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HEAD IN THE CLOUDS, HEAD IN THE SAND: FEDERAL FAILURE TO UPDATE GUIDANCE ON COMPUTER TRANSACTIONS IN AN INTERNATIONAL CONTEXT

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Abstract: The United States has two different rationales for taxing income of non-U.S. persons and entities. First, the income may be "sourced" to the United States, as defined in the Internal Revenue Code. Alternatively, the income may be effectively connected to a trade or business within the United States that provides income to the non-U.S. person or entity. The sourcing rules for income of non-U.S. persons and entities depend heavily on the nature of the underlying transaction and the geographical location where certain key elements of the transaction take place. So long as the non-U.S. person or entity avoids activities that constitute a trade or business within the United States under the Internal Revenue Code, precluding taxable effectively connected income, even significant revenue streams may escape taxation by the United States. With the rise of new models of digital transactions, companies may structure their business operations to limit or avoid U.S. taxation. Twenty years ago, the Department of the Treasury developed regulations governing computer transactions. Since then, new mechanisms for digital deliveries have developed, including the cloud computing products. These products—software-as-a-service (SaaS), platform-as-a-service (PaaS), and infrastructure-as-a-service (IaaS)—have sprouted, rooted, and blossomed into an expansive and profitable industry. This Comment summarizes the landscape of cloud taxation, reviews different ways to frame cloud transactions under current law, and advocates for new federal action to ensure income does not escape taxation by virtue of the underlying transaction's technological form.

INTRODUCTION

By allowing remote access to computer products from virtually anywhere, technological developments have changed how consumers and businesses access and use software and computing resources.[1] Nations have sought to apply existing tax regimes to new "cloud computing" transactions, but these new models of commerce defy easy application of

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1. *What Is Cloud Computing?*, AMAZON WEB SERVS., https://aws.amazon.com/what-is-cloud-computing/ [https://perma.cc/PWF6-GCNM]; *Documentation > Overview*, GOOGLE, https://cloud.google.com/docs/overview/ [https://perma.cc/J3PN-779D]; *The Only Consistent and Comprehensive Hybrid Cloud*, MICROSOFT, https://azure.microsoft.com/en-us/overview/hybrid-cloud/ [https://perma.cc/99R8-DD3S].

traditional foundations for taxing jurisdiction.[2] Intranationally, states have been fighting to levy sales tax on retail vendors who operate an online platform without a physical presence in the state,[3] and they have made similar attempts to tax income stemming from intellectual property housed in favorable jurisdictions like Delaware.[4] These issues are amplified in an international context, particularly when nations have been slow to develop strategies to ensure income from these new transactions does not escape taxation.[5] This Comment surveys the domestic tax landscape of the United States with regard to transnational cloud computing transactions and discusses the ways in which these transactions resist clean categorization under the current framework.

Traditionally, jurisdiction for taxes on transnational transactions has been related to the geographic location of the parties to the transaction or to certain key aspects of the transaction.[6] Domestic tax authorities have a framework, simple to devise if difficult to apply, to determine each of the relevant locations in a traditional service, sale, or licensing agreement: the parties each have an identifiable residence or current geographic location, and the transaction itself may occur in the physical world or involve an intangible item (e.g., intellectual property) with geographically-specific rights or protections. In a cloud transaction, however, there is an ongoing relationship among the parties, the customers or end-users may be highly mobile, and the transaction allows remote access from virtually any place

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2. David Shakow, *The Taxation of Cloud Computing and Digital Content*, PENN. L.: LEGAL SCHOLARSHIP REPOSITORY (July 18, 2013), https://scholarship.law.upenn.edu/faculty_scholarship/475/ [https://perma.cc/29EG-K4BB].

3. South Dakota v. Wayfair, Inc., 585 U.S. ___, 138 S. Ct. 2080, 2096–99 (2018) (overruling a line of precedent that required a business's physical presence in a state for the state to levy sales tax on the business rather than the consumer on the basis that the "Cyber Age" has irrevocably changed the commercial landscape as well as "the dynamics of the national economy"). Importantly, the states were entitled to sales tax prior to *Wayfair*, but the consumer was the liable party. *Id.* at 2088 (discussing the difficulties of collecting such tax from consumers); Direct Mktg. Ass'n v. Brohl, 575 U.S. ___, 135 S. Ct. 1124, 1127–28 (2018) (summarizing the relationship between sales and use taxes as well as the general obligation for consumers to pay use taxes when sales tax is not collected); *see also* Shakow, *supra* note 2, at 9–16 (discussing steps taken by states to address Internet-based transactions within the United States).

4. *See* DEL. CODE ANN. tit. 30, § 1902(b)(8) (2018) (exempting intellectual property holding corporations from Delaware state tax); *see generally* JEFFREY A. MAINE & XUAN-THAO NGUYEN, THE INTELLECTUAL PROPERTY HOLDING COMPANY: TAX USE AND ABUSE FROM VICTORIA'S SECRET TO APPLE 92–122 (2017).

5. Arthur J. Cockfield, *The Rise of the OECD as Informal 'World Tax Organization' Through National Responses to E-Commerce Tax Challenges*, 8 YALE J.L. & TECH. 136, 138–39 (2006); Monica Gianni, *The OECD's Flawed and Dated Approach to Computer Servers Creating Permanent Establishments*, 17 VAND. J. ENT. & TECH. L. 1, 27–31 (2014).

6. Orly Mazur, *Taxing the Cloud*, 103 CALIF. L. REV. 1, 11 (2015).

in the world.[7] Accordingly, cloud transactions resist tests that hinge on particular geographic locations.

After a short technical overview, this Comment proceeds in four parts. First, it will define the relevant terms and outline some of the characteristics of different cloud computing product models. Second, it will provide a brief overview of the different mechanisms by which the incomes of non-U.S. persons and entities may become subject to U.S. taxation, including U.S.-sourced income, a U.S. trade or business, and, if taxation will occur, bilateral tax treaties. Specifically, this Comment will discuss the model treaties promulgated by the Organization for Economic Co-operation and Development (OECD), the United Nations (U.N.), and the United States that form the basis for many bilateral tax treaties.[8] Third, this Comment will discuss the difficulty in applying these existing frameworks to cloud transactions. Finally, this Comment will urge the federal government to take legislative or regulatory action to clarify the landscape and ensure consistent and predictable taxation.

I. NEBULOUS TRANSACTIONS AND GROUNDED TAX POLICY

A. Summary of Cloud Computing

Over the past several years, there has been a greater movement toward accessing remote computing products, resources, and tools. Although this development may echo antiquated, room-sized mainframe accessed through remote terminals, cloud computing delivery models are based on efficiency rather than necessity.[9] In essence, these models allow users to access software, computing resources, or programming tools remotely without having to store that information locally.[10] In addition to a lighter footprint on local machines, access can scale with multiple users.[11] Each additional user can access the cloud-computing product from a cheap computer without expensive hardware adapters or resource-intensive

7. *Id.* at 14–15.

8. Cockfield, *supra* note 5, at 186–87.

9. Shakow, *supra* note 2, at 3 ("In the 1960s . . . large entities (such as universities) wanted to allow many users to share their few computers . . . . The user could instruct the computer to run programs that were resident on the computer, manipulating data that was stored on the computer. The results of the computer operations might be available only at the computer site, or . . . be sent back to the user to be printed . . . . The development of the personal computer and its easy availability made this structure obsolete.").

10. *Id.*

11. *Id.*

local software.[12] The customer pays a fee to the provider, but the provider assumes responsibility for access outages, data loss, and other risks. Similarly, the marginal cost of hosting additional data associated with new users is lower for providers who already have an infrastructure of data centers to store and process information.

Economies of scale make this method of infrastructure, platform, and software delivery more efficient as burdens shift to parties who can handle them at lower marginal cost, so it is likely that such cloud computing models will continue to grow. Additionally, the delivery and access mechanism may increase privacy and corporate security. For example, customs searches at border crossings have expanded into the digital realm, and officials may indiscriminately review and analyze digital content stored locally on a physical object crossing the border.[13] However, customs entities may limit their search to exclude remotely hosted material such as that stored using cloud computing.[14] From a practical standpoint, a device passing through customs may be configured to limit the scope of a customs search by storing minimal information locally.[15] This encourages customers dealing with sensitive data to move much of their activities to the cloud and beyond the reach of customs officials.[16]

As cloud computing has proliferated, including in the public sector, governments have failed to develop adequate methods to ensure cloud transactions do not escape taxation, particularly if it has an international character.[17] Currently, the federal government evaluates the source of a transaction's income based on the location of certain transaction elements to determine whether the income is taxable.[18] Alternatively, a non-U.S.

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12. Such computers may be netbooks, thin clients, or other terminal-type access points. *See, e.g.*, Clientron Corp. v. Devon IT, Inc., 35 F. Supp. 3d 665, 669 n.1 (E.D. Pa. 2014) (defining "thin client" by accepting plaintiff's definition); Devon IT, Inc. v. IBM Corp., 805 F. Supp. 2d 110, 117 (E.D. Pa. 2011) (discussing the benefits of a specific thin client product); 48 C.F.R. § 23.701(3) (2018) (defining "computer" to include thin clients and workstations in the context of federal acquisitions).

13. *E.g.*, U.S. CUSTOMS & BORDER PROT., CBP DIRECTIVE NO. 3340-049A, BORDER SEARCH OF ELECTRONIC DEVICES 4–5 (2018), https://www.cbp.gov/sites/default/files/assets/documents/2018-Jan/CBP-Directive-3340-049A-Border-Search-of-Electronic-Media-Compliant.pdf [https://perma.cc/64ND-2ECG] (discussing search procedures, including copying the local content of a device upon "reasonable suspicion").

14. *Id.* at 4 ("Officers may not intentionally use the [electronic] device to access information that is solely stored remotely. To avoid retrieving or accessing information stored remotely and not otherwise present on the device, Officers will [typically] request that the traveler disable connectivity to any network . . . .").

15. *See id.*

16. *Id.*

17. Gianni, *supra* note 5, at 27–31.

18. Shakow, *supra* note 2, at 21–22.

person or entity could be operating a trade or business within the United States that generates effectively connected income.[19]

For the purposes of this Comment, "provider" will refer to the entity generating income from cloud computing, "customer" will refer to the entity contracting with the provider, and "user" will refer to the natural person accessing and using cloud computing products, services, and resources.

B. Introduction to Cloud Transactions: Infrastructure; Service; or Platform as a Service

The National Institute for Standards and Technology (NIST) defines cloud computing as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."[20]

NIST also identifies several essential characteristics of cloud computing, including on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service.[21] NIST has further defined three different service models for cloud computing delivery. First, software as a service (SaaS) provides customers with access to pre-developed software from the provider accessible through a thin client or local program.[22] "The [customer] does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings."[23] Readers may be familiar with SaaS products such as Google Docs, Microsoft Office 365, or Apple Mail. Second, platform as a service (PaaS) allows customers to access a suite of programming tools, including

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19. I.R.C. §§ 864(b), 871(b)(1), 882(a)(1) (2012).

20. PETER MELL & TIMOTHY GRANCE, U.S. DEP'T OF COMMERCE, NAT'L INST. OF STANDARDS AND TECH., THE NIST DEFINITION OF CLOUD COMPUTING 2 (2011), https://nvlpubs.nist.gov/nistpubs/legacy/sp/nistspecialpublication800-145.pdf [https://perma.cc/CS4E-N9ND] [hereinafter NIST REPORT].

21. *Id.* at 2.

22. *Id.*; LEE BADGER, TIM GRANCE, ROBERT PATT-COMER & JEFF VOAS, U.S. DEP'T OF COMMERCE, NAT'L INST. OF STANDARDS AND TECH., CLOUD COMPUTING SYNOPSIS AND RECOMMENDATIONS 2-1–2-2 (2012) [hereinafter NIST SYNOPSIS], https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-146.pdf [https://perma.cc/QM7P-9UDD].

23. NIST SYNOPSIS, *supra* note 22, at 2-1–2-2.

languages, libraries, and services, that allow them to deploy their own applications or programs on the provider's cloud infrastructure.[24] Application Programming Interfaces (APIs) are one example of such tools that provide pre-written code, allowing programmers to build functionality, including interaction with other applications or platforms.[25] Though customers do not control underlying resources, they do control "the deployed applications and possibly application hosting environment configurations."[26] Readers may be familiar with PaaS products such as Microsoft Azure or Google App Engine. Most PaaS products are business-to-business, targeting programmers and developers. Third, infrastructure as a service (IaaS) allows as-needed access to raw computing resources such as processing, storage, servers, or networks where the customer "has control over operating systems, storage, deployed applications" as well as "limited control of select networking components (e.g., host firewalls)."[27] IaaS typically delivers access to hardware resources.[28] Readers may be familiar with IaaS storage products such as Google Drive, Microsoft OneDrive, and Apple iCloud. Because each model provides different products and different delivery mechanisms, the underlying transactions will be characterized differently, yielding different tax treatment.[29] There are different variations in delivering each of these product models that are beyond the scope of this Comment.[30]

The products offered by each model can be described in relation to each other. An IaaS customer uses the provider to host and mechanically operate their own programs for their own users or clients. A PaaS

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24. *Id.* at 2-2; NIST REPORT, *supra* note 20, at 2–3.

25. *See* Oracle Am., Inc. v. Google Inc., 750 F.3d 1339, 1348–51 (Fed. Cir. 2014) (defining APIs in an ongoing case over their copyrightability), *rev'd*, 886 F.3d 1179 (Fed. Cir. 2018); BARRIE SOSINSKY, CLOUD COMPUTING BIBLE 51 (2011) (describing APIs as "one of the key differentiators" of cloud computing by "instantiating resources needed to support applications" and noting that each cloud provider has proprietary APIs, risking vendor "lock-in").

26. NIST SYNOPSIS, *supra* note 22, at 2-2.

27. *Id.*; NIST REPORT, *supra* note 20, at 3.

28. *See* SOSINSKY, *supra* note 25, at 11.

29. *See, e.g.*, I.R.C. § 861 (2012) (sourcing income to domestic or foreign jurisdictions based on its character); *id.* § 1441 (providing for withholding of taxes on certain income paid to nonresident aliens); *id.* §§ 1442–1443; *id.* § 864(b) (defining a trade or business within the United States and establishing that performance of services for payment constitutes such trade or business).

30. *See generally* NIST SYNOPSIS, *supra* note 22 (discussing four "different deployment" models that may be applied to the three "service models," and also analyzing the different balances of control and responsibilities in each of the twelve combinations). This slim volume provides a helpful technical overview as well as a discussion of the business models driving delivery of cloud computing products.

customer uses a set of computational tools to create their own programs hosted by the provider and with the provider's support. Finally, a SaaS customer uses a prepackaged software program, likely built by the provider, that is ready to use and that runs on the infrastructure of the provider or a third party.

C. The Cloud Computing Business

Cloud computing product contracts define promises providers make to customers, including product availability, remedies for breach of contract, data preservation at contract termination, and data security or confidentiality.[31] Providers also typically include certain limitations on, or exceptions to, these promises such as scheduled outages (such as for maintenance or upgrade).

Amazon, IBM, Microsoft, and Alphabet[32] are major players in the industry.[33] Each company offers a comprehensive product line providing raw computational resources, developer tools, storage, databases, and resources marketed to enterprise IT departments ranging from a spellcheck application programming interface (API) to barebones cloud servers.[34] The breadth of products illustrates the complicated nature and variety of cloud-based products and, accordingly, the difficulty in categorizing a cloud-based transaction and sourcing the attendant income.

Though providers may theoretically host their cloud-based transactions anywhere, practical constraints encourage each company to concentrate data centers acting as hosting locations for their cloud products.[35] These

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31. *Id.* at 3-1–3-2.

32. Alphabet is the parent company for Google. At times in this Comment, there may be references to "Google" interchangeably with "Alphabet" because of industry use and the relatively new corporate structure.

33. Laurie Beaver, *How the Top Four Cloud Companies Fared in Q3*, BUS. INSIDER (Nov. 2, 2017, 10:41 AM), http://www.businessinsider.com/amazon-alphabet-ibm-microsoft-cloud-q3-2017-11 [https://perma.cc/2B2W-RE63]; Bob Evans, *Amazon or IBM: Who's the King of Cloud Revenue?*, FORBES (Oct. 20, 2017, 10:29 AM), https://www.forbes.com/sites/bobevans1/2017/10/20/amazon-or-ibm-whos-the-king-of-cloud-revenue/#59f3aa11691e [https://perma.cc/FF8R-EJ7N].

34. *Azure Products*, MICROSOFT, https://azure.microsoft.com/en-us/services [https://perma.cc/AE7N-SKTM]; *Cloud Products*, AMAZON, https://aws.amazon.com/products [https://perma.cc/X565-CB42]; *IBM Cloud Products*, IBM, https://www.ibm.com/cloud/products [https://perma.cc/6G6D-64U7]; *Products and Services*, GOOGLE, https://cloud.google.com/products [https://perma.cc/KFT5-4UBJ].

35. SOSINSKY, *supra* note 25, at 13–14 (identifying factors, including tax efficiency, in siting data centers); *see In re* Warrant to Search a Certain E-Mail Account Controlled & Maintained by Microsoft Corp., 829 F.3d 197, 202–03 (2d Cir. 2016) (discussing Microsoft's consideration of assigning data to a specific location), *vacating as moot* 584 U.S. ___, 138 S. Ct. 1186, 1188 (2018); NIST SYNOPSIS,

data centers consist of large racks of servers that store information or process changes, including transactions.[36] Any particular site may have company-employed staff, subsidiary staff, or subcontractors servicing the location.[37] Further, the cloud company may own the facility or lease server space.[38] Table 1 lists the locations of cloud facilities for the four major companies above.

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supra note 22, at 8-1–8-2 (discussing performance concerns associated with cloud computing products).

36. KAREN SCARFONE, WAYNE JANSEN & MILES TRACY, U.S. DEP'T OF COMMERCE, NAT'L INST. OF STANDARDS AND TECH., SPECIAL PUBL'N 800-123, GUIDE TO GENERAL SERVER SECURITY 2-1 (2008), https://nvlpubs.nist.gov/nistpubs/legacy/sp/nistspecialpublication800-123.pdf [https://perma.cc/KST5-6QET] (defining "server" in the context of data security); SOSINSKY, *supra* note 25 (describing cloud customers as "renting or leasing part of an enormous infrastructure of datacenters, computers, storage, and networking capacity" and characterizing datacenters as huge facilities sited near cheap, renewable power); *e.g.*, Ingrid Burrington, *Why Amazon's Data Centers Are Hidden in Spy Country*, ATLANTIC (Jan. 8, 2016), https://www.theatlantic.com/technology/archive/2016/01/amazon-web-services-data-center/423147/ [https://perma.cc/9ST7-D6ND] (describing Amazon's entry into northern Virginia data centers through leasing facilities as well as the breadth of Amazon's web hosting operation); Steven Levy, *Google Throws Open Doors to Its Top-Secret Data Center*, WIRED (Oct. 17, 2012, 7:30 AM), https://www.wired.com/2012/10/ff-inside-google-data-center/ [https://perma.cc/4H6N-MY8H] (describing a tour of a Google, now Alphabet, data center).

37. *See, e.g.*, *Assuring Uptime for Data Center Systems 24/7/365*, ABM, https://www.abm.com/data-centers/ [https://perma.cc/47AA-CMBW] (describing costs associated with data center failures and offering maintenance, support services, and staffing); *Data Center Operations*, KROESCHELL, http://www.kroeschell.com/capabilities/data-center-operations/ [https://perma.cc/9CB3-DCMG] (offering services to maintain and support data center operations); *Data Center Services*, MURPHY, https://www.murphynet.com/services/data-center/ [https://perma.cc/BUY4-JSLN] (offering data center services, including design, construction, and maintenance).

38. *See* Apple, *iOS Security: IOS 11*, 53 (Jan. 2018) (disclosing Apple's practice of storing its consumer iCloud on "third-party storage services, such as [Amazon's] S3 and Google Cloud Platform"); Samuel Axon, *Your Apple iCloud Data Is Now Stored on Google Servers — Surprised?*, ARS TECHNICA (Feb. 26, 2018, 12:59 PM), https://arstechnica.com/gadgets/2018/02/your-apple-icloud-data-is-now-stored-on-google-servers-surprised/ [https://perma.cc/S2M7-TGJA] (discussing Apple's use of Google and Amazon servers to host iCloud content); Levy, *supra* note 36 (describing Google's historical leasing of data centers and eventual development of its own facilities).

Table 1:
Global Cloud Facility Locations

Amazon[39]	**IBM**[40]	**Microsoft**[41]	**Alphabet**[42]
United States	United States	United States	United States
Canada	Canada	Canada	Canada
Brazil	Brazil	Brazil	Brazil
India	India	India	India
Japan	South Korea	Japan	Japan
South Korea	China	South Korea	Hong Kong
China	Singapore	China	Taiwan
Singapore	Australia	Hong Kong	Singapore
Australia	United Kingdom	Singapore	Australia
Ireland	Norway	Australia	United Kingdom
United Kingdom	Netherlands	South Africa	Germany
Germany	Italy	Ireland	Belgium
France	France	United Kingdom	Finland
	Germany	Germany	

These lists illustrate concentrations of cloud facilities in the United States, Canada, India, the United Kingdom, Australia, Germany, and Brazil. These reflect concentrations of people and economic activity, mirroring the demand for cloud computing products. Although these companies could theoretically locate their physical data centers and servers in favorable tax jurisdictions, consumer demand for rapid access to their products is currently a greater priority.[43]

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39. *AWS Global Infrastructure*, AMAZON WEB SERVS., https://aws.amazon.com/about-aws/global-infrastructure [https://perma.cc/47E7-DZXJ].

40. *IBM Cloud Global Data Centers*, IBM, https://www.ibm.com/cloud-computing/bluemix/data-centers#datacentermap [https://perma.cc/W5DY-AB7E].

41. *Azure Regions*, MICROSOFT, https://azure.microsoft.com/en-us/regions [https://perma.cc/R6K9-LN6M].

42. *Cloud Locations*, GOOGLE, https://cloud.google.com/about/locations/ [https://perma.cc/3XHB-JZJT].

43. *See, e.g.*, *In re* Warrant to Search a Certain E-Mail Account Controlled and Maintained by Microsoft Corp., 829 F.3d 197, 202–03 (2d Cir. 2016) (discussing Microsoft's practice in assigning

D. Bilateral Tax Treaty Regime

A system of bilateral tax treaties overlays domestic tax laws.[44] The OECD and U.N. have promulgated model treaties for this purpose, and the United States has also circulated a model treaty as a starting point for its bilateral treaties.[45] These models provide frameworks for nations to negotiate bilateral tax treaties, and they are useful in surveying the landscape. One purpose of bilateral tax treaties is to avoid taxation of the same income by multiple nations.[46] The OECD has been at the forefront in refining international tax agreements and principles, including in the digital space.[47]

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cloud-based email accounts to a particular data center), *vacated as moot*, 584 U.S. ___, 138 S. Ct. 1186, 1188 (2018); IBM, THE IMPORTANCE OF DATA'S PHYSICAL LOCATION IN THE CLOUD 1–3 (2017) [hereinafter IBM REPORT], https://www.ibm.com/cloud-computing/bluemix/sites/default/files/assets/docs/importance_data_physical_location_cloud_0.PDF [https://perma.cc/QED9-K4FX]. *But see* SOSINSKY, *supra* note 25, at 18–19 (describing government monitoring and access of cloud servers and products in the United States and China as risks associated with a server's physical location, resulting in Google's location of Chinese servers to Hong Kong); NIST SYNOPSIS, *supra* note 22, at 6-3 (suggesting providers could seek "low-cost areas").

44. U.S. DEP'T OF STATE, TREATIES IN FORCE: A LIST OF TREATIES AND OTHER INTERNATIONAL AGREEMENTS OF THE UNITED STATES IN FORCE ON JANUARY 1, 2017 (2017), https://www.state.gov/documents/organization/273494.pdf [https://perma.cc/8Z95-W8YP]. The United States has bilateral income tax treaties with some 116 countries and territories as well as thirty tax reimbursement treaties with non-governmental organizations. *Id.*

45. OECD, MODEL TAX CONVENTION ON INCOME AND ON CAPITAL: CONDENSED VERSION 2017 (2017) [hereinafter OECD MODEL]; U.N. DEP'T OF INT'L ECON. & SOC. AFFAIRS, U.N. MODEL DOUBLE TAXATION CONVENTION BETWEEN DEVELOPED AND DEVELOPING COUNTRIES (2011), https://digitallibrary.un.org/record/13957/files/ST_ESA_102-EN.pdf [https://perma.cc/P2SF-235A] [hereinafter U.N. MODEL]; U.S. DEP'T OF THE TREASURY, UNITED STATES MODEL INCOME TAX CONVENTION OF NOVEMBER 15, 2006 (2006) [HEREINAFTER U.S. MODEL], https://www.treasury.gov/press-center/press-releases/Documents/hp16801.pdf [https://perma.cc/RW9F-5RWY].

46. OECD MODEL, *supra* note 45, at 42–43; U.N. MODEL, *supra* note 45, at 27–28, U.S. MODEL, *supra* note 45, at 35.

47. OECD, ADDRESSING BASE EROSION AND PROFIT SHIFTING 51–53 (2013) [hereinafter OECD BEPS REPORT], https://www.oecd-ilibrary.org/docserver/9789264192744en.pdf?expires=1544841943&id=id&accname=ocid195064&checksum=21A029758F9AAC390B2A443D98C58F7B [https://perma.cc/WSA4-TXTZ] (discussing action plan to address base erosion and profit shifting, including need for steps to address digital economy); OECD, ADDRESSING THE TAX CHALLENGES OF THE DIGITAL ECONOMY, ACTION 1: 2015 FINAL REPORT 64–65 (2015) [hereinafter OECD TAX CHALLENGES], https://www.oecd-ilibrary.org/docserver/9789264241046-en.pdf?expires=1544841828&id=id&accname=ocid195064&checksum=573583CB7FDD3809E18790C7CBEC0ABA [https://perma.cc/DN2P-2YTG] (identifying unique characteristics of the digital economy that complicate tax procedures); Cockfield, *supra* note 5, at 142–49 (discussing role of OECD model treaty in addressing challenges of digital commerce).

Under the OECD Model, a resident of a contracting state may invoke the bilateral treaty.[48] Then, if that non-U.S. person or entity maintains a permanent establishment in the United States, any business profits fairly attributable to that permanent establishment may be taxed under the treaty, which is often more favorable taxation than it would be under domestic U.S. law.[49] Enumerated permanent establishments include offices, factories, workshops, mines, quarries, and other places "of extraction of natural resources" as well as a "fixed place of business, through which the business of an enterprise is wholly or partly carried on."[50]

Only the business profits fairly attributable to the permanent establishment are subject to tax in that jurisdiction, and certain types of operations are categorically excluded from the definition of permanent establishment.[51] The OECD characterizes these exclusions as activities that are merely preparatory or auxiliary in nature.[52] In this analysis, "[t]he decisive criterion is whether or not the activity at the fixed place of business in itself forms an essential and significant part of the activity of the enterprise as a whole."[53] Preparatory activities generally precede and contemplate the essential and significant enterprise activity while auxiliary activities typically include nonessential support of the enterprise; the allocation of resources, including assets and employees, may be relevant in determining whether an activity is preparatory or auxiliary.[54]

International organizations have made efforts to determine how cloud-based transactions fit into this system, but they have not yet established clear guidelines for whether or when servers located in a jurisdiction constitute a permanent establishment for tax purposes.[55] Recent

48. OECD MODEL, *supra* note 45, at 29–30.

49. *Id.* at 30–33; *id.* at 28, 42–43 (for treatment).

50. *Id.* at 31, 117.

51. *Id.* at 31–33.

52. *Id.*; Gianni, *supra* note 5, at 8–9.

53. OECD MODEL, *supra* note 45, at 132–33.

54. *Id.* at 133.

55. OECD BEPS REPORT, *supra* note 47, at 33–36 (discussing contemporary difficulties in identifying permanent establishments with additional discussion of using the Internet to avoid a taxable presence); Gianni, *supra* note 5, at 11 (discussing difficulties in characterizing servers as permanent establishments); *id.* at 25–26 (noting that certain equipment may constitute a permanent establishment where the business is carried on through the equipment); *id.* at 27–31 (discussing steps taken by individual nations to characterize servers as permanent establishments, at least in certain circumstances); Mazur, *supra* note 6, at 39–42; Shakow, *supra* note 2, at 15 (analogizing international taxing regime to different state treatment of cloud transactions within the United States).

commentary from the OECD on its treaty suggests that a server will constitute a permanent establishment unless it merely provides preparatory or auxiliary activities such as posting a communication link, advertising, gathering marketing, supplying information, or mirroring another server to rehost information primarily stored elsewhere in an effort to maintain data integrity.[56] If the server is performing core business functions, then it most likely would constitute a permanent establishment.

The U.N. Model is similar to the OECD Model in that it requires a permanent establishment as well as attributable income in the taxing jurisdiction, and its commentary explicitly identifies the relevant differences.[57] The U.N. Model adheres to the same preparatory or auxiliary exceptions as the OECD Model.[58] However, the models also differ. Under the U.N. Model, if an organization provides services for more than 183 days in a twelve-month period, its activities constitute a permanent establishment.[59] The U.S. Model also requires a permanent establishment to which income may be attributed.[60] Some countries have held the door open for servers alone to constitute permanent establishments, but the United States has not issued clear guidance on when servers alone may create a permanent establishment or constitute a U.S. trade or business.[61]

E. United States Domestic Tax Regime

If a taxpayer does not, or cannot, invoke a tax treaty, then it determines its tax obligations according to domestic U.S. law and the Internal Revenue Code (the Code).[62] Generally speaking, the United States taxes its residents, including natural persons and businesses organized in the United States, on their worldwide income.[63] In doing so, the source of

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56. OECD MODEL, *supra* note 45, at 151–54 (commentary on electronic commerce).

57. U.N. MODEL, *supra* note 45, at 9–14, 96–136 (commentary on U.N. Model art. 5 that explicitly details its inspiration from and relationship to the OECD Model).

58. *Id.* at 135.

59. *Id.* at 10.

60. U.S. MODEL, *supra* note 45, at 7–9.

61. Gianni, *supra* note 5, at 27–31 (discussing treatment of servers by Sweden, Italy, Spain, France, and India); *id.* at 23–24; Mazur, *supra* note 6, at 33.

62. I.R.C. §§ 894, 7852 (2012).

63. *See id.* § 61 (establishing broad rule for taxable income); *id.* § 7701(a)(30) (defining "United States person"); *id.* § 872(a) (limiting taxation on nonresident aliens); *id.* § 877A (discussing implications of a United States person expatriation). Traditionally, foreign subsidiaries of U.S. corporations are taxed on repatriated income. *See generally id.* §§ 951–965 (governing controlled foreign corporations, including wholly owned foreign subsidiaries of U.S. companies). This regime has been modified by the law referred to as the Tax Cuts and Jobs Act of 2017, Pub. L. 115-97, 131

income is important to taxpayers. For instance, non-U.S. individuals are only taxed on U.S. sourced income and not non-U.S. sourced income.[64] For U.S. corporations operating controlled foreign corporations, dividends paid to the U.S. corporation will be exempted from taxation if they are associated with foreign source income.[65] Additionally, the United States taxes foreign entities on their income sourced to the United States.[66] The nature and character of each transaction are independently analyzed, regardless of the formal structure of the transaction, to determine the tax consequences.[67] If multiple transactions involve a single payment, then that one payment may constitute multiple incomes that must be independently analyzed, characterized, and sourced.[68]

Though there are exceptions, the default rules of the United States source income from transactions involving foreign entities based on a physical location that depends on the type of transaction. For example, interest is sourced to the residence of the debtor paying interest.[69] Alternatively, dividend income is sourced to the residence or place of incorporation of the entity issuing the dividend.[70] Income from the sale of real property is sourced to the property's location, and income from the sale of inventory is sourced to the location where title to the inventory is transferred.[71] Sale of personal and intangible property is sourced based on the residence of the seller.[72] Income from rental or royalty arrangements is sourced based on the location where the property is used, or the right is protected for rental and royalty income, respectively.[73] Income derived from services is sourced based on where the performance of the service

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Stat. 2054. The taxation of controlled foreign corporations is generally beyond the scope of this Comment.

64. I.R.C. § 872(a).

65. I.R.C. § 245A(a), Pub. L. 115-97, tit. I, § 14101(a), 131 Stat. 2054, 2189–92 (2017).

66. I.R.C. §§ 861–865 (2012).

67. *E.g.*, *id.* § 7701(e) (clarifying that treatment of nominal service contracts will be considered leases in certain circumstances); Tidewater, Inc. v. United States, 565 F.3d 299, 308 (5th Cir. 2009) (determining that chartering a boat for offshore petroleum extraction support activities constituted a lease under I.R.C. § 7701(e) and identifying control over the vessel by the customer as the determinative fact); Boulez v. Comm'r, 83 T.C. 584, 589–91 (1984) (analyzing the actual terms of a transaction rather than the mere form given to it by the parties).

68. *E.g.*, Goosen v. Comm'r, 136 T.C. 547, 559–63 (2011) (analyzing each constituent transaction of a payment in order to determine the character and ultimate source of each amount of income).

69. I.R.C. § 861(a)(1).

70. *Id.* The source of dividend income may be allocated to be partially U.S. sourced where a quarter or more of a foreign entity's income is U.S. sourced.

71. *Id.* §§ 865, 863.

72. *Id.* § 865(g), (d).

73. *Id.* § 861(a)(4).

occurs: income will be U.S. sourced only if the taxpayer performs the service within the United States.[74] Importantly, if the taxpayer receives payment for services provided both in the United States and abroad, the amount of income deemed sourced to the United States is allocated based on the number of days the service is performed in the United States.[75]

After the Code sources a foreign taxpayer's income, it then determines whether the taxpayer has a U.S. trade or business and whether income sourced to the United States is effectively connected to any such trade or business.[76] This analysis impacts both the taxability and the tax rate for the income: effectively connected income is taxed at ordinary rates while only certain non-effectively connected is taxed at a flat 30% rate or, in some circumstances, not subject to U.S. taxes at all.[77]

F. Treasury Regulation § 1.861-18

As clear as the Code's framework for sourcing income may be, the fact-driven nature of tax disputes make it impractical for Congress to comprehensively address current and future tax challenges statutorily.[78] To clarify ambiguities in the Code, Congress authorized the Treasury Department to issue "all needful rules and regulations."[79] Like other regulations, these demand deference on review, but the U.S. Supreme Court had initially construed this deference narrowly to determine whether the regulation "harmonizes" with the plain language, origin, and purpose of the Code to carry out a congressional mandate.[80] The Court also evaluated whether or not the construction of the regulation were contemporaneous with the statute, showing sensitivity to legislative intent, the history of the regulation, the reliance of actors on the regulation, the consistency of the regulation within a larger scheme, the uniformity of application of the regulation, and the "degree of scrutiny" Congress had

74. *Id.* § 861(a)(3).

75. Treas. Reg. § 1.861-4 (2018).

76. I.R.C. § 864.

77. *Id.* §§ 871(a)(1), 871(b)(1), 881(a)(1), 882(a)(1).

78. *See, e.g.*, Perez v. Comm'r, 144 T.C. 51, 56–73 (2015) (determining whether egg donor compensated for pain and suffering associated with the donation was allowed to exempt such income from taxation as compensation for personal injury); O'Donnabhain v. Comm'r, 134 T.C. 34, 41–42, 70–72 (2010) (determining whether costs for sexual reassignment and breast enhancement procedures were for treatment of gender identity disorder and finding only the former costs deductible).

79. I.R.C. § 7805(a).

80. Nat'l Muffler Dealers Ass'n v. United States, 440 U.S. 472, 477 (1979).

applied to the regulation when amending or reviewing the underlying statute.[81]

Following *Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc.*,[82] the landscape of agency deference changed dramatically, and, in 2011, *Mayo Foundation for Medical Education & Research v. United States*[83] clarified long-murky questions of deference and extended *Chevron* deference to Treasury regulations.[84] Accordingly, a court will now determine whether Congress directly addressed the subject of the regulation, and, if it has not, the court will defer to an agency's regulation if it is "based on a permissible construction of the statute."[85] This gives wide latitude to the Treasury in issuing regulations in the face of congressional silence or ambiguity, and it also ensures that courts will rarely overturn Treasury regulations. Accordingly, Treasury regulations are influential, particularly in light of the complex and fact-driven nature of the tax regime.

In 1998, eBay had just formed, launched, and gone public.[86] A satellite failure caused an outage for nearly 90% of all pagers in the United States.[87] Netscape Navigator was the dominant web browser.[88] That same year, the Treasury promulgated a regulation for the "[c]lassification of transactions involving computer programs," defining "computer program" to include "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result," including documentation, manuals, or databases related to the operation of the program.[89] This regulation enumerates four categories of computer program transactions and seeks to classify any transaction as one of these types[90]: (1) transfer of a copyright right in the program; (2) transfer of a copy of the copyrighted computer program; (3) the provision of services for the development or modification of the computer program; or (4) the

81. *Id.*

82. 467 U.S. 837 (1984).

83. 562 U.S. 44 (2011).

84. *Chevron*, 467 U.S. at 842–43; *Mayo*, 562 U.S. at 54–56.

85. *Chevron*, 467 U.S. at 843.

86. *eBay History*, EBAY, https://www.ebayinc.com/our-company/our-history/ [https://perma.cc/T94P-NFSQ].

87. *Why Only One Satellite*, CNET, https://www.cnet.com/news/why-only-one-satellite/ [https://perma.cc/QJJ3-YU6Q].

88. *GVU's Tenth WWW User Survey*, GA. TECH.: GVU CTR. (1998), https://www.cc.gatech.edu/gvu/user_surveys/survey-1998-10/graphs/technology/q41.htm [https://perma.cc/56SZ-8LND].

89. Treas. Reg. § 1.861-18(a)(3) (2018).

90. *Id.* § 1.861-18(a)(1), (b)(1).

provision of know-how relating the computer programming techniques.[91] The regulation strongly encourages viewing a transaction so that it falls into only one category, and it requires transactions that fall under multiple categories to be analyzed as distinct transactions.[92]

The first kind of transaction, transfer of a copyright right, involves the transfer of one or more rights enumerated in the regulation: the right to make copies for distribution; the right to prepare derivative programs based on the copyrighted program; the right to make a public performance of the program; or the right to publicly display the program.[93] An all substantial rights analysis applies when determining whether a copyright holder has transferred a copyright right or sold a copyrighted article. Under this analysis, a transaction is merely a copyright license, and therefore not a sale of a copyrighted article, when "not all substantial rights have been transferred."[94] In the case of a permanent transfer, the transaction is considered a sale of a copyrighted article, and the resulting income is sourced under the sale rules accordingly.[95] An explicit license generates royalty income.[96] If a copy of the program is transferred without any of the enumerated copyright rights, or if the transfer of any of these rights is de minimis, then the transaction will be considered a transfer of a copyrighted article rather than of a copyright right.[97] Computer programs, including the APIs essential to PaaS toolkits, are generally subject to copyright protection.[98] Accordingly, providing certain cloud computing products could be characterized as a transfer of a copyright right.

The second category of transactions contemplated by the regulation, transfer of a copy of a copyrighted article, includes the transfer of "a copy of a computer program from which the work can be perceived, reproduced, or otherwise communicated" in any medium.[99] A totality of circumstances analysis, including the extent of any transfer of the burdens

91. *Id.* § 1.861-18(b)(1).

92. *Id.* § 1.861-18(a)(2), (b)(2).

93. *Id.* § 1.861-18(c)(2).

94. *Id.* § 1.861-18(f)(1); *see also* I.R.C. § 865 (2012).

95. Treas. Reg. § 1.861-18(f)(22); *see also* I.R.C. §§ 861(a)(4), 862(a)(4).

96. Treas. Reg. § 1.861-18(f)(1).

97. *Id.* § 1.861-18(c)(1)(ii).

98. *See* Oracle Am., Inc. v. Google LLC, 886 F.3d 1179, 1210–11 (Fed. Cir. 2018) (applying and rejecting copyright fair use defense to API use and rejecting claim that APIs are not copyrightable); Oracle Am., Inc. v. Google Inc., 750 F.3d 1339, 1354 (Fed. Cir. 2014) (rejecting claim that APIs cannot be copyrighted in a prior decision by the same court).

99. Treas. Reg. § 1.861-18(c)(3).

and benefits of ownership, is used to determine whether there is a transfer of a copyrighted article.[100] If the holder does not transfer the burdens and benefits of ownership, then the Code treats the transaction as a lease generating rental income rather than a sale.[101] In determining whether a transaction constitutes a transfer of a copyright right or a copyrighted article, "consideration must be given as appropriate to the special characteristics of computer programs in transactions that take advantage of these characteristics."[102] The regulation identifies the ability to produce copies of the program at minimal cost as a "special characteristic" of computer programs, and it describes destruction of a tangible copy containing the program or remote deactivation of the program as transaction elements that derive from this characteristic.[103] Although cloud computing products may be subject to copyright, the provider retains nearly all of the rights and remains able to severely limit customer control over the product.[104]

The third category, provision of services, is categorically different from those dealing in copyright, and there are no helpful definitions in the regulation. Rather, the regulation requires a totality of circumstances analysis to determine whether a transaction involving "a newly developed or modified computer program" constitutes provision of services with an emphasis on the intent of the parties as to ownership of copyright rights and the allocation of risk of losses.[105] This focus on new development or modification echoes the copyright concept of a "work made for hire" that is "specially . . . commissioned for use as a contribution to a collective work" as defined in a contract.[106] The focus on creation also illustrates the regulation's narrow interpretation of computer transactions as service contracts only where the services relate to the development or modification of a program.[107] The creative element suggests that

100. *Id.* § 1.861-18(f)(2).

101. *Id.*

102. *Id.* § 1.861-18(f)(3).

103. *Id.*

104. *See* NIST SYNOPSIS, *supra* note 22, at 5-3–5-5, 6-3–6-5, 7-2–7-6 (discussing differing scopes of control for SaaS, PaaS, and IaaS, respectively); SOSINSKY, *supra* note 25, at 11.

105. Treas. Reg. § 1.861-18(d).

106. 17 U.S.C. § 101 (2012) (defining "work made for hire"); *see* Cmty. for Creative Non-Violence v. Reid, 490 U.S. 730, 751–53 (1989) (analyzing the "work made for hire" doctrine and applying section 101 in the context of works prepared by employees under agency law and works prepared by independent contractors).

107. Treas. Reg. § 1.861-18(b)(1)(iii), 1.861-18(d).

transactions involving a static computer program will rarely, if ever, be considered a service contract under this regulation.

Finally, the fourth category, provision of know-how, is similarly narrow: the know-how must relate to "computer programming techniques."[108] This category further requires that the provider supply such information "under conditions preventing unauthorized disclosure" and that the "know-how" is "[c]onsidered property subject to trade secret protection."[109] Though the regulation does not specify how associated income should be sourced, the Internal Revenue Service (IRS) subjects this know-how to the rules governing intangible property that may be sold or licensed as intellectual property.[110] The Treasury Decision issued along with the final regulation supports this interpretation in distinguishing the tax treatment of services from know-how under the regulation.[111]

In its decision responding to public comment and accompanying final regulation, the Treasury grounded the regulatory framework in copyright protections, suggesting an extension of that regime to computer programs.[112] In this announcement, the Treasury explicitly indicated its intention to exclude "data bases and content provided as part of the transaction" but to include "media, user manuals or documentation, or similar items (in addition to data bases) if incidental to and routinely transferred along with the computer program."[113] The Treasury also articulated its position that a transaction allowing modification of source code or the transfer of a software development tool will typically constitute a right to create a derivative computer program, one of the enumerated copyright rights, unless customer ability to modify the source code is de minimis.[114] The Treasury also spoke to the regulation's authority to define terms in applying tax treaties.[115]

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108. *Id.* § 1.861-18(b)(1)(iv).

109. *Id.* § 1.861-18(e).

110. I.R.S. C.C.A. 200911005 (Mar. 13, 2009), at 9; *see also* Rev. Rul. 64-56, 1964-1 C.B. 133–34 (predating the regulation at issue but determining that "know-how" in a non-computer context constitutes a transfer of intangible property). Note that this citation and those immediately *infra* rely on other Treasury guidance to clarify the Treasury regulations.

111. T.D. 8785, 1998-2 C.B. 499 (rejecting calls for clarification on the importance of the distinction between provision of services and know-how by reiterating the differing sourcing rules of each under I.R.C. § 861(a)(3), 862(a)(3) and I.R.C. § 861(a)(4), 862(a)(4), respectively).

112. T.D. 8785, 1998-2 C.B. 495.

113. T.D. 8785, 1998-2 C.B. 495–96.

114. T.D. 8785, 1998-2 C.B. 497.

115. T.D. 8785, 1998-2 C.B. 495.

The regulation includes a series of eighteen example transactions to illustrate its application.[116] Unfortunately, these examples also demonstrate that substantially similar transactions will be treated differently based on the structure of the transaction despite the regulation's stated intent that the economic effect of the transaction, rather than its form as a computer transaction, should determine the outcome of the analysis.[117]

G. Other Administrative Guidance

Tax rules are complicated, so the IRS frequently builds on Treasury regulations by issuing other, less formal guidance including revenue rulings, revenue procedures, private letter rulings (PLRs), technical advice memoranda (TAMs), and chief counsel advice (CCA).[118] Despite these ample tools to resolve ambiguities, address developing industries, and issue guidance allowing practitioners and prospective taxpayers to know and comply with their tax obligations, the IRS has declined to provide any information on its planned treatment of income from cloud-based transactions.[119]

Despite its inaction in clarifying the landscape of cloud computer transactions for taxpayers, the IRS implemented an internal policy governing its use of cloud resources, and it published warnings to taxpayers about identity theft and other scams using purportedly official

116. Treas. Reg. § 1.861-18(h) (2018).

117. T.D. 8785, 1998-2 C.B. 495 (emphasizing regulatory intent that "functionally equivalent transactions should be treated similarly"); Treas. Reg. § 1.861-18(g)–(h); *see* Yariv Brauner, *Why Examples? Towards More Behaviorally-Intelligent Regulation*, 37 VA. TAX REV. 243, 279–82 (2018) (discussing disparate treatment of transactions with similar economic effects but different structures based on examples eight, nine, and ten of the regulation).

118. *FOIA Library*, I.R.S., https://www.irs.gov/privacy-disclosure/foia-library [https://perma.cc/PYS6-9JNA] (providing an indexed, "comprehensive list of documents and other information available electronically on the IRS.gov site"); *Understanding IRS Guidance – A Brief Primer*, I.R.S., https://www.irs.gov/newsroom/understanding-irs-guidance-a-brief-primer [https://perma.cc/P427-BNP3] (providing explanations of varying levels of informal IRS guidance).

119. IRS PLRs have addressed cloud computing businesses' claims for tax-exempt status. This determination has no relation to the cloud-based business model. *See, e.g.*, I.R.S. Priv. Ltr. Rul. 201514013 (Jan. 6, 2015); I.R.S. Priv. Ltr. Rul. 201507025 (Nov. 18, 2014); I.R.S. Priv. Ltr. Rul. 201405022 (Nov. 8, 2013); I.R.S. Priv. Ltr. Rul. 201216040 (Jan. 26, 2012).

cloud platforms.[120] The IRS also explicitly encourages taxpayers to use cloud platforms as a way to digitize and back up their tax records.[121]

This contrast of issuing guidance to protect taxpayer data security while declining to articulate positions that could increase tax revenues and reduce inappropriate tax efficiencies may suggest a "wait and see" strategy for the industry to mature and for other nations and international organizations, like the OECD, to develop initial policies.

H. Unique Challenges Presented by Cloud Transactions

Cloud computing presents multiple challenges absent in traditional use and distribution of computer programs, let alone the physical market.[122] Some, including the OECD, have recognized that these differences undermine the traditional framework underpinning taxing jurisdiction.[123]

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120. *E.g.*, *Cloud Computing Environment*, I.R.S., https://www.irs.gov/privacy-disclosure/cloud-computing-environment [https://perma.cc/XS3B-6AFC] (describing various cloud delivery platforms in the context of preserving data security of federal tax information, "FTI"); TREASURY INSPECTOR GEN. FOR TAX ADMIN., U.S. DEP'T OF THE TREASURY, THE INTERNAL REVENUE SERVICE DOES NOT HAVE A CLOUD STRATEGY AND DID NOT ADHERE TO FEDERAL POLICY WHEN DEPLOYING A CLOUD SERVICE 1–5 (Aug. 7, 2017), https://www.treasury.gov/tigta/auditreports/2017reports/201720032fr.pdf [https://perma.cc/E7KN-GLF8] (finding that the IRS has failed to implement steps required by the U.S. Chief Information Officer's cloud first policy but that it has taken some steps to develop an enterprise-wide cloud strategy and framework); I.R.S., U.S. DEP'T OF THE TREASURY, PUBLICATION 1075: TAX INFORMATION SECURITY GUIDELINES FOR FEDERAL, STATE, AND LOCAL AGENCIES AND ENTITIES: SAFEGUARDS FOR PROTECTING FEDERAL TAX RETURNS AND RETURN INFORMATION 51 (2016) https://www.irs.gov/pub/irs-pdf/p1075.pdf [https://perma.cc/R8H7-77YB] (discussing data security requirements for FTI when using cloud computing); IRM 10.8.24 (May 2, 2016) (establishing policy on IRS IT assets with regard to cloud computing); *National Tax Security Awareness Week No. 2: Don't Take the Bait; Avoid Phishing Emails by Data Thieves*, I.R.S. News Release IR-2017-194 (Nov. 28, 2017) (warning taxpayers of fraudulent activity of purported cloud computing platforms); *Fake Insurance Tax Form Scam Aims at Stealing Data from Tax Pros, Clients*, I.R.S. News Release IR-2017-171 (Oct. 12, 2017) (warning taxpayers of similar frauds); *Don't Take the Bait, Step 2: Be Alert to Account Takeover Tactics*, I.R.S. News Release IR-2017-120 (July 18, 2017) (warning taxpayers of similar frauds); Carolyn Duffy Marsan, *IRS Flips Storage for Virtualized Cloud Service Offering*, GCN (Mar. 31, 2015), https://gcn.com/articles/2015/03/31/irs-unisys.aspx [https://perma.cc/P34H-M3PG] (discussing IRS contract with Unisys to provide cloud-based storage for the agency).

121. *IRS Reminds Taxpayers to Safeguard Their Tax Records as the Beginning of Hurricane Season Approaches*, I.R.S. News Release IR-2015-83 (June 1, 2015) (encouraging taxpayers to maintain records electronically, including in the cloud).

122. *But see* Andrew Keane Woods, *Against Data Exceptionalism*, 68 STAN. L. REV. 729, 756–63 (2016) (suggesting treating cloud data as having a physical location where it is stored for jurisdictional purposes in criminal investigations but acknowledging that a different standard may be appropriate in tax or civil dispute contexts). Woods comes to the opposite conclusion for criminal investigation purposes, but this provides a helpful overview of some of the same issues.

123. *See, e.g.*, OECD BEPS REPORT, *supra* note 47, at 33–36 (discussing theory of jurisdiction for taxation); Mazur, *supra* note 6, at 27 (identifying the challenges of sourcing cloud-related income);

The remote nature of cloud transactions also presents a growing concern to tax authorities by encouraging tax avoidance structures by providers.[124] Additionally, the income associated with cloud computing products may be uniquely difficult to characterize or source to a particular activity because of the ongoing nature of the relationship associated with the product.[125] These characteristics of cloud computing products and transactions complicate application of existing tax rules and hinder reasoning by analogy.

First, some of the basic premises used to classify taxable income are not present.[126] For example, the intangible nature of a cloud computing transaction resists clear categorization. The distinctions between rental, license, and sale blur as a result of the flexible nature of the transaction.[127] Further, the ubiquitous access provided by cloud computing may make the locations of the parties unclear, unpredictable, or unknowable.[128] For example, a traveling user may access her cloud computing product from multiple countries in a period of weeks or in the course of a single train ride. Additional steps by customers to protect sensitive information, including virtual private networks, may obscure the end user's location further by requiring the traveler to remotely access a business network before accessing the cloud computing product through that network.[129]

Gianni, *supra* note 5, at 3 (describing the challenge of applying existing international tax frameworks to new technological developments in the digital economy).

124. *See, e.g.*, OECD TAX CHALLENGES, *supra* note 47, at 64–68 (discussing mobility of intangibles, users, and business functions as complicating factors in tax administration).

125. *See, e.g.*, Mazur, *supra* note 6, at 18–27 (analyzing application of Treas. Reg. § 1.861-18 and traditional classification principles to cloud-based income).

126. *See, e.g.*, I.R.C. § 861(a)(3) (2012) (sourcing service income to the United States if the services were performed in the United States, with a de minimis exception).

127. *See* Shakow, *supra* note 2, at 5.

128. *See* Mazur, *supra* note 6, at 28 (noting that "[m]ultiple users within the same organization can . . . simultaneously access the software from different jurisdictions," complicating "place of use" analysis); Marketa Trimble, *The Future of Cybertravel: Legal Implications of the Evasion of Geolocation*, 22 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 567, 599–605 (2012) (discussing methods to hide one's physical, geographic location online); *see also* NIST REPORT, *supra* note 20, at 2 (describing cloud computing as a model that allows "ubiquitous, convenient, on-demand network access" to products); Shakow, *supra* note 2, at 5 (discussing complications in "locat[ing] the transaction" in a cloud context); *id.* at 14 (noting ambiguity in customer location in a domestic context).

129. *See* Orrin S. Kerr, *Norms of Computer Trespass*, 116 COLUM. L. REV. 1143, 1168–69 (2016) (discussing the use of a virtual private network to change an Internet protocol address); Marketa Trimble, *supra* note 129, at 602–03 (discussing proxy use to change Internet protocol addresses); John Palfrey, *The Public and the Private at the United States Border with Cyberspace*, 78 MISS. L.J. 241, 255–56 (2008) (providing a case study for circumventing national Internet restrictions by using a virtual private network).

Accordingly, the location of the product's user may be unknown to the customer let alone the cloud computing provider. This complicates necessary determinations regarding the location or character of the income-generating activity.[130] Additionally, the value of the ultimate product derives from many abstract sources including the intellectual property incorporated into the product, the intellectual and creative labor applying protected intellectual property, the computational resources hosting or processing the underlying activity, and the continuing relationship between provider and customer.[131] Each of these components—the provider, the provider's intellectual property protections, the provider's employees, the computational resources, the customer, and the end user—may be physically present in different countries, and the traditional methods of determining and exercising taxing jurisdiction are difficult to apply as a result.

Second, cloud computing providers may structure their activities to limit their tax liability. The user accesses the cloud computing product remotely and online. Accordingly, any Internet connection in any country could feasibly provide the necessary access.[132] The convenience of using cloud computing products from any location with an adequate Internet connection is appealing to customers, but the provider side of a cloud computing transaction can also occur anywhere.[133] Though some technical and business limitations may encourage providers to concentrate their programmers and servers in a single jurisdiction,[134] they can disperse these assets to limit or avoid taxation.[135] If, for example, the location of the servers hosting or processing the income-generating transaction provides the basis for taxation, then the provider can simply relocate those servers to a favorable tax jurisdiction. Providers can take similar steps for

130. *See* Shakow, *supra* note 2, at 5. For sourcing based on activities, see I.R.C. §§ 861–865.

131. *See* Shakow, *supra* note 2, at 26.

132. *See* Woods, *supra* note 122, at 761–62 (discussing practical limitations of data storage in remote locations as well as incentives for providers to do so); Shakow, *supra* note 2, at 4 (discussing duplication of cloud-based data on multiple servers in different locations for efficiency).

133. *See* OECD TAX CHALLENGES, *supra* note 47, at 144; IBM REPORT, *supra* note 43, at 1–3 (discussing cloud benefits as well as practical limitations).

134. IBM, *supra* note 43, at 1–3.

135. *See* OECD TAX CHALLENGES, *supra* note 47, at 144 (noting risk of "centrali[zing] infrastructure at a distance from the market jurisdiction" while maintaining ability to do business there); Woods, *supra* note 122, at 761–62 (providing specific example, in a nontax context, of Google maintaining data for Chinese customers in Hong Kong to "keep the data out of the reach of the Chinese authorities" (footnote omitted)).

the programming staff.[136] This situation is further complicated by the business needs of providers to create backups in the form of mirror servers that copy data hosted elsewhere in an effort to preserve data integrity.[137] Although such providers may clearly establish that one server is the original that another server copies, the mirror system could as easily create different copying arrangements for different customers or distribute the data to many more servers to limit tax liability.[138] Even absent such a complex structure, the underlying transactions are, in a real sense, occurring in multiple locations at once.[139] In other words, a sophisticated provider could deliver a cloud product to different customers using mirror servers in different jurisdictions to limit potential tax liability.[140] In addition to the location of physical assets necessary to a transaction, intellectual property that may generate royalty income could be warehoused in a tax-efficient jurisdiction.[141] Ultimately, the user, customer, and provider may each structure their activities surrounding the cloud computing transaction to lower or eliminate their tax liability because each of their locations is, theoretically, arbitrary.[142]

Third, and most importantly, cloud computing transactions resist traditional methods of classification because of the unique dynamic between the provider and the user. Unlike the static computer programs contemplated by the Treasury regulation, the user in a cloud transaction can create, modify, and store their data as it interacts with the provider's

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136. *See* Woods, *supra* note 122, at 771–72 (discussing physical locations together with employees in analyzing claims of personal jurisdiction).

137. *See* Mazur, *supra* note 6, at 43–44; Shakow, *supra* note 2, at 4.

138. *See* Mazur, *supra* note 6, at 11–12; OECD MODEL, *supra* note 45, at 153 (clarifying that mirror servers are insufficient to create a permanent establishment but not considering data distributed across several servers or multi-user servers that perform some mirror functions); NIST SYNOPSIS, *supra* note 22, at 6-3 (discussing ability for providers to locate cloud infrastructure in "low-cost areas.").

139. *See* Shakow, *supra* note 2, at 4 (discussing duplication of data on multiple servers for data integrity); SOSINSKY, *supra* note 25, at 326 (noting that server mirroring for data integrity does involve a primary server behind which mirrors lag though the goal is concurrency).

140. OECD MODEL, *supra* note 45, at 155; *see* OECD TAX CHALLENGES, *supra* note 47, at 80 (identifying mirror servers as a mechanism of limiting contact with a market jurisdiction).

141. *See, e.g.*, MAINE & NGUYEN, *supra* note 4, at 193–98 (providing a case study of Microsoft's foreign intellectual property arrangement to minimize taxes). The perspective of this work is U.S. controlled foreign corporations, but foreign entities could as easily use these measures to limit their U.S. tax liability.

142. *See* Gianni, *supra* note 5, at 35. Basing the structure of the transaction, particularly the location of the servers that store or process the transaction, on tax implications may not be practical or satisfactory for a customer, but it remains possible.

service on an ongoing basis.[143] If the transaction involves PaaS[144] or IaaS,[145] then the user may build their own program using the provider's tools or computing resources.[146] This bidirectional flow of modification is starkly different from a static program downloaded and installed locally or installed using a pre-packaged physical medium (such as a compact disc) because the user is, at least, accessing content they still own and, at most, contributing to the provider's content. Cloud computing providers also retain absolute ownership of their rights without risk of unlicensed secondary distribution or copying[147]—very rarely will the full benefits and burdens of a cloud product be transferred to the customer outside some bespoke, private SaaS contexts.[148] In addition to absolute control, the provider retains all risk associated with the operation of the cloud computing product.[149] Compared to more traditional computer products such as packaged software, end users play a more active role in the creation of cloud computing programs but are also limited in their ability to act beyond the scope of their agreement.

II. THE FOG ROLLS IN: NEW TECHNOLOGY RESISTS TRADITIONAL CHARACTERIZATION

The Treasury should consider issuing guidance to the public in characterizing cloud computing transactions and sourcing the resulting income. The content of this guidance may be less important than its existence and role in establishing clear expectations of tax liability and compliance.[150] Predictability and certainty for tax planning purposes will allow market participants to act and plan long term. Although many large cloud computing businesses are U.S. entities subject to U.S. taxation and the United States will likely remain a particularly attractive market for

143. Mazur, *supra* note 6, at 9–11.

144. PaaS products provide a suite of programming tools to deploy their own applications. Microsoft Azure and Google App Engine include PaaS products.

145. IaaS products provide access to raw computing resources such as storage, computational power, servers, or networks. For example, consumer IaaS products offering storage include Google Drive, Microsoft OneDrive, Apple iCloud, and DropBox.

146. *See* T.D. 8785, 1998-2 C.B. 497 (suggesting that this could be considered creation of a derivative program but not addressing the issue in a cloud computing context).

147. Mazur, *supra* note 6, at 10–11; *see also* T.D. 8785, 1998-2 C.B. 498 (discussing the "all substantial rights" requirement for transfer as a sale).

148. NIST REPORT, *supra* note 20, at 3 (defining different deployment models).

149. *See* Mazur, *supra* note 6, at 10.

150. *See* Mazur, *supra* note 6, at 4. Governments are under pressure to clarify tax issues and current law does not provide sufficient guidance. *Id.*

providers due to its consumer base, opportunity for lucrative government contracts, and ready access to capital, these factors are unstable. Although it is a similarly attractive market (albeit comprised of distinct nations), the European Union (EU) has recently proposed a pair of directives that would shift the focus of international taxation in the digital space to the places where providers interact with customers and impose an interim tax on digital activities that currently escape EU taxation.[151] More recently, the United Kingdom has announced an intention to implement a two percent digital services tax effective April 2020.[152] These measures suggest a desire for taxing jurisdictions to address digital transactions that resist traditional treatment, and they mark a shift in focus from net income to revenue.

Proactive steps would ensure the United States retains its position of prominence in this industry, and predictable tax treatment instills confidence. Some suggested treatments for characterizing and then sourcing income from cloud computing transactions in each cloud model follow.

A. Overview of Possible Characterizations of Cloud Computing Transactions and Related Income

Cloud-based transactions resist easy characterization because the enumerated transfer categories are narrowed to require elements that are not present. Depending on the characterization of a cloud transaction, related income could be sourced to the United States or foreign sources according to different methodologies. Although IaaS, PaaS, and SaaS delivery models each refer to "services," they provide different products and require separate analysis to characterize and ultimately source the resulting income. Analogies to established methods of classifying transactions and sourcing income may act as a stopgap, but they fail to capture the character of the transaction adequately. Perhaps more importantly, these analogies may allow creative tax planning to limit liability.

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151. European Commission, *Proposal for a Council Directive on the Common System of a Digital Services Tax on Revenues Resulting from the Provision of Certain Digital Services*, at 24, 28, COM (2018) 148 final (Mar. 21, 2018) (first discussing the tax challenges at issue, then proposing the framework for new interim tax and a rate of 3%); European Commission, *Proposal for a Council Directive Laying Down Rules Relating to the Corporate Taxation of a Significant Digital Presence*, at 16–17, COM (2018) 147 final (Mar. 21, 2018) (proposing "significant digital presence" standard).

152. HM TREASURY, BUDGET 2018, 2017-19, HC 1629, at 44 (UK).

For example, IaaS transactions may be analogized to royalty income akin to a mineral concession: in each case the customer is paying for a right to use a limited resource.[153] Similarly, PaaS transactions may be compared to licensing agreements where the customers pay for the use of intellectual property for contractually agreed-upon purposes and for an agreed-upon term.[154] SaaS transactions may be compared to traditional service agreements or to sales of a licensed copy of software.[155]

However, these analogies fail to adequately address the unique character of these transactions. SaaS transactions provide closely curtailed access to software from any location with ongoing support, but there is no transfer of enumerated copyright rights in the software.[156] The customers and end users typically only retain the ability to modify their experience, including through APIs.[157] Further, the "service" of a SaaS product ultimately may be performed in an arbitrary location potentially unknowable to the provider taxpayer.[158] PaaS transactions may provide a development framework for customers, but unlike a traditional intellectual property licensing agreement, the provider retains absolute control over the product and has no need for traditional intellectual property protections.[159] Importantly, the provider remains able to modify or update the suite of tools provided to the customer.[160] Sourcing the income from a PaaS transaction to the place of intellectual property protection is not reasonable when the protection is unnecessary and, more

153. *See* I.R.C. § 861(a)(4) (2012).

154. *See* Treas. Reg. § 1.861-18(f)(3) (2018) (contemplating unique characteristics of computer programs and providing example of restricted access at the end of a lease).

155. *See id.* § 1.861-18(f) (discussing distinction between sale of copyrighted article and transfer of a copyright right).

156. *See id.* § 1.861-18(c)(2) (enumerating copyright rights); NIST SYNOPSIS, *supra* note 22, at 5-1 (characterizing the customer as receiving "[t]he right to use specific applications on demand, and application data management, such as backup and data sharing between [customers]"); SOSINSKY, *supra* note 25, at 71–72 (comparing SaaS offerings to "shrink-wrapped software" and noting that the software is "monitored and maintained by the [provider]").

157. NIST SYNOPSIS, *supra* note 22, at 5-3; SOSINSKY, *supra* note 25, at 71 (noting the option for SaaS providers to allow customers and users to customize their experiences with APIs).

158. *See, e.g.*, SOSINSKY, *supra* note 25, at 72 (noting that "[t]he software is available over the Internet globally"). This is a particular risk if the place of performance is the end user's location.

159. *See* SOSINSKY, *supra* note 25, at 70–71 (discussing the risk of "vendor lock-in" associated with proprietary APIs used in PaaS systems, limiting portability of customer's creation, and indicating that customer customization is allowable only to the extent the provider allows); NIST SYNOPSIS, *supra* note 22, at 6-3 (discussing need for continuing provider support as well as provider's other monitoring and control aspects even as customer deploys their applications).

160. *See* NIST SYNOPSIS, *supra* note 22, at 6-3 (describing the provider's operation and control over the lowest layers of the software stack).

importantly, when so many of the tools are proprietary and not necessarily subject to registered protection.[161] A customer is unable to take their creation elsewhere without significant modification, and there is no risk that the customer can use the PaaS product in an unapproved way. Finally, unlike a mineral deposit, the location of computational infrastructure in an IaaS transaction is not permanently tied to real property with a fixed geographic location: the resource is flexible and mobile, if finite.

B. Software as a Service

Using established tools of income sourcing, SaaS may be conceptualized as a blend of provision of software and provision of services.[162] This interpretation would implicate the existing computer regulations governing both the transfer of a copyrighted article and the provision of a service.[163] Viewing SaaS income as coming from both software and services addresses the unique allocation of control and risk to the provider in SaaS transactions while also recognizing the benefit obtained by the customer.[164] Additionally, this method could also limit disparate treatment between SaaS providers and providers who rely on traditional methods of selling and distributing software through physical media or digital download.[165] However, the regulation requires separation of such transactions unless an element is de minimis.[166] Because of the convoluted process of determining where key aspects of the transactions occur and because of the full array of the provider's support structures that add value to the product, this may raise more questions than it addresses.[167]

Applying the regulation, computer transactions can only involve the provision of services where there is a "newly developed or modified

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161. *See* NIST SYNOPSIS, *supra* note 22, at 6-4 (discussing lack of portability for customers because of proprietary languages and run-time environments); SOSINSKY, *supra* note 25, at 71 (discussing the "lock-in" risk associated with proprietary environments). There may be additional issues related in determining the place of protection for unregistered intellectual property.

162. *See* Mazur, *supra* note 6, at 57.

163. *See* I.R.C. § 861(a)(3) (2012); Treas. Reg. § 1.861-18(b)(1)(ii) (2018); Mazur, *supra* note 6, at 57.

164. *See* Mazur, *supra* note 6, at 58–59.

165. *Id.* at 58.

166. Treas. Reg. § 1.861-18(b)(1)–(2).

167. *See* Mazur, *supra* note 5, at 25–27 (discussing this problem in detail, including characterization both within and without the scope of Treas. Reg. § 1.861-18, the risk of a predominant character, and line-drawing difficulties for de minimis components, and risk/control concerns).

computer program."[168] The rights of ownership and the risks of loss both remain with the provider, suggesting a service arrangement, but there is no newly developed or modified program in many SaaS products.[169] The provider is not offering programming labor to create a program for the customer's use, and SaaS products are designed to be generally marketable: they are generally prepackaged and ready-to-use.[170] To the extent a SaaS product is customizable by the customer, those variations are frequently limited to customer or user experience and within a range of options offered by the provider.[171] "To discharge [their contractual] obligations a provider must exercise final authority over the application . . . . [T]he control possessed by the [customer] exists only at the discretion of the provider."[172]

Additionally, this application fails to capture income from transactions structured to limit or avoid taxation. Most importantly, the service component of the income should be sourced to the place of performance.[173] This means that the source of this income would be prorated based on the locations of the various end users. The location of the contracting customer is not necessarily the place of performance, so the provider or the customer would have to monitor each instance of access of a SaaS product for tax purposes. In a contract with a large organization, the customer may have many traveling end users who need to access a SaaS product and rely on a virtual private network to maintain this access securely. A customer is not likely to disclose the location of every user to allow a provider to determine their tax liability. This ballooning of compliance cost essentially invalidates the utility of viewing SaaS as a service transaction.

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168. Treas. Reg. § 1.861-18(d).

169. There are bespoke or heavily customized SaaS products available, but these are more expensive for customers than "off-the-shelf" products. For fully customized, made-to-order SaaS products, see *supra* note 106 (discussing work made for hire). *See also* NIST REPORT, *supra* note 20, at 3 (defining deployment models, including private cloud products made for a specific organization and its needs); SOSINSKY, *supra* note 25, at 7–8 (discussing deployment models, including private cloud products). Importantly, private cloud products may still have their physical infrastructure located off premises from the customer. This creates additional variability in allocation of risk and control.

170. Treas. Reg. § 1.861-18(b)(iii) (suggesting static or prepackaged products are ineligible for service characterization because the program is neither newly developed nor modified).

171. *See* NIST SYNOPSIS, *supra* note 22, at 5-3 fig.10 (illustrating the "Limited Admin Control" and "User Level Control" of the customer); SOSINSKY, *supra* note 25, at 71 (discussing customer modification through provider-packaged APIs).

172. NIST SYNOPSIS, *supra* note 22, at 5-3.

173. *See* I.R.C. § 861(a)(3) (2012).

For a SaaS transaction to be viewed solely as the transfer of a copyrighted article, it may only include de minimis transfer of copyright rights or provision of services.[174] Because a SaaS transaction involves ongoing support from the provider, and the customer receives no benefits or burdens of ownership, the de minimis standard would not apply, and the relationship would be separated into multiple transactions.[175] Importantly, the customer never receives the burdens of ownership of the computer program—"SaaS clouds provide scalability and also shift significant burdens from [customers] to providers."[176] This casts doubt on the regulation's ability to govern a SaaS transaction as a sale of a copyrighted computer program.

The non-transfer of benefits and burdens suggests that a SaaS transaction could be viewed as a lease agreement between the provider and the customer.[177] Under this theory, if the customer has control over the software for a fixed period of time at which point access ends, this limit on control may be dispositive.[178] However, in a SaaS transaction, the customer's control is sharply curtailed by the provider's ability to modify the scope of the customer's control at any time.[179] Further, the provider remains responsible for maintaining the system and supporting the customer throughout the course and duration of the relationship.[180] Unlike circumstances that blur the line between service and lease in the physical world, the software in a SaaS transaction is never beyond the supervision of the provider.[181] Additionally, the customer is limited in their ability to use or modify the software as they choose. Although a lease of personal or real property may provide contractual limitations on the lessee's ability to use or modify the property, this is typically an ex-post check rather than an ex-ante impossibility. The inherent characteristics of a SaaS product preclude the customer from using the software in ways that breach the contract. Accordingly, SaaS transactions resist lease analysis.

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174. Treas. Reg. § 1.861-18(c)(1)(ii).

175. For a discussion of provider control in a SaaS context, see *supra* note 156 and accompanying text.

176. NIST SYNOPSIS, *supra* note 22, at 5-3; *see also* Treas. Reg. § 1.861-18(f)(2) (prioritizing an analysis of transfer of burdens and benefits of ownership in a sale).

177. Treas. Reg. § 1.861-18(f)(2).

178. *Id.* § 1.861-18(f)(3); *see also* Tidewater, Inc. v. United States, 565 F.3d 299, 308 (5th Cir. 2009) (determining that a nominal service agreement is actually a lease).

179. *See* NIST SYNOPSIS, *supra* note 22, at 6-3.

180. *Id.*

181. *Id.* at 5-3 (clarifying the hard limits of customer control in a SaaS product); *see also Tidewater*, 565 F.3d at 308 (focusing on customer's control in identifying a contract as a ship lease); I.R.C. § 7701(e)(1) (2012).

If SaaS is not a transfer of a copyrighted article or a lease of property, then it could be considered a transfer of a copyright right. Though the license analysis tracks the lease analysis in practical purposes, conceptually they are distinct. Under the regulation, SaaS transactions cannot constitute transfers of copyright rights: the owner retains each of the four enumerated rights.[182] The customer is not allowed to produce copies of the program, to perform the program publicly, to display the program publicly, or to create a derivative work.[183] The provider retains control over a SaaS product to prevent copying or appropriation into a derivative work, and it is conceptually unclear what "performing" or "displaying" a SaaS product would entail.[184] Further, sourcing royalty income associated with a transfer of a copyright right under U.S. law hinges on the place where the right is legally protected.[185] For a SaaS transaction, this would be the place where the software is copyrighted. Practically speaking, this would likely be a low- or no-tax jurisdiction where intellectual property could be warehoused for that purpose.[186] However, because the provider retains absolute control over the software, including limitations on reproduction or subsequent distribution, they do not need copyright protection to prohibit unauthorized use.[187] Though the contract will likely contain forum selection and choice of law clauses, the location of the legally protected right may be unclear if the contract provides for global use and distribution. The absence of transferred rights and the practical ambiguities in determining the place of protection for proprietary, unregistered software cause SaaS transactions to resist analysis as transfers of copyright rights.

The fourth and final type of enumerated transaction is the provision of know-how related to programming.[188] Such know-how must be subject to protection as a trade secret and related to "programming techniques."[189] SaaS transactions do not include proprietary know-how regarding programming techniques not contained in manuals or documentation

182. *See* Treas. Reg. § 1.861-18(c)(2).

183. *See id.*

184. T.D. 8785, 1998-2 C.B. 497–98 (discussing the enumerated copyright rights and acknowledging that rights to perform or display "in the context of computer programs is still developing").

185. I.R.C. § 861(a)(4).

186. *See* MAINE & NGUYEN, *supra* note 4, at 193–98 (discussing use of such warehousing structures in the context of controlled foreign corporations).

187. Mazur, *supra* note 6, at 10–11.

188. Treas. Reg. § 1.861-18(e).

189. *Id.*

because the premise of the model is to deliver a standalone product that requires little to no customer programming.[190] "SaaS provides the complete infrastructure, software, and solution stack[:] . . . it is the cloud-based equivalent of shrink-wrapped software."[191] Shrink-wrapped software contains plenty of proprietary information, but that information does not relate to programming techniques. On the contrary, freely available knowledge about use of the software is an essential component of this model.

The Treasury regulation purporting to address computer transactions fails to account for SaaS activity: it requires characterization of income from computer transactions as one of four categories, but none of the rules comfortably characterize the income from SaaS products.[192]

C. Platform as a Service

PaaS transactions involve the "capability . . . to deploy onto the cloud infrastructure [customer]-created or acquired applications using programming languages, libraries, services, and tools supported by the provider."[193] The provider offers the customer the use of tools and infrastructure to deploy applications of their choosing.[194] In this arrangement, the provider retains all rights to the platform and the underlying APIs, toolkits, and libraries.[195] The customer has no right to distribute the platform to others or display it. The customer may have the right to create and deploy their own software on the platform, but they have no rights in the platform itself and limited ability to use their creation on any other platform.[196] Although there may be manuals and documentation associated with the use of the PaaS, this does not constitute know-how within the meaning of the regulation: the tools themselves may be proprietary, but the instruction in their use is not.[197] Much like SaaS

190. SOSINSKY, *supra* note 25, at 71; Treas. Reg. § 1.861-18(e).

191. SOSINSKY, *supra* note 25, at 71.

192. Treas. Reg. § 1.861-18(a)–(b).

193. NIST REPORT, *supra* note 20, at 2–3.

194. NIST SYNOPSIS, *supra* note 22, at 6-1.

195. *See* SOSINSKY, *supra* note 25, at 71 (discussing customer risk associated with the proprietary toolkit model); NIST SYNOPSIS, *supra* note 22, at 6-4 (discussing risks of provider's proprietary control over product and its impact on customer's use of its own creations); Oracle Am., Inc. v. Google LLC, 886 F.3d 1179, 1210–11 (Fed. Cir. 2018) (the most recent decision in protracted litigation over fair use of publicly-known APIs).

196. See discussion on proprietary PaaS products, *supra* note 159 and accompanying text.

197. *See, e.g.*, *Oracle*, 886 F.3d at 1210–11 (enforcing copyright protections in an API universally used and widely understood).

products, the more widespread and better understood a PaaS product is by the public, the larger market share it can command. Similarly, PaaS products do not easily fall into "[t]he provision of services for the development or modification of the computer program."[198] Although PaaS products provide tools for customers to develop their own applications, the provider also offers use of hardware resources and intellectual property in the process. This complicates a straightforward service analysis.

The PaaS transaction may be analogized into three parts. First, the PaaS transaction allows a customer to use the computing resources of the provider to deploy the program.[199] This may be compared to a lease of machinery or equipment as the resources operate mechanically.[200] Second, the provider provides a series of programming "languages, libraries, services, and tools."[201] The customer's use of this intellectual property could be considered a license. Third, the provider "support[s]" these programming tools, including by hosting the ultimate application and allowing access to necessary computing resources.[202] This notion of support is essential to cloud computing and integrally related to the delivery model and the allocation of risk and responsibility to the provider and could be classified as a traditional, but not computer, service.[203] This means the three components are leasing of computer resources, licensing of intangible tools, and ongoing conventional services supporting the transaction.[204]

The IRS will peer through the nominal structure of a transaction,[205] but absent clear guidance or a workable standard, it becomes difficult for private actors to reliably characterize PaaS transactions and properly apportion each type of income to represent the complexities of the transaction's real economic effect, let alone predict IRS treatment of any particular transaction. The IRS should take steps to eliminate this

198. Treas. Reg. § 1.861-18(b)(1)(iii) (2018).

199. NIST SYNOPSIS, *supra* note 22, at 6-1 (discussing customer use of provider's "tools and execution resources").

200. *Oracle*, 886 F.3d at 1210–11 (applying and rejecting copyright fair use defense to API use and rejecting claim that APIs are not copyrightable).

201. NIST REPORT, *supra* note 20, at 2–3.

202. *Id.*; NIST SYNOPSIS, *supra* note 22, at 6-3 fig.14 (showing provider's "[t]otal [c]ontrol" over underlying operating system and hardware in a PaaS Transaction).

203. I.R.C. § 861(a)(3) (2012).

204. Under Treas. Reg. § 1.861-18(b)(2), each of these would be viewed as distinct transactions.

205. *E.g.*, Goosen v. Comm'r, 136 T.C. 547, 559–63 (2011); Boulez v. Comm'r, 83 T.C. 584, 589 (1984).

uncertainty, and at minimum, it should provide new guidance to characterize new types of computer transactions that have developed since 1998 and to create a more flexible standard adaptable to future developments.

D. Infrastructure as a Service

IaaS products provide remote access to raw computing resources such as processing, storage, or networks that allow a customer to run arbitrary software.[206] As noted above, these resources have both a physical and an abstract component: the computational resources require physical devices to store or process the customer's data, but the provider can distribute the underlying operations flexibly. "While this structure grants very significant control over the software stack to [customers], [customers] consequently must take on the responsibility to operate, update, and configure these traditional computing resources for security and reliability."[207] By allowing customers broader control to use computing resources for their own purposes, IaaS transactions are very similar to a rental or royalty agreement.[208] There may be uncertainty determining whether the transaction occurs geographically at the customer's location or on the server side. However, the actual operations occur at the server's location where the computational resources are used.

Even if an IaaS transaction appears to generate rental income, the regulation prohibits such characterization: the four allowable categories are transfer of a copyright right, transfer of a copyrighted article, provision of services, and provision of know-how.[209] An IaaS involves no transfer of either copyrighted right or copyrighted article. Further, although the product provides access to computing resources, there is minimal, if any, support beyond that access: customers are expected to act independently in using the resources.[210]

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206. NIST REPORT, *supra* note 20, at 3; NIST SYNOPSIS, *supra* note 22, at 7-2 fig.16 (showing greater control for the customer in IaaS transactions than in SaaS or PaaS transactions).

207. NIST SYNOPSIS, *supra* note 22, at 7-2.

208. *See id.* at 7-6 (characterizing the arrangement as a "rental" of computing hardware and resources).

209. Treas. Reg. § 1.861-18(b)(i)–(iv).

210. NIST SYNOPSIS, *supra* note 22, at 7-2.

E. New Regulatory Regime

To provide clarity to the market, the Treasury should promptly address the cloud computing deployment models. Current frameworks may allow taxpayers to approximate the tax implications of their activities, but substantial uncertainty remains. As the market for cloud computing products grows, taxpayers may creatively plan their transactions to avoid tax liability inappropriately. This also distorts the market by treating equivalent providers differently based solely on their model of product delivery, prioritizing form over economic effect directly contrary to the intent of the current regime.[211] Waiting for other nations and international organizations to define the space may be reasonable while the United States remains the dominant market for these products, but that may not be the case forever. Advance planning is essential, and concrete guidance will allow taxpayers to act confidently with predictable outcomes while also ensuring tax compliance.

CONCLUSION

The federal government has not enacted a tax regime that comfortably contemplates increasingly common taxable transactions. In 1998, the Treasury Department took steps to classify computer-based transactions, but it has not made significant modifications in the intervening twenty years. Over this period of time, international organizations, notably the OECD, have struggled to address the impact of an increasingly digital world. Additionally, the EU and United Kingdom are planning unilateral action on this issue. The Treasury Department should consider updating its framework for computer transactions to directly address transaction models in cloud computing. If the United States declines to act, there is growing risk that it will be forced to respond to the actions of others. A "wait and see" approach allows for more deliberate planning, but time to take the lead may be running out.

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211. T.D. 8785, 1998-2 C.B. 495 ("The specific rules of the proposed regulations are based on certain key principles: that the special features of computer programs should be recognized and that functionally equivalent transactions should be treated similarly."); Mazur, *supra* note 6, at 58 (discussing the importance of horizontal equity in different distribution mechanisms).