer program by any means and in any form, in part or in whole,” including by “loading, displaying, running, transmission or storage of the computer program.”<sup>100</sup> But:

[a] person having a right to use a copy of a computer program shall be entitled, without the authorization of the rightholder, to observe, study, or test the functioning of the program in order to determine the ideas and principles which underlie any element of the program if he does so while performing any of the acts of loading, displaying, running, transmitting, or storing the program which he is entitled to do.<sup>101</sup>

This statutory right cannot be restricted by contract.<sup>102</sup>

Apart from reproduction for reverse engineering purposes, Article 5(1) of the EU Software Directive provides a defense similar to § 117(a) of the U.S. Copyright Act: if and to the extent reproduction is “necessary for the use of the computer program by the lawful acquirer in accordance with its intended purpose, including for error correction,” the software acquirer does not need authorization from the copyright owner, except as otherwise agreed in a contract.<sup>103</sup> Thus, if the copyright owner does not restrict the application of Article 5(1) of the EU Software Directive in a software license agreement, or if a secondary lawful acquirer is not in privity of contract with the copyright owner, the lawful acquirer is free to reproduce the software copy as necessary for the use of the program in accordance with its intended

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96. *Id.* ¶¶ 42 and ¶ 1 of the operative part of the judgment.

97. *Id.* ¶¶ 48–51.

98. EU Software Directive, *supra* note 90, at art. 4(1).

99. 17 U.S.C. § 106(1)–(3) (2012).

100. EU Software Directive, *supra* note 90, at art. 4(1)(a).

101. *Id.* at art. 5(3).

102. *Id.* at art. 8.

103. *Id.* at art. 5(1), (3). Contractual clauses that seek to restrict use of the software program for purposes of decompilation are invalid. *See id.*, at pmb. 16, arts. 1(2), 8; Case C-406/10, SAS Inst. Inc. v. World Programming Ltd., 2012 EUR-Lex CELEX ¶¶ 57–58 (May 2, 2012).

purpose. The copyright owner can only seek to contractually limit the application of Article 5(1) of the EU Software Directive in relation to a first acquirer of the software copy. Such limitation would not bind secondary buyers that are not in privity of contract with the copyright owner. Therefore, a second buyer would be able to take full advantage of Article 5(1) of the Software EU Directive.

Article 5(1) permits reproduction and adaptation “necessary for the use of the computer program by the lawful acquirer in accordance with its intended purpose.” The intended purpose of any computer program is to offer certain functionality. A question is whether a copyright owner can define the purpose of a program by specifying in a standard license agreement or in the product documentation that the program is not intended to be used or commercialized in a cloud service. Given the public policy underpinnings of Article 5(1) of the EU Software Directive, however, it seems questionable whether a copyright owner can define the intrinsic purpose of its program so unilaterally. Article 5(1) of the EU Software Directive defers to contractual restrictions in connection with the rights of the initial acquirer and does not indicate that such restrictions are intended to follow a software copy downstream. Even if the copyright owner could unilaterally define the purpose of a program, such purpose definition might only apply to the initial acquirer and be subject to modification by parties to downstream transactions. And, if the copyright owner itself offers other copies of the program in a cloud context, this would seem to undermine a unilateral purpose definition to the contrary altogether. Therefore, it seems likely that under the EU Software Directive, a lawful acquirer of a software copy can offer it in the cloud service context without authorization by the copyright owner.

Regarding the first sale doctrine, the EU Court of Justice held in *Oracle v. UsedSoft* that a software copyright owner cannot prevent the resale of software copies downloaded with the copyright owner’s consent, even if the initial acquirer agreed with the software copyright owner that the software copies were licensed only to the initial acquirer and would not be resold.<sup>104</sup> The EU Court adopted the view—previously taken by German courts—that any transfer of possession without a time limit for a lump sum fee is a sale and triggers the first sale doctrine. It expanded this view to software downloads and indicated that someone who acquires a software copy lawfully (from the copyright owner, with the copyright owner’s consent, or

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104. Case C-128/11, *UsedSoft GmbH v. Oracle Int’l Corp.*, 2012 EUR-Lex CELEX, ¶¶ 44–46 (July 3, 2012).

from a secondary distributor after exhaustion kicks in) may make and sell an additional copy provided that she deletes the original copy. Consequently, copies can be resold much more easily because they can be freely separated from the media or devices on which they were originally installed.

This decision represented a serious setback for the software industry's—and most developed countries'—fight against software piracy; pirates can claim that they were merely reselling legitimate copies of software, and copyright owners may have to prove that the original copies were not deleted fast enough, leading to increased uncertainty and practical difficulties. The EU Court also indicated that, after copyright exhaustion kicks in, secondary purchasers may transfer software licenses that they acquired in sales-like transactions. The legal basis for this assertion remains unclear, because neither the first sale doctrine nor other copyright law principles address the transfer of licenses. Nevertheless, the EU Court of Justice seems to view such an expansion of the first sale doctrine as beneficial from a policy perspective to ensure the doctrine has more force.

However, even without the seller being able to transfer the license, a second buyer may use the software in accordance with its intended purpose under Article 5(1) of the EU Software Directive. With the permissions granted in Article 5(1) of the EU Software Directive, there may be little incentive to transfer a license between the first buyer and the copyright owner, because such a license would typically restrict rather than permit acts. Finally, the EU Court of Justice stated that any contractual agreements to the contrary would be unenforceable regardless of whether they were negotiated and concluded between sophisticated parties with similar bargaining strength. Following the EU Court of Justice's decision, German courts have already blessed the resale of software copies that were licensed by educational institutions subject to heavy discounts and restrictive licenses and subsequently sold to UsedSoft for further resale and margin arbitrage.<sup>105</sup>

## 2. *EU Copyright Directive*

The EU Copyright Directive harmonizes certain aspects of copyrights in the information society.<sup>106</sup> It is not intended to affect existing rules for computer programs in the EU Software Directive.<sup>107</sup> But, since GUIs are not covered by the EU Software Directive,<sup>108</sup> they can be covered by the EU

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105. *See, e.g.*, Oberlandesgericht Frankfurt am Main [OLG] [German Court of Appeals], Nov. 6, 2012, Az. 11-U68-11 (Adobe v. UsedSoft).

106. EU Copyright Directive, *supra* note 91.

107. *Id.* at art. 1(2)(a).

108. *See supra* Section IV.A.1.

Copyright Directive.<sup>109</sup> Under the EU Copyright Directive, the copyright owner receives an exclusive right to reproduce, distribute, and communicate its copyrighted work to the public.<sup>110</sup> The right to communicate to the public is largely equivalent to the public display and public performance rights of §§ 106(4) and (5) of the U.S. Copyright Act. Based on this right, copyright owners receive a broad right to prohibit or license any form of online transmissions, including streaming, broadcasting and other transmissions, as well as transmissions to screens in separate hotel rooms<sup>111</sup> and the displays on screens visible to guests in a pub.<sup>112</sup>

A first sale in the EEA common market exhausts distribution rights under the EU Software Directive and EU Copyright Directive, but the right to communicate to the public under the EU Copyright Directive is not exhausted by a first communication.<sup>113</sup> The copyright owner's exclusive reproduction right under Article 2 of the EU Copyright Directive is limited by Article 5, which exempts temporary and transient copies necessitated by technological processes.<sup>114</sup> The UK Supreme Court recently held that loading a webpage does not implicate a copyright owner's exclusive reproduction rights because it only causes the kinds of temporary copies that Article 5 of the EU Copyright Directive permits.<sup>115</sup> The right to communicate to the public, however, is not similarly limited. Therefore, although a user accessing a remotely hosted software copy over the Internet and creating a locally cached copy of the GUI may not require the copyright owner's permission, the cloud provider that offers access to that GUI to multiple users would need permission to communicate the GUI to the public.<sup>116</sup> The EU Court of

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109. Case C-393/09, *Bezpečnostní softwarová asociace—Svaz softwarové ochrany v. Ministerstvo kultury*, 2010 E.C.R. I-13971 ¶ 51.

110. EU Copyright Directive, *supra* note 91, at arts. 2–4.

111. Case C-607/11, *ITV Broad. Ltd. v. TVCatchup Ltd.*, 2013 EUR-Lex CELEX ¶ 1 of the Operative Part of the Judgment (Mar. 7, 2013); Case C-306/05, *Sociedad General de Autores y Editores de España v. Rafael Hoteles SA*, 2006 E.C.R. I-11519 ¶¶ 37–38.

112. Case C-403/08, *Football Ass'n Premier League Ltd. v. QC Leisure*; Case C-429/08, *Karen Murphy v. Media Protection Servs. Ltd.*, 2011 E.C.R. I-09083 ¶ 192 (joined cases).

113. EU Copyright Directive, *supra* note 91, at art. 3(3).

114. *See Football Ass'n Premier League Ltd.*, 2011 E.C.R. I-09083 ¶ 176; Case C-5/08, *Infopaq Int'l A/S v. Danske Dagblades Forening*, 2009 E.C.R. I-06569 ¶¶ 54–74.

115. *Public Relations Consultants Ass'n Ltd. v. Newspaper Licensing Agency Ltd.*, [2013] UKSC 18.

116. The EU Court of Justice held in the *Bezpecnostni* case that television broadcasting of a GUI does not constitute a communication to the public, because such broadcasting did not allow the viewing public to interact with the GUI. *See* Case C-393/09, *Bezpečnostní softwarová asociace—Svaz softwarové ochrany v. Ministerstvo kultury*, 2010 E.C.R. I-13971 ¶ 57. However, in the case of cloud offerings, users would typically interact with any GUI and the narrow exception carved out in this case does not apply.

Justice has noted that what constitutes a communication to the public under EU law requires an individual assessment<sup>117</sup> but generally depends on how many users are accessing a copy, whether the users are a defined group, and whether the communication is made for profit.<sup>118</sup>

#### B. EU COPYRIGHT LAW APPLIED TO THE CLOUD

Applied to the Scenarios set forth in Part II of this Article, we find some commonalities and differences compared to the results under U.S. copyright law:

**Scenarios 1 and 2** (sale of copy, single or multiple user deployment, no copyrightable GUI, no significant additional copies): The cloud provider can claim Article 5(1) of the EU Software Directive and does not need a license from the copyright owner.

**Scenario 3** (multiple user access causes substantial additional copies in cache memory): The cloud provider may be able to rely on Article 5.1 of the EU Software Directive and operate without a license, if the additional copies in cache caused by the multi-tenant setup are “necessary for the use of the computer program in accordance with its intended purpose.”

**Scenario 4** (licensed copies): Under the EU Software Directive, the first sale doctrine would usually apply and thus Scenario 4 would be treated similarly as Scenarios 1–3.

**Scenario 5** (creative, static GUI): Based on the holding by the UK Supreme Court, any implication of the reproduction right may be covered by Articles 2 and 5 (transient copies for delivery) of the EU Copyright Directive. Yet, unless all users of a particular software copy offered in a cloud context are employees of one legal entity accessing one software copy only on behalf of such entity, public communication rights under Article 3 of the EU Copyright Directive may be implicated and require a license from the copyright owner.

**Scenario 6** (creative video): In a single user deployment, streaming may not implicate *public* communication rights and any implication of the reproduction right may be covered by Articles 2 and 5 (transient copies for delivery) of the EU Copyright Directive. In a multi-user deployment, public communication rights may be implicated.

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117. Case C-162/10, *Phonographic Performance (Ireland) Ltd v. Ireland*, 2012 EUR-Lex CELEX ¶ 29 (Mar. 15, 2012).

118. *See id.* ¶¶ 33, 35; Case C-135/10, *Società Consortile Fonografici v. Del Corso*, 2012 EUR-Lex CELEX ¶ 99 (Mar. 15, 2012).

**Scenario 7** (downloadable items): Clip art is only covered by the EU Copyright Directive. Reproduction and communication to the public are not authorized by law and must be licensed. Exhaustion could apply with respect to distribution of clip art, but not allow reproduction or communication to the public. JavaScripts and other software programs are only covered by the EU Software Directive; the cloud provider could claim exhaustion and Article 5(1) of the EU Software Directive to defend single user offerings, but any reproduction in multi-tenant scenarios would implicate the copyright owner's reproduction rights.

Compared to the situation in the United States,<sup>119</sup> the position of the software copyright owner is even weaker in Europe, given the much broader application of the first sale doctrine and the view that copying to access webpages does not implicate reproduction rights. Consequently, cloud providers could potentially purchase and use software copies to render cloud offerings without permission from—and adequate compensation to—copyright owners in Europe with very few copyright restraints.

## V. WHAT HAPPENS WHERE IN THE CLOUD? INTERNATIONAL COMPLICATIONS

As discussed in Part IV of this Article, cloud providers may be able to buy and deploy software copies without permission from the copyright owner to render software-as-a-service offerings in Europe. Pursuant to Part III, European cloud providers may be able to render such offerings also to customers in the United States without infringing U.S. copyrights if those cloud providers can design their offerings so that neither providers nor users have to create any copies of the software on U.S. territory.

Copyrights are territorial.<sup>120</sup> The scope of protection under intellectual property laws is determined by the law of the country where the alleged infringement occurred.<sup>121</sup> “On infringement issues, the governing conflicts principle is usually *lex loci delicti*.”<sup>122</sup> Even where U.S. courts have personal jurisdiction over a defendant, they are generally hesitant to decide cases based

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119. See *supra* Part III.

120. *Kirtsaeng v. John Wiley & Sons, Inc.*, 133 S. Ct. 1351, 1376 (2013) (Ginsburg, J., dissenting) (“The Copyright Act, it has been observed time and again, does not apply extraterritorially.”).

121. NIMMER & NIMMER, *supra* note 27, § 17.05; Raymond T. Nimmer & Lorin Brennan, *Modernizing Secured Financing Law for International Information Financing: A Conceptual Framework*, 6 HOUS. BUS. & TAX L.J. 1, 46 (2005); Hanns Ullrich, *TRIPS: Adequate Protection, Inadequate Trade, Adequate Competition Policy*, 4 PAC. RIM L. & POL’Y J. 153, 158–59 (1995).

122. Nimmer & Brennan, *supra* note 121, at 91.

on foreign intellectual property laws because they do not want to interfere with the sovereignty of the foreign state that granted the intellectual property right.<sup>123</sup>

Thus, assuming that the cloud provider keeps its servers and operations in Europe—or better yet, in a jurisdiction that does not recognize foreign copyrights at all<sup>124</sup>—a software copyright owner in the United States would be in a relatively weak position to prevent the commercialization of its software via service agreements with users in the United States, and not just on procedural and jurisdictional grounds. In Scenarios 1–4, U.S. copyrights would not be implicated because all software copies remain outside of U.S. territory. In Scenarios 5 and 6 (creative, static GUI or video), in a single-user deployment, the GUI deployment would not implicate public display or performance rights irrespective of the jurisdictional situation. In a multiple-user deployment version of Scenarios 5 and 6, public display and performance would occur on U.S. territory, but the cloud provider would not be acting on U.S. territory, and no individual cloud user would be causing public performance or display to occur. In Scenario 7 (downloadable items), cloud users would receive copies on U.S. territory. This could implicate reproduction or distribution rights under U.S. copyright law. If the U.S.-based users or the foreign cloud providers asserted a first sale defense on the basis that the provider purchased copies of the downloadable items abroad, U.S. courts would have to decide whether they apply U.S. or foreign copyright or property law to determine ownership of the downloaded copies.<sup>125</sup> If they chose to apply foreign law, the first sale defense could legitimize distribution of downloadable copies under U.S. copyright law, even without permission from the U.S. copyright owner.

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123. NIMMER & NIMMER, *supra* note 27, § 17.03 (noting that this should be less of a concern with respect to copyrights because copyright ownership does not usually depend on an express grant or act by a government agency, unlike in the case of patents or trademarks).

124. For example, the Marshall Islands have copyright protections which exempt “any sound recording or audiovisual work in which the person who owns the master phonorecord, master disc, master wire, master tape, master film or other device or article from which the sounds and/or audiovisual images are derived is not a citizen of the [Marshall Islands].” Unauthorized Copies of Recorded Materials Act, 1991, § 204 (Marshall Islands), *available at* [http://www.wipo.int/wipolex/en/text.jsp?file\\_id=236201](http://www.wipo.int/wipolex/en/text.jsp?file_id=236201). The Marshall Islands is not a party to any international copyright treaties.

125. See Determann, *Importing Software and Foreign Copyright*, *supra* note 26, at 34.

## VI. WHAT HAPPENS IN THE CLOUD TO SOFTWARE COPYRIGHTS?

Clouds are on the horizon for software copyrights.<sup>126</sup> Cloud providers have the potential to disrupt balances of interests under copyright law as well as commercialization models because software-as-a-service implicates rights under copyright law very differently than traditional distribution models. Without the need to make a copy for every user or physically transfer copies, cloud providers may be able to use software to provide services without specific permission from—and adequate compensation to—software copyright owners. Cross-border scenarios introduce additional complexities when software copies made in the cloud stay in the cloud—and outside of jurisdictions where software developers have recourse to copyright laws. Moreover, international exhaustion, as recently articulated by the U.S. Supreme Court in *Kirtsaeng*, may further enable disruption to seep into even those jurisdictions with strong copyright protections for software, such as the United States.<sup>127</sup> Like any change, disruption brings threats to some and opportunities to others: software developers that can avoid distributing any copies can evade the applicability of the first sale doctrine (the ‘distribution trigger’ in most open source licenses), reverse engineering via decompilation, and interoperability with undesired add-ons.<sup>128</sup> Software developers that have parted with software copies in the past—or continue to pursue more traditional distribution models—can anticipate challenges from unauthorized cloud providers. Everyone must not only prepare for the fact that software copyrights are implicated differently—and less—in cloud scenarios, but also understand what happens in the cloud.

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126. See Lothar Determann, *Clouds on the Horizon for Software Copyrights?*, 18 CYBERLAWYER 6, 8 (2013).

127. Determann, *Importing Software*, *supra* note 26, at 36.

128. See generally Determann & Nimmer, *supra* note 4.

