

*Before the*  
**Federal Trade Commission**  
Washington, D.C.

*In re*

Solicitation for Public Comments on the  
Business Practices of Cloud Computing  
Providers

Docket ID: FTC-2023-0028

**COMMENTS OF**  
**THE COMPUTER & COMMUNICATIONS INDUSTRY ASSOCIATION (CCIA)**

The Computer and Communications Industry Association (CCIA)<sup>1</sup> welcomes the opportunity to provide comments in response to the Federal Trade Commission’s (FTC) Request for Information and “Solicitation for Public Comments on the Business Practices of Cloud Computing Providers” (RFI) released on March 22, 2023.<sup>2</sup>

Cloud computing, as part of the global information technology (IT) services industry, plays an important role in the U.S. and global economy as users, customers, and companies benefit from new and innovative services this sector provides. As the RFI notes, cloud computing offers benefits for many different industries “including but not limited to healthcare, finance, transportation, eCommerce, and defense.”<sup>3</sup> Cloud computing has changed the competitive landscape for IT services, offering greater choice in products and reducing the overall costs to IT services customers across all industries.<sup>4</sup>

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<sup>1</sup> CCIA is an international, not-for-profit association representing a broad cross-section of technology and communications firms. For over fifty years, CCIA has promoted open markets, open systems, and open networks, advocating for sound competition policy and antitrust enforcement. CCIA members employ more than 1.6 million workers, invest more than \$100 billion in research and development, and contribute trillions of dollars in productivity to the global economy. For more, visit [www.ccianet.org](http://www.ccianet.org).

<sup>2</sup> Federal Trade Commission, Solicitation for Public Comments on the Business Practices of Cloud Computing Providers, March 22, 2023. <https://www.regulations.gov/docket/FTC-2023-0028/document>.

<sup>3</sup> FTC RFI at 1.

<sup>4</sup> See Organisation for Economic Co-operation and Development (OECD), “Cloud Computing: The Concept, Impacts and the Role of Government Policy” (2014). [https://read.oecd-ilibrary.org/science-and-technology/cloud-computing-the-concept-impacts-and-the-role-of-government-policy\\_5jxzf4lcc7f5-en#page1](https://read.oecd-ilibrary.org/science-and-technology/cloud-computing-the-concept-impacts-and-the-role-of-government-policy_5jxzf4lcc7f5-en#page1). The OECD observed that “cloud computing providers have significantly lower operating costs than companies would have if they ran their own IT infrastructure, due to their global scale and the possibility to aggregate the demand of multiple users of cloud computing.”

The RFI states that “FTC staff is studying a wide array of issues related to market power, business practices affecting competition, and potential security risks.”<sup>5</sup> In this regard, CCIA strongly believes that, for the FTC to determine whether there are potential competition and security concerns in this area, it is important to fully and accurately understand the IT services industry and the role cloud computing has played as a part of that industry. In addition, the agency must develop a clear understanding of the complex realities of IT services and the interaction of cloud computing with other business models.

The enclosed comments outline general observations regarding IT services and cloud computing (Part I) and offer insights into cloud computing from both a competition and a data security perspective (Part II).

## **I. General Observations on Cloud Computing and Other IT Services**

The IT services industry has brought about tremendous growth over the past several decades. The introduction of cloud computing within the IT services industry has provided consumers and businesses with additional options to organize, store, and process data, allowing businesses to reduce their spend on IT and easily scale up their IT in line with business growth.

The concept of the cloud has existed since the 1950s when American computer scientist J.C.R. Licklider conceptualized an interconnected system of computers.<sup>6</sup> Over the decades that followed, the concept of the “cloud” evolved with the power of the internet, and technology and telecommunications companies began to offer “virtual” private networks as a rentable service, eventually leading to the development of the modern cloud computing infrastructure in the 1990s.<sup>7</sup> According to the Organisation for Economic Co-operation and Development (OECD), cloud computing is defined as “computing services based on a set of computing resources that can be accessed in a flexible, elastic, on-demand way with low management effort.”<sup>8</sup>

The RFI asks about the different layers of cloud computing, expressly referring to infrastructure, platform, and software, and to what extent cloud providers specialize within a

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<sup>5</sup> FTC RFI at 1.

<sup>6</sup> William Goddard, “The Evolution of Cloud Computing – Where’s It Going Next?” (2018). <https://the-report.cloud/the-evolution-of-cloud-computing-wheres-it-going-next/>.

<sup>7</sup> *Id.*

<sup>8</sup> *Supra* note 4 at 8.

layer or operate at multiple layers.<sup>9</sup> It is important to note that the distinction between different layers has blurred over time and many services do not fit neatly into these categories.<sup>10</sup> In practice, there might be no distinction between each one of the layers and, therefore, CCIA encourages the FTC to analyze cloud services taking into account business realities and the ways in which these services are actually provided and used.

There are also public and private clouds. A public cloud is an IT model where a third-party service provider manages on-demand computing services and infrastructure shared with multiple organizations via the internet. A private cloud, on the other hand, is an IT model where the infrastructure is devoted to one organization. This private cloud can either be hosted at that organization's own data center, a third-party facility, or a private cloud provider. A hybrid cloud combines both public and private cloud infrastructures.

Finally, it is important to highlight some of the key characteristics of cloud computing. First, the rapid elasticity and adaptability of cloud computing bring tremendous benefits to customers since it easily adapts to different business needs. For example, cloud services have allowed for small businesses, including startups, to scale quickly while maintaining the highest level of protection of data and to reduce overhead costs by allowing businesses to purchase IT services on an as-needed basis. Cloud computing can eliminate large, costly up-front IT investments for companies, which may particularly benefit small businesses. Last, cloud computing network access also allows users to connect several devices to the cloud and facilitates online collaboration.<sup>11</sup>

As one of the most important developments in the digital economy of the last decade, cloud services provide critical flexibility, cost savings, and security to consumers.

## **II. Competition and Data Security in Cloud Computing**

### **A. Competition**

#### **1. A Fair IT Services Ecosystem is Innovative and Promotes Competition**

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<sup>9</sup> FTC RFI question 1 at 1.

<sup>10</sup> See Ofcom, Cloud Services Market Study: Interim Report (April 2023), para. 3.17. [https://www.ofcom.org.uk/data/assets/pdf\\_file/0029/256457/cloud-services-market-study-interim-report.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0029/256457/cloud-services-market-study-interim-report.pdf).

<sup>11</sup> *Supra* note 4 at 9.

According to the OECD, “cloud computing provides the ability to access IT resources on demand without the need for significant capital expenditure. It thereby significantly lowers the entry barriers for new entrants in multiple sectors. Cloud computing has the potential to become a veritable platform for innovation that spurs the development of new products and services. In the context of innovation, cloud computing also facilitates online collaboration on a global scale.”<sup>12</sup> In general, it has been recognized that nothing has been more significant to reduce the cost of start-up innovation than cloud services.<sup>13</sup>

From a competition perspective, IT services, including cloud services offerings, are highly competitive. In the context of storage, businesses also have robust options for IT services, including on-premises offerings as well as a wide range of cloud services. On-premises cloud storage options, such as those provided by Nextcloud, ownCloud, Seafile, Pydio Cells, and Synthing, can be customized to meet and exceed the needs of organizations of all sizes.<sup>14</sup> Providers, such as VMware, Dropbox, and SoftLayer, come from varying technical and corporate backgrounds and focus on specific cloud services that directly compete with other cloud service providers.<sup>15</sup>

IT services vary widely to meet the needs of customers operating across nearly every industry in the U.S. economy. There are broad sectors of the economy, including retail, media, telecom, education, banking, and financial services, where cloud service providers offer important benefits such as access to new customers, improved deployment times, and potentially reduced costs. Smaller cloud providers have successfully targeted both enterprise companies seeking reliable places to host high-end software tools and smaller startups looking for cheap, easy, and reliable solutions.

The rising demand for cloud technologies further demonstrates that there is room and growth potential for new entrants.<sup>16</sup> New entrants that are equipping customers with unique, scalable, and cost-efficient cloud solutions include Databricks, Uptake Technologies Inc.,

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<sup>12</sup> *Id.*

<sup>13</sup> Steve Weber, “US needs to foster competition in the Cloud now” (2022).

<https://thehill.com/opinion/technology/3547947-us-needs-to-foster-competition-in-the-cloud-now/>.

<sup>14</sup> Jack Wallen, “5 best on-premises cloud storage options” (2019). <https://www.techrepublic.com/article/5-best-on-premises-cloud-storage-options/>.

<sup>15</sup> S. Srinivasan, “Cloud Computing Provider” (2014). <https://www.springerprofessional.de/en/cloud-computing-providers/1886716>.

<sup>16</sup> Grand View Research, “Cloud Computing Market Size, Share & Trends Report, 2030” (2021). <https://www.grandviewresearch.com/industry-analysis/cloud-computing-industry/methodology>.

Rubrik, D2iQ Inc., Vlocity Inc., Confluent Inc., Stratoscale, and SecurityScorecard. These new cloud companies have proved to be attractive to venture capital investors.<sup>17</sup> For example, Databricks announced a \$1.6 billion round of funding in 2021 to accelerate innovation in AI-driven data architecture.<sup>18</sup> Additionally, new cloud service providers focused on security, storage, and databases continued to land new investments and customers during the COVID-19 pandemic.<sup>19</sup> These investments and client opportunities will prompt more companies to accelerate cloud-related projects to keep ahead of the competition.

In terms of competitive dynamics,<sup>20</sup> cloud providers compete in a market for IT services. Cloud services are part of the overall IT services industry, which is highly competitive and dynamic including large and small companies. As such, customers are often able to create the most beneficial IT system for their needs as a result of combining offerings from multiple different IT providers at the same time, including cloud services providers. Additionally, cloud providers also compete with on-premises solutions. According to industry analyst Gartner, in 2021 less than 10% of total global IT spending was on public cloud.<sup>21</sup> Therefore, cloud providers actively market cloud solutions to compete with on-premises alternatives.<sup>22</sup> Finally, there is robust competition in cloud services among small and large players.<sup>23</sup> In general, this competitive environment provides cloud customers with numerous options and providers.

The RFI questions what incentives cloud providers are offering to customers to obtain more of the cloud services they need from a single provider.<sup>24</sup> In this regard, it is fundamental to understand that a high percentage of cloud customers use multiple cloud providers at the same

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<sup>17</sup> The Wall Street Journal, Sara Castellanos, “Cloud Startups Ride Wave of Pandemic-Fueled Investments” (2020). <https://www.wsj.com/articles/cloud-startups-experience-wave-of-pandemic-fueled-investments-11601026201>.

<sup>18</sup> Databricks, “Databricks Raises \$1.6 Billion Series H Investment at \$38 Billion Valuation” (2021). <https://www.databricks.com/company/newsroom/press-releases/databricks-raises-1-6-billion-series-h-investment-at-38-billion-valuation>.

<sup>19</sup> *Supra* note 17.

<sup>20</sup> FTC RFI question 3 at 1.

<sup>21</sup> Gartner, “Gartner Forecasts Worldwide IT Spending to Grow 3% in 2022” (2022). <https://www.gartner.com/en/newsroom/press-releases/2022-06-14-gartner-forecasts-worldwide-it-spending-to-grow-3-percent-in-2022>.

<sup>22</sup> *See*, for example, AWS Cloud Financial Management “Five things you should do to create an accurate on-premises vs cloud comparison model” (2022). <https://aws.amazon.com/blogs/aws-cloud-financial-management/five-things-you-should-do-to-create-an-accurate-on-premises-vs-cloud-comparison-model/>.

<sup>23</sup> *See*, for example, AWS “Price reductions on Amazon EC2 instances running SUSE Linux Enterprise Server (SLES) OS” (2022). <https://aws.amazon.com/about-aws/whats-new/2022/06/price-reductions-amazon-ec2-instances-suse-linux-enterprise-server-sles-os/>.

<sup>24</sup> FTC RFI question 6 at 2.

time (multi-homing).<sup>25</sup> A Flexera survey found that 70% of companies that use cloud services turn to multiple public cloud providers.<sup>26</sup> The fact that customers are using many cloud services from different providers simultaneously (*e.g.*, adopting a multicloud approach) reflects the majority of cloud providers' focus on designing interoperability and portability features.

Similarly, in relation to open source,<sup>27</sup> numerous cloud providers offer products based on open-source software. With so much built and processed via APIs in the cloud, cloud-enabled organizations can easily move data and workloads between cloud environments. Open-source cloud APIs and standards, along with other solutions, give these organizations more flexibility to move between vendors, reduce the number of tools required to support cloud environments, and ultimately support the integration of existing business systems with the cloud.<sup>28</sup> In addition to the rising adoption of open-source cloud APIs and standards, many cloud services come with tools designed to facilitate data migration to and from the cloud. For example, Google Kubernetes Engine (GKE) is a managed service Google invented “to deploy and operate containerized applications at scale using Google’s infrastructure;” Google previously released Kubernetes as open source software, resulting in it now being used to the benefit of a large number of other small and large companies to support containerized workloads in their existing environment.<sup>29</sup> In practice, there are more Kubernetes-based services on Amazon Web Services (AWS) than on the Google Cloud Platform. Practices, such as open sourcing technology like Kubernetes, provide more choices to consumers.

Regarding the relation between artificial intelligence (AI) and cloud computing,<sup>30</sup> cloud providers are playing a key role in giving customers access to AI and machine learning (ML). For example, Amazon Bedrock is a “new service for building and scaling generative AI applications, which are applications that can generate text, images, audio, and synthetic data in

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<sup>25</sup> Flexera “2023 State of the Cloud report,” at 20 (2023). <https://info.flexera.com/CM-REPORT-State-of-the-Cloud#view-report>.

<sup>26</sup> *Id.*

<sup>27</sup> FTC RFI question 8 at 2.

<sup>28</sup> See Google Cloud, “State of API Economy 2021 Report” (2020). [https://pages.apigee.com/rs/351-WXY-166/images/Apigee\\_StateOfAPIS\\_eBook\\_2020.pdf](https://pages.apigee.com/rs/351-WXY-166/images/Apigee_StateOfAPIS_eBook_2020.pdf). According to the survey of 700 IT decision-makers around the globe in 2020, 56% of respondents viewed APIs as helping them build better digital experiences and products, and 52% agreed that APIs accelerate innovation by exposing assets with partners, demonstrating that making two systems interoperate and portable can improve business performance, in addition to all the cost-efficiency considerations.

<sup>29</sup> “GKE overview,” <https://cloud.google.com/kubernetes-engine/docs/concepts/kubernetes-engine-overview>.

<sup>30</sup> FTC RFI question 9 at 2.

response to prompts.”<sup>31</sup> Amazon Bedrock gives customers easy access to foundation models (FMs)—those ultra-large ML models that generative AI relies on, allowing AWS customers to use this technology without generating a model themselves and to choose the best models for their specific needs.<sup>32</sup> In addition, Google Cloud also provides foundation model builders and downstream developers, whether open source or proprietary, with the tools they need to build, tune and deploy foundation models at scale. Google Cloud’s Model Garden on Vertex AI<sup>33</sup> provides a single environment to search, discover, and interact with Google’s own foundational models as well as models from both open-source partners and wider AI partners.<sup>34</sup> More broadly, cloud infrastructure makes it possible for businesses to access advanced computing resources that otherwise would be extremely expensive to deploy, which can help other businesses and AI startups by offering them alternatives to compete.<sup>35</sup> Given the multiple benefits that these AI and ML tools bring to consumers and innovation, CCIA strongly supports these developments in the context of a fair and competitive cloud computing environment.

## 2. Competition and R&D

The RFI asks if cloud providers continue to invest sufficient resources in research and development (R&D), in which areas cloud providers are investing most heavily, and why.<sup>36</sup> Given the intense competition among IT providers, there is increased investment in the R&D of new IT and cloud technologies. In response to the growing demand for cloud technologies, leading cloud providers focus their investments to innovate and better compete with one another and on-premises IT providers. These cloud providers are key contributors to the R&D of cloud technologies that benefit both consumers and businesses. Leading technology companies have consistently increased their spending on R&D and capital expenditures in the last five years and

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<sup>31</sup> Amazon Web Services, “Announcing New Tools for Building with Generative AI on AWS” (2023).

<https://aws.amazon.com/blogs/machine-learning/announcing-new-tools-for-building-with-generative-ai-on-aws/>.

<sup>32</sup> AWS, “AWS announces Amazon Bedrock and multiple generative AI services and capabilities” (2023).

<https://www.aboutamazon.com/news/aws/aws-amazon-bedrock-generative-ai-service>.

<sup>33</sup> Google Cloud, Your Guide to Generative AI support in Vertex AI (2023).

<https://cloud.google.com/blog/products/ai-machine-learning/vertex-ai-model-garden-and-generative-ai-studio>.

<sup>34</sup> Google Cloud, Building the most open and innovative AI ecosystem (2023).

<https://cloud.google.com/blog/products/ai-machine-learning/building-an-open-generative-ai-partner-ecosystem>.

<sup>35</sup> The Wall Street Journal, Tom Dotan and Miles Kruppa, “Microsoft, Google, Amazon Look to Generative AI to Lift Cloud Businesses” (2023). <https://www.wsj.com/articles/microsoft-google-amazon-look-to-generative-ai-to-lift-cloud-businesses-7159a43f>.

<sup>36</sup> FTC RFI question 2 at 1.



have done so on a global scale. For example, in 2022, Alibaba invested \$8.025B<sup>37</sup> in R&D, Amazon \$73.213B,<sup>38</sup> Google \$39.500B,<sup>39</sup> Microsoft \$26.627B,<sup>40</sup> Oracle \$8.032B,<sup>41</sup> and Salesforce \$5.055B.<sup>42</sup> Continued R&D investment by U.S cloud providers will be essential to keep pace with competitors worldwide.

### 3. Unfair Practices by Legacy IT Providers May Inhibit Competition

The RFI also includes questions about what barriers (contractual, technological, etc.) exist to offering services that compete with individual services offered by cloud infrastructure providers, and what costs cloud customers face in switching software services, using multiple cloud and/or providers porting their data from one cloud provider to another.<sup>43</sup> In this regard, a key concern is how cloud providers may be harmed by other legacy IT companies entering the cloud space and unfairly leveraging their market power in non-cloud markets to lock customers in to their own cloud ecosystems as a result of restrictive licensing practices and other unfair practices.

For example, a 2021 study points out how certain legacy software providers' market power in the enterprise, productivity, and database software is used to lock in customers into their cloud infrastructure, thereby distorting competition in this market.<sup>44</sup> One of the practices identified refers to legacy software providers imposing unfair software licensing terms, which make it practically impossible for those providers' customers to take their existing enterprise software and deploy it on the cloud service provider of their choice. Importantly, there are no

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<sup>37</sup> See "Alibaba Research and Development Expenses 2011-2022 | BABA."

<https://www.macrotrends.net/stocks/charts/BABA/alibaba/research-development-expenses>.

<sup>38</sup> See "Amazon Research and Development Expenses 2010-2023 | AMZN."

<https://www.macrotrends.net/stocks/charts/AMZN/amazon/research-development-expenses>.

<sup>39</sup> See "Alphabet Research and Development Expenses 2010-2023 | GOOGL."

<https://www.macrotrends.net/stocks/charts/GOOGL/alphabet/research-development-expenses>.

<sup>40</sup> See "Microsoft Research and Development Expenses 2010-2023 | MSFT."

<https://www.macrotrends.net/stocks/charts/MSFT/microsoft/research-development-expenses>.

<sup>41</sup> See "Oracle Research and Development Expenses 2010-2023 | ORCL."

<https://www.macrotrends.net/stocks/charts/ORCL/oracle/research-development-expenses>.

<sup>42</sup> See "Salesforce Research and Development Expenses 2010-2023 | CRM."

<https://www.macrotrends.net/stocks/charts/CRM/salesforce/research-development-expenses>.

<sup>43</sup> FTC RFI question 10 at 2.

<sup>44</sup> Frédéric Jenny, "Cloud Infrastructure Services: An analysis of potentially anti-competitive practices" (2021).

[https://35b77d9a-460d-4082-a309-3301d9552efa.usrfiles.com/ugd/35b77d\\_4490e58b3da3490590cf55d15f561e4b.pdf](https://35b77d9a-460d-4082-a309-3301d9552efa.usrfiles.com/ugd/35b77d_4490e58b3da3490590cf55d15f561e4b.pdf).



technical justifications for these practices. Other unfair practices may include (i) licensing restrictions requiring the government to repurchase previously paid-for software, in order to use those applications in competitive cloud environments; (ii) fixed, inflexible annual support fees, that cannot be reduced, even with a reduction in software usage; and (iii) predatory software audits used to cement lock-in.<sup>45</sup>

Unfair practices by legacy IT providers may have significant implications in three key aspects: (i) interoperability; (ii) portability; and (iii) openness. *First*, interoperability between cloud services is a big part of what allows choice to exist for consumers.<sup>46</sup> It also is a catalyst for innovation and growth. Interoperability gives consumers the ability to choose not only what is best for them but also what has the best price.<sup>47</sup> CCIA encourages interoperability as a way to increase ‘market contestability’ and reduce barriers to entry and believes that practices such as multi-homing and switching can help keep markets open to entry and expansion. For example, in the context of AI and ML developments, an interoperable environment is crucial to promote competition and innovation.

It is important to underscore that there are contexts where interoperability may be limited due to technical constraints or because interoperation could pose risks to network security or data protection. In those cases, given adequate mobility, consumers will choose the product whose trade-offs best reflect their needs. The concern is when legacy IT providers limit interoperability with no technical rationale to justify these constraints. As part of its market study, the United Kingdom’s Ofcom has recently called out the fact that Microsoft has erected barriers to multicloud with its cloud infrastructure by adopting proprietary standards and closed APIs to restrict interoperability and portability with third party services.<sup>48</sup> The Ofcom report also noted

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<sup>45</sup> Michael Garland, “VENDOR-LOCK AND LACK OF COMPETITION IN THE GOVERNMENT’S SOFTWARE ESTATE” (2023). [https://netchoice.org/wp-content/uploads/2023/01/NetChoice\\_Garland\\_The\\_Pernicious-Consequences-of-Vendor-Lock.pdf](https://netchoice.org/wp-content/uploads/2023/01/NetChoice_Garland_The_Pernicious-Consequences-of-Vendor-Lock.pdf). See also Omdia, The Case for Vendor Diversity: The Need for Change in Government Technology and Procurement Practices (Nov. 2021). <https://omdia.tech.informa.com/-/media/tech/omdia/marketing/commissioned-research/pdfs/the-case-for-vendor-diversity-the-need-for-change-in-government-technology-and-procurement-practices.pdf?rev=0b250c31616c43549937d2c07832afdc>.

<sup>46</sup> OECD, “Data Portability, Interoperability and Digital Platform Competition” (2021) at 12.

<https://www.oecd.org/daf/competition/data-portability-interoperability-and-digital-platform-competition-2021.pdf>.

<sup>47</sup> *Id.*

<sup>48</sup> Ofcom, Cloud Services Market Study: Interim Report (April 2023), para. 5.69.

[https://www.ofcom.org.uk/data/assets/pdf\\_file/0029/256457/cloud-services-market-study-interim-report.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0029/256457/cloud-services-market-study-interim-report.pdf).

that there is no technical justification for these restrictions considering that “other cloud providers, including Google, offer equivalent services without imposing any such restrictions.”<sup>49</sup>

*Second*, data portability helps to drive innovation and competition by enabling consumers to securely switch between services from different providers, empowering them to try new services, and allowing them to choose the offering that best suits their needs.<sup>50</sup> In addition to interoperability alternatives, it is also important for data to be able to be moved by the customer. Therefore, unjustified technological limitations to portability are another example of unfair practices that should be avoided. For example, limitations that some of the legacy IT companies put on solutions like Google BigQuery<sup>51</sup> or Anthos,<sup>52</sup> which Google provides to allow a consumer to do high-intensity computing analytical work on the environments where they are, rather than having to move into one central location and then moving them back, harm innovation and goes against cost saving. These solutions are industry firsts and bring significant benefits to customers who are able to effectively work seamlessly across different clouds enabling a multicloud approach. This then allows customers to optimize on prices and service quality as well as ensuring data security. Other examples of unfair limitations are fees to move workflows to other cloud providers or charging for licensing with a “non-approved cloud provider.” All these restricting licensing provisions reduce choice and may harm competition.

*Third*, as mentioned above, cloud open source is crucial to give customers more flexibility to move between vendors, reduce the number of tools required to support cloud environments, and ultimately support the integration of existing business systems with the cloud. Therefore, practices that in an unjustified way limit openness are unfair. For example, changes to a cloud provider’s code to make it impossible for other cloud providers’ features to work on its environment have a direct impact on consumers and may harm competition.<sup>53</sup> The Ofcom

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<sup>49</sup> *Id.*

<sup>50</sup> *Supra* note 45 at 10.

<sup>51</sup> BigQuery is a multicloud analytics solution that enables customers to access and securely analyze data stored across cloud services including non-Google cloud infrastructure. Customers can therefore analyze data from one single BigQuery Omni interface no matter where it is stored and without requiring users to migrate their data out of any other cloud service.

<sup>52</sup> Anthos is a multicloud solution for container orchestration across a variety of cloud environments and on-premises. Anthos is agnostic of underlying technology and allows developers to build an application once and then run it anywhere (*i.e.*, in any cloud environment), instead of having to configure specialized versions (*e.g.*, by rewriting the code) for each different underlying infrastructure.

<sup>53</sup> *Supra* note 45.

report noted that, for example, Microsoft has taken steps to limit compatibility with third party providers, such as by modifying open-source software to include their own non-open APIs, or building on open standards in a way that creates lock-in.<sup>54</sup> Under these circumstances, the consumer usually is not able to understand why the features are not working and will end up using instead the ones that work. This constitutes an artificial limitation on consumer choice, which may restrict competition.

Finally, it is important to mention that the industry itself has taken steps to promote best practices across markets, including self-regulatory initiatives such as the SWIPO Switching Cloud Providers and Data Portability Code (SWIPO Code),<sup>55</sup> CISPE's Fair Software Principles,<sup>56</sup> and the Coalition for Fair Software Licensing,<sup>57</sup> which aim to develop an open cloud universe that promotes the interests of all cloud users. However, ultimately, these initiatives can only achieve their potential when all industry players comply.

#### **4. It is Critical to Differentiate Between Legitimate and Unfair Practices**

To analyze cloud computing and other IT services, it is essential to understand the scale of the potential benefits of cloud services to consumers, innovation, and the U.S. economy, and to distinguish between legitimate and unfair practices. It is fundamental to differentiate between justified and unjustified limitations to an open and interoperable IT services ecosystem.

For example, facilitating the export of complex and extensive workloads from one cloud service provider to any other IT environment, including on-premise, involves certain operational costs for any cloud vendor, as also noted by the SWIPO Code.<sup>58</sup> In particular, the code recognizes the need to allow providers of data processing services to charge customers for network charges, and associated costs, incurred. As such, recoupment of costs associated with supporting customer traffic across global networks through fees may ensure future cloud network and service investment.

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<sup>54</sup> *Supra* note 48, para. 5.63.

<sup>55</sup> SWIPO, "Code of Conduct for Data Portability and Cloud Service Switching for Infrastructure as a Service (IaaS) Cloud services" (2020). <https://swipo.eu/wp-content/uploads/2020/07/SWIPO-IaaS-Code-of-Conduct.pdf>.

<sup>56</sup> CISPE, "Principles of Fair Software Licensing for Cloud Customers".  
<https://www.fairsoftware.cloud/principles/>

<sup>57</sup> Coalition for Fair Software Licensing "The Coalition for Fair Software Licensing Principles".  
<https://www.fairsoftwarelicensing.com/>.

<sup>58</sup> *Supra* note 55.

Therefore, it is important to recognize practices and limitations that are legitimate and necessary to provide cloud services in an adequate manner. As a general rule, fair competition should be about companies competing on the merits, instead of locking-in customers through not-technically justified unfair licensing practices and commercial terms.

## **B. Security and Privacy Considerations**

In addition to the benefits that cloud computing provides to customers from an innovation point of view, the cloud is also a better alternative from a security perspective since using the cloud is more secure and resilient than traditional on-premises infrastructure. Cloud providers offer many different security options and customize the offerings to meet the security needs of their customers. Additionally, cloud providers have secure facilities designed to protect data and provide the latest in security protections.

The RFI asks to what extent particular segments of the economy are reliant on a small handful of cloud service providers and what the data security impacts of this reliance are.<sup>59</sup> Cloud computing consists of multiple data centers that helps mitigate concerns around a single point of potential failure, particularly where customers are able to multicloud between different cloud providers. Cloud infrastructure consists of multiple independent data centers in different geographic locations. Cloud providers offer multiple places to store data, each of which is independent of the other. Additionally, companies can use multiple cloud providers to store their data, or they can use a hybrid cloud and on-premise IT solution.

Cloud-based businesses provide strong consumer data security since they offer customers the tools to create systems with controlled access, strong perimeters, and surveillance.<sup>60</sup> Some leading cloud service providers are building options for small and midsize businesses (SMBs) and enterprises that adopt perimeter-less data environments,<sup>61</sup> underscoring the shift to a zero-trust model, which takes advantage of the scale and daily release of features available through commercially available public and hybrid cloud environments. Consumers can count on cloud-based businesses for heightened resilience. Cloud providers have incentives to employ layers of

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<sup>59</sup> FTC RFI question 11 at 2.

<sup>60</sup> Otava, “Reduce Downtime with the Cloud: 5 Ways the Cloud Helps You Stay Online” (2021). <https://www.otava.com/blog/reduce-downtime-with-the-cloud-5-ways-the-cloud-helps-you-stay-online/>.

<sup>61</sup> For example Google Cloud, <https://cloud.google.com/beyondcorp>.

reliability solutions, such as automatic failover, servers, backup storage, security systems, and power generators, to lower the chance of the cloud computing system, and ultimately businesses and their consumers, experiencing downtime. Some cloud providers have also developed products and services that enable businesses to easily move data, workloads, and in some cases, entire applications, on and off the cloud or between clouds, increasing competition between the cloud and other IT environments.

The RFI also asks how responsibility for the security of consumers' personal information is allocated between cloud vendors and cloud customers.<sup>62</sup> It is common for cloud providers to share responsibility with their customers. An example is the Shared Responsibility Model on security in which "Security and Compliance is a shared responsibility between AWS and the customer."<sup>63</sup> This shared model can help relieve the customer's operational burden as AWS is responsible for protecting the infrastructure that runs all of the services offered in the AWS Cloud. This infrastructure is composed of the hardware, software, networking, and facilities that run AWS Cloud services. Customers are responsible for security of their data in the cloud, which will depend on which AWS cloud services that customer selects.<sup>64</sup>

Finally, it is essential to consider that cloud providers continue to invest in many different mechanisms to ensure that their customers have the highest levels of reliability, security, and performance at competitive prices. All this information regarding security and compliance-related offerings is commonly publicly available for all customers.<sup>65</sup>

CCIA is pleased to provide this information and welcomes any questions from the FTC.

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<sup>62</sup> FTC RFI questions 19 and 20 at 3.

<sup>63</sup> See AWS, <https://aws.amazon.com/compliance/shared-responsibility-model/>.

<sup>64</sup> *Id.*

<sup>65</sup> See, for example, AWS. <https://aws.amazon.com/codewhisperer/>. <https://aws.amazon.com/about-aws/whats-new/2022/07/aws-marketplace-vendor-insights-streamline-vendor-risk-assessments-preview/>. <https://aws.amazon.com/about-aws/whats-new/2022/10/amazon-detective-reduce-time-investigate-amazon-guardduty-findings-grouping-related-findings/>. <https://press.aboutamazon.com/2022/11/aws-announces-amazon-security-lake>. <https://aws.amazon.com/about-aws/whats-new/2022/12/aws-security-hub-new-security-best-practice-controls/>.