

NetChoice Response to FTC Request for Information on Cloud Computing

June 21, 2023

Thank you for soliciting Public Comments on the Business Practices of Cloud Computing Providers. Our comment focuses on the *Market Power and Business Practices Affecting Competition* in the market for cloud services.

As a threshold matter, the cloud marketplace is integrally part of the broader market for information technology (IT) services, because cloud services are simply one way that customers meet their IT needs. The cloud marketplace is therefore not distinct from the IT services market. However, for purposes of this RFI, we refer in our comment to the “cloud market,” “cloud industry,” or “market for cloud services,” when we are really discussing the market for IT services delivered via cloud infrastructure.

As noted during the FTC’s May 11 cloud-focused panel discussion, the advent of cloud computing has created a sea change in the operational landscape for information technology. In the first modern wave of computing, users were required to purchase and manage their own infrastructure, equipment, and software. For businesses, this meant securing space, hardware, software, backup power, and the skills required to run a data center. It also meant purchasing wasteful surplus capacity to accommodate surges that might occur. This is akin to the classic example of the retailer that builds capacity to deal with a spike in Christmas business, while that surplus capacity sits idle for the rest of the year.

Cloud services solve the problem of over-capacity by providing a shared consumption model that charges only for actual usage, like a public utility. In other words, consumers pay for capacity and resources consumed. Cloud providers can scale IT resources up or down, on demand, in real time. And cloud consumers can outsource to the cloud provider many of the skills needed to manage the virtual and physical data processing environment including security, software upgrades, hardware upgrades, obsolescence, and facility management. When outsourcing the performance of these requirements to a cloud provider, most users gain the benefits of more competent professionals than average users or businesses could afford on their own.

Cloud computing is also a great equalizer, providing the same benefits at similar price points to customers from the one-person startup to the largest enterprises in the world, like the United States government with its two million employees.¹ All have access to the same secure infrastructure and cloud-based applications. All can limit costs to only what is actually consumed. All benefit from lower barriers to entry for their information technology requirements. Because of the advent of cloud there is no longer a need to invest upfront capital on servers and associated hardware and software to get an application into production quickly.

We believe foundationally there is strong competition among highly capable cloud service providers of many sizes. There are few technical limitations to keep new entrants from offering cloud services: the technology is well understood; there are no patents or other intellectual

¹ The U.S. government likely spends about \$10 to \$15 billion per year on cloud services.

property barriers to entry; and while entry requires capital, the United States is a nation of entrepreneurs with large reserves of capital seeking places to invest.

As seen with the surge of funding for artificial intelligence (AI), and as observed in the FTC’s May 11 event, there is great interest in integrating AI technology into cloud computing.² Furthermore, there are many well-financed players in the broader market for IT services. For example, IT consumers have more choices available for cloud services than do consumers in the highly competitive market for mobile phone services, which is also capital intensive.

The threat to cloud competition is not a lack of quality participants offering quality services. There are plenty. In fact, there is so much competition that the greatest threat to a healthy market is some cloud providers forcing their legacy consumers into their own clouds, avoiding competition altogether. The single greatest threat to cloud competition is thus the attempt by some providers to lock in their customers – businesses of all sizes and government agencies especially – into specific clouds by limiting mobility through pernicious contract clauses, predatory discounting and other dangerous schemes that leave consumers with limited or unpalatable options. We are not speaking here of “network effects” that might limit mobility and competition. Instead, some providers have opted to use aggressive anti-competitive behavior designed to “vendor-lock” consumers and limit their choices.

These behaviors, if left unchecked, will continue to thwart healthy competition in cloud services, inflate prices, and slow innovation. Our comment details some of the most pernicious examples of behaviors that limit cloud competition.

The Cloud Industry Enjoys Vibrant Competition, with Many Providers Competing to Offer their Services

Dozens, if not hundreds, of cloud providers serve a variety of business and consumer needs, offering “Infrastructure as a Service” (IaaS), “Platform as a Service” (PaaS), “Software as a Service” (SaaS), or some combination of the three. The benefits for the “as a Service” model is the cost for the customer, whether business or individual user; the customer can pay to access each service it needs – whether data storage, messaging platforms, app hosting, and more – at the scale it requires.³ It allows small and medium enterprises and large organizations alike to take advantage of business growth opportunities and innovation potential, without the necessity of building or leasing space in a data center themselves.

Indeed, enterprise spending on cloud infrastructure services neared \$64 billion in the first quarter of 2023 – representing a sales growth of 20 percent, over \$10 billion, year over year.⁴ Businesses are also enjoying significant returns as a result of their adoption of cloud services. A 2022 study

² Quinn, Rob, “Nvidia Is Now Worth Almost \$1T Thanks to AI Boom,” *Newser*, <https://www.newser.com/story/335770/nvidia-is-now-one-of-the-worlds-most-valuable-firms.html>

³ See explanation of various “as a Service” models, “What are IaaS, PaaS and SaaS?” <https://www.ibm.com/topics/iaas-paas-saas>

⁴ Haranas, Mark, “AWS, Microsoft, Google’s Cloud Market Share Q1 2023,” *CRN*, <https://www.crn.com/news/cloud/aws-microsoft-google-s-cloud-market-share-q1-2023>

by the Stanford Digital Economy Lab, among the first large-scale studies of the impact of cloud adoption on firm performance, found that “younger, smaller” firms, especially those who operate in high research and development industries, benefit most from cloud adoption, particularly hiring labor with cloud expertise.⁵ According to the research:

[W]e document a large increase and fast diffusion of cloud-related skills among the US public firms. The diffusion is wide across sectors and occupations, and deep into our economy (e.g., more than 60% of the firms at least had one job posting requesting cloud-related skills)... We show that in contrast to the nonadopters, cloud adopters have about 6.9% higher average sales over the last decade. The identified effect is robust to using alternative definitions of cloud adoptions, data sources, and various estimation methods. In addition, it is growing over both treatment and calendar years, suggesting organizational learning and other potential complementary investments.⁶

The adoption of cloud computing technologies is essential for modern organizations to thrive, especially in a business environment where telework, “work from home” and other virtual engagements endure. University of California-Berkeley professor Steve Weber even noted cloud’s importance to business transformation: “The single most important development in the digital economy over the last decade has been the architectural transformation from on-premises servers and software to the ‘cloud.’”⁷ Even in the face of economic and inflationary constraints, businesses want to invest in the cloud, and as such, there is a vibrant, competitive marketplace for cloud providers.

The top industry players in the cloud space include recognizable providers like Amazon Web Services (AWS), Microsoft Azure, Google Cloud, Salesforce, Oracle, IBM (Kyndryl), and Dell. Yet many others exist, including growing industry players, like VMWare, Dropbox, OVHcloud, Adobe, Box, Cloudflare, Digital Ocean, and Airtable that provide specific, innovative solutions for organizations. Further, international providers like Tencent, Huawei, and Alibaba have grown tremendously in recent years in the global cloud marketplace. Tencent did not appear at all in “top cloud provider” discussions in 2019 and 2020, for example. Now, the company represents some 2 percent of the global cloud market share, a roughly equal market share with Oracle.⁸

Indeed, it is a mix of these companies that are represented on many “top ten” lists of cloud service providers. Comparing the *Statista* cloud market share “top ten” list, for example, with that of *Technology Magazine* and *Dgtl Infra* creates a grouping of nearly twenty different cloud providers that comprise myriad leading global companies in the cloud computing industry.⁹

⁵ Jin, Wang, “Cloud Adoption and Firm Performance: Evidence from Labor Demand” Stanford Digital Economy Lab, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4082436

⁶ Id., pp. 33-4

⁷ Weber, Steve, “US needs to foster competition in the Cloud now” *the Hill* <https://thehill.com/opinion/technology/3547947-us-needs-to-foster-competition-in-the-cloud-now/>

⁸ Dignan, Larry, “Top cloud providers 2019: AWS, Microsoft Azure, Google Cloud; IBM makes hybrid move; Salesforce dominates SaaS,” *ZDNet*, <https://www.zdnet.com/article/top-cloud-providers-2019-aws-microsoft-azure-google-cloud-ibm-makes-hybrid-move-salesforce-dominates-saas/>

⁹ See the following lists from *Statista*, *Technology Magazine*, and *Dgtl Infra*, all published in 2023: <https://www.statista.com/chart/18819/worldwide-market-share-of-leading-cloud-infrastructure-service-providers/> <https://technologymagazine.com/top10/top-10-biggest-cloud-providers-in-the-world-in-2023>

Many consider the top cloud industry players to be AWS, Microsoft Azure, Google Cloud, and Oracle. Yet other competitors are only growing stronger in their product offerings and business growth – taking direct aim at those leading companies. In September, cloud-based security company Cloudflare promised \$1.25 billion in investments and funding to startups that would use its serverless computing platform. Cloudflare’s Chief Executive Matthew Prince focused on competitive pricing and stronger product offerings as a key factor in this business strategy:

*“I wouldn’t characterize it as ‘stealing’ market share from anyone,” [Prince] said. “It’s a matter of earning market share, and the way you earn market share is by providing a better product at a more affordable price.” Asked how much more affordable, he said merely that it’s “significantly less expensive than the legacy public clouds” because of how it’s built.*¹⁰

In another case, cloud storage provider Snowflake acquired open-source project facilitation tool Streamlit for \$800 million—both companies fall outside of what are considered “dominant” cloud providers, yet have raised hundreds of millions in financing for such a deal.¹¹ Streamlit, a popular platform for project development on data-based apps, will become an important integration into Snowflake’s services offered to its business and developer clients, supporting and filling a unique niche in the cloud computing marketplace.

Yet another new player in the cloud computing industry, Internxt, was valued in April 2022 at \$40 million. This is relatively small compared to the top organizations in the cloud market, but it too fills a specific need by certain cloud users. According to CEO Fran Villalba Segarra, Internxt aims to be an “open-source, blockchain-based cloud storage service providing safe, secure and GDPR-compliant digital storage.”¹² The company’s offerings would be particularly sought-after by users valuing a specific level of data privacy not offered by other cloud providers.

Synergy Research Group found that new players have been growing, especially as the demand for cloud services grown.¹³ Indeed, the market share of revenue earned by AWS and Google each decreased at the end of 2022, despite revenue growth in both companies.¹⁴ Not only is the pie of the cloud market continuing to grow, but new entrants are enjoying bigger pieces of that pie each year.

<https://dgtlinfra.com/top-10-cloud-service-providers-2022/>

¹⁰ Quoted by Connie Loizos, “Cloudflare takes aim at AWS with promise of \$1.25 billion to startups that use its own platform,” *TechCrunch*, <https://tcrn.ch/3fko7d8>

¹¹ Miller, Ron “Snowflake acquires Streamlit for \$800M to help customers build data-based apps” *TechCrunch*, <https://tcrn.ch/3ICfUdT>

¹² Preimesberger, Chris, “Web3 startup Internxt, valued at \$40M aims to compete with Google Drive,” *VentureBeat*, <https://venturebeat.com/data-infrastructure/web3-startup-internxt-valued-at-40m-aims-to-compete-with-google-drive>

¹³ Synergy Research Group, “Q1 Cloud Spending Grows by Over \$10 Billion from 2022; the Big Three Account for 65% of the Total,” <https://www.srgresearch.com/articles/q1-cloud-spending-grows-by-over-10-billion-from-2022-the-big-three-account-for-65-of-the-total>

¹⁴ Griffiths, Charles, “The Latest Cloud Computing Statistics (updated May 2023)” AAG <https://aag-it.com/the-latest-cloud-computing-statistics>

Further, research from McKinsey found that many businesses use more than one cloud provider to meet their unique needs. “Several participants noted that working with multiple cloud providers served as a hedge against price increases or service degradation.”¹⁵ McKinsey also noted that this practice of using multiple cloud providers may become only more common in coming years as new entrants to the cloud industry marketplace continue innovating and offering new or differentiated services.¹⁶

The competitive landscape of the cloud computing industry is strong. Many players compete to offer their services to clients, often meeting customers’ idiosyncratic needs. Similarly, customers have ample choice to choose the best price and product environment for their business, often combining the offerings of more than one provider. Smaller, niche cloud providers offer unique services to their customers, providing lower prices or stronger product offerings or higher quality than other competitors in the marketplace.

Competition for Government Cloud Contracts by FedRAMP-Authorized Providers Also Reveals Strong Cloud Competition

One particularly salient case study of the breadth of cloud competition is in the marketplace for FedRAMP-authorized services. The Federal Risk and Authorization Management Program (FedRAMP) was established in 2011 to promote the adoption of cloud technologies across the federal government, with a focus on cost-effective and uniform security authorizations on a government-wide scale.¹⁷ This goal is an essential one, since cybersecurity breaches and attacks are only becoming more common – and cloud products must be innovative *and* secure *and* constantly adapting to new threats. Significant funds are also at stake: according to a *Harvard Business Review* article, some \$9 billion will be spent on cloud-based IT in 2023 alone.¹⁸

The process to be FedRAMP-certified involves a third-party analysis (also approved and contracted by the U.S. government) to demonstrate each provider’s cloud product meets key security requirements. Once they achieve authorization, their product is also listed at an impact level: low, medium, and high, depending on the level of adverse effect to the government’s organizational operations should there be a security breach.¹⁹

From there, a company’s specific cloud product can be listed on the FedRAMP marketplace: hundreds of different cloud providers are listed with thousands of different product authorizations, allowing potential government clients to sort and filter options for products that

¹⁵ Campbell, Brendan, Mark Gu, Venkatesh L, and Kaavini Takkar, “Five learnings from CTOs and tech leaders on their cloud strategies.” McKinsey & Company, <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/five-learnings-from-ctos-and-tech-leaders-on-their-cloud-strategies>

¹⁶ Id.

¹⁷ “Program Basics” <https://www.fedramp.gov/program-basics/>

¹⁸ Bencie, Luke and Sarah Bencie, “What It Takes to Sell Cloud-Based Software to the U.S. Government,” *Harvard Business Review*, <https://hbr.org/2023/05/what-it-takes-to-sell-cloud-based-software-to-the-u-s-government>

¹⁹ Asnani, Deepak, “Your guide to government cloud FedRamp and DOD impact levels,” *MuleSoft Blog*, [https://blogs.mulesoft.com/migration/government-cloud-fedramp-dod-impact-levels/#:~:text=FedRAMP%20impact%20levels,Standard%20\(FIPS\)%20199%20standards.](https://blogs.mulesoft.com/migration/government-cloud-fedramp-dod-impact-levels/#:~:text=FedRAMP%20impact%20levels,Standard%20(FIPS)%20199%20standards.)

best fit their needs.²⁰ The most popular cloud computing companies have hundreds of product authorizations: AWS has over one thousand authorizations for use by government clients, and Microsoft over seven hundred. Both of these providers have contracts with hundreds of U.S. government agencies as well. Even so, over two hundred smaller, niche, or more startup-level cloud providers are also listed in the marketplace, and all have existing government contracts for their software too.

Indeed, most of these companies listed on the FedRAMP marketplace have just one or two of their products authorized by FedRAMP. This indicates a great deal of competition in the marketplace for winning government clients: each of these smaller companies has developed its products enough to meet a stringent, security-focused standard and are available for use. Even more, they are elevated on an official government marketplace alongside the incumbents in the industry – the small startup is competing against the largest incumbent for government contracts.

To be sure, FedRAMP authorization can be prohibitive for the smallest and newest startup players in the cloud computing industry. Authorization can cost from \$400,000 to more than \$1 million for a single cloud product – meaning that only those companies that are sufficiently profitable or financed to pursue authorization can become a vendor for government clients.²¹ Government software contracts are some of the most lucrative, and as the U.S. government continues modernizing its software and IT infrastructure, government contracts are surely a key objective in the business strategy of many cloud providers.

Given that, FedRAMP authorization could be considered a barrier to entry for cloud companies. At the same time, however, it is not insurmountable for small startups at an appropriate stage of their business development to seek authorization. On the FedRAMP marketplace, nearly one hundred other companies are in the process of achieving their FedRAMP authorization, and nearly all have no other FedRAMP authorizations already.²²

It is worth repeating: FedRAMP authorization indicates a strong level of trust and security in a provider's products, an indicator of quality in their offerings. With so many providers already FedRAMP-authorized for use by government clients, and other providers in the pipeline to authorization, there surely exists a strong marketplace of competition among cloud providers for these highly sought-after contracts.

Artificial Intelligence has Emerged as a Key Component of Cloud Product Offerings as Businesses Increasingly Rely on AI Tools

Businesses have been relying on artificial intelligence (AI) tools for many years, whether in the form of autocorrecting text messages, reviewing medical scans to screen for disease, or implementing customer service chat-bots. More recently, generative AI platforms like OpenAI's ChatGPT and DALL-E have captured the imagination, curiosity, and attention of organizations

²⁰ "FedRAMP Marketplace: FedRAMP at a Glance,"

<https://marketplace.fedramp.gov/#!/products?sort=productName&status=Compliant>

²¹ Bencie and Bencie, "What It Takes to Sell Cloud-Based Software to the U.S. Government"

²² "FedRAMP Marketplace: FedRAMP at a Glance"

and ordinary users alike. It is no surprise that cloud providers are integrating AI into their offerings.

One of the most public examples of this transformation into AI-cloud integration is that of Microsoft's Azure platform utilizing OpenAI's generative AI. In January 2023, Microsoft invested \$10 billion into OpenAI, the company that created ChatGPT,²³ and in March, Microsoft announced the availability to use ChatGPT in its Azure cloud platforms, allowing users to use this generative AI tools in their businesses, "summarizing content, generating suggested email copy, and even helping with software programming."²⁴ One use case of Microsoft's Azure OpenAI integration is with the medical records company Epic, a collaboration that will "bring natural language queries and interactive data analysis to SlicerDicer, Epic's self-service reporting tool, helping clinical leaders explore data in a conversational and intuitive way."²⁵

Salesforce, too, has committed to integrate AI into its cloud offerings. The company in March 2023 launched a \$250 million generative AI fund to bolster startups developing generative AI.²⁶ In May, Salesforce introduced a new generation of its Tableau generative AI tool, meant to "automate data analysis, anticipate user needs and automatically generate actionable insights."²⁷

Microsoft and Salesforce are not the only cloud providers integrating generative AI tools into their cloud offerings. Box, a content management cloud storage provider, announced in May it will integrate OpenAI models as well, working with a customer's files stored on its cloud to offer unique insights and analyses: "a user can ask questions about a document, pull out insights from a spreadsheet, or summarize a presentation."²⁸ Box's work with OpenAI also indicates that AI technologies can be cloud agnostic. However, use of AI tools certainly requires deliberate development and integration into cloud technologies.

In another case, Mavenir, a telecom company focused on open Radio Access Networks (RAN), is raising \$100 million to integrate AI tools into its cloud-based automated network technology for telecoms services.²⁹ And Together, a startup cloud platform focused on developing and proliferating AI tools, raised \$20 million in a May 2023 round of seed funding.³⁰

²³ Bass, Dina, "Microsoft Invests \$10 Billion in ChatGPT Maker OpenAI," *Bloomberg*, <https://www.bloomberg.com/news/articles/2023-01-23/microsoft-makes-multibillion-dollar-investment-in-openai#xj4y7vzkg>

²⁴ Boyd, Eric, "ChatGPT is now available in Azure OpenAI Service," Microsoft Azure Announcements <https://azure.microsoft.com/en-us/blog/chatgpt-is-now-available-in-azure-openai-service/>

²⁵ "Microsoft and Epic expand strategic collaboration with integration of Azure OpenAI Service" <https://news.microsoft.com/2023/04/17/microsoft-and-epic-expand-strategic-collaboration-with-integration-of-azure-openai-service/>

²⁶ "Salesforce Ventures Launches \$250M Generative AI Fund" <https://www.salesforce.com/news/stories/generative-ai-investing/>

²⁷ "Salesforce Introduces the Next Generation of Tableau, Bringing Generative AI for Data and Analytics to Everyone," <https://www.salesforce.com/news/stories/tableau-einstein-gpt-user-insights/>

²⁸ "Box Introduces Box AI to Bring Intelligence to Enterprise Content," <https://www.businesswire.com/news/home/20230502005489/en/>

²⁹ Lunden, Ingrid, "Mavenir raises \$100M to build more AI into its cloud-based automated network technology for telecoms services" *TechCrunch*, <https://techcrunch.com/2023/05/02/mavenir-raises-100m-to-build-more-ai-into-its-cloud-based-automated-network-technology-for-telecoms-services/>

³⁰ Prakash, Vipul Ved, "Together's \$20M seed funding to build open-source AI and cloud platform," <https://www.together.xyz/blog/seed-funding>

But not all major cloud players have successfully integrated AI into their products yet. AWS' newly launched generative AI tool, Bedrock, was seen as “incomplete” and “fairly early” in its development by trial customers.³¹ Even so, AWS launched its generative AI offerings in an increasingly competitive environment, with Microsoft's integration of ChatGPT, Salesforce's push towards AI development, and other market players in the AI and cloud computing industry. This is yet more indication of strong competition in the cloud computing marketplace. There is strong drive among industry players – leaders and new entrants alike – to offer the most innovative, diverse, and effective product offerings to their customers.

Ultimately, Microsoft, Salesforce, and these other AI-forward cloud computing players are focused on building business productivity capabilities within its cloud, making cloud technology faster, more intuitive, and easier to use with the assistance of AI tools. Cloud computing is meant to – and indeed does – cut costs, improve productivity, and ultimately support organizational growth. Support from AI tools and platforms only furthers this goal: AI integration with cloud is certainly the next step in businesses' adoption of cloud technologies.

Microsoft Uses Unfair License Restrictions That Limit Cloud Mobility and Reduce Cloud Competition

Despite vibrant competition in the cloud industry, a few vendors use anticompetitive practices in order to entrench their position, most often by preventing customers from switching providers in search of lower costs, stronger service offerings, and more innovative solutions for their businesses.

In 2019, Microsoft changed its standard licensing on some of its products, including Windows Server, SQL Server and the dominant business productivity product Microsoft Office. The net effect of the licensing change was to lock many Microsoft users into Microsoft's Azure cloud – to the exclusion of other cloud providers. This is accomplished by contractual restrictions in the new non-negotiable Microsoft licensing agreement.

But the new licensing clause requires users to purchase new Microsoft licenses for Office, Windows Server, and SQL Server for use in clouds other than Azure. Before 2019, there were no similar restrictions on license mobility. Customers were allowed to use Microsoft licenses in infrastructures or cloud environments of their choice. Post 2019, certain market-dominant Microsoft products (e.g., SQL Server) may *not* be used in competitive clouds without paying a punitive penalty. And other market-dominant Microsoft products (e.g., Windows Server) may *not* be used in competitive clouds at all.

The change means that users may no longer deploy their already-paid-for Microsoft licenses where they want. This is profound, because the typical on-ramp to cloud is the “lifting and shifting” of already owned on-premises software into cloud environments. Microsoft's new

³¹ Daly, Matt, “Amazon's Answer to ChatGPT Seen as Incomplete” *Bloomberg*, <https://www.bloomberg.com/news/articles/2023-05-24/amazon-s-answer-to-chatgpt-seen-as-incomplete-vaporware#xj4y7vzkg>

licensing now expressly forbids lifting and shifting of their massively dominant software brands into most clouds other than their own Azure. For customers, it does not matter if an alternative to Azure performs better, offers higher quality of service, has more beneficial cybersecurity features or provides better price points. To avoid the forced march to Azure, customers must start over and buy new licenses, abandoning their original investment. This repurchasing scheme is tantamount to General Motors (GM) requiring its car owners to only park in car garages owned by GM. To park elsewhere, car owners would have to purchase a new car.

Customers with older versions of Microsoft software, operating under pre-2019 license terms, are also captured as the new restrictions are effectuated in an update of the annual maintenance agreement. Soon, if not already, only users of older versions of Microsoft software who are *not* paying for annual support will be free of the onerous licensing language and unrestricted cloud choices. Microsoft then forces those users into a Hobson's choice – after a certain point, it will only provide extended security updates for those older software versions *if the user migrates those workloads to Azure*. If the user wishes to run those older versions on another cloud, they may no longer be eligible for those security updates. The choice is then between running vulnerable Microsoft software elsewhere, or running it on Azure to receive security updates. As a result, the class of Microsoft customers unaffected by the new license restriction is shrinking daily.

Given that Microsoft is the world's largest software company, dominating in productivity and operating systems software, the scale and consequences of its licensing decisions are extraordinary. In the productivity space alone, the Office software bundle includes Teams, Word, Excel, PowerPoint, Outlook, and OneDrive. It subsumes at least six subcategories of IT products. Gartner estimates the Office bundle drives about \$42 billion a year in revenue capturing almost ninety percent of the productivity market.³² If Microsoft sold only the Office bundle, and no other products or services, it would still be in the top one hundred U.S. companies by revenue, similar in size to Coca-Cola.³³ Windows Server and SQL Server face slightly more competition, but they are colossal juggernauts in their markets too.

With this type of market dominance, it is easy to appreciate how Microsoft's licensing restrictions have enormous consequences. It is also transparent why Microsoft would be tempted to leverage licensing provision to unfairly limit competition and to force users into its own cloud. Professor Frederic Jenny, who presented at FTC's May 11 panel discussion, has written persuasively on the topic. He has pointed out that Azure's gain in market share since 2019 is likely *not* due to organic growth, but rather the result of perverse licensing restriction.³⁴ To quote Professor Jenny,

Microsoft does not publicly provide any technical explanation to justify this policy, but rather, emphasizes that significant savings when compared to AWS' proposition, 'AWS is 5 times more expensive than Azure for Windows Server and SQL Server. Why run them

³² Google Workspace Continues to Gain Market Share Versus Microsoft Office and Office 365, Gartner Report, July 2022.

³³ See listing of top U.S. public companies available at <https://stockanalysis.com/list/highest-revenue/>

³⁴ Cloud Infrastructure Services: An analysis of potentially anti-competitive practices, Jenny, Frederic, Oct. 2021, paragraph 63.

*anywhere else? Other cloud service providers may claim to have similar savings to the Azure Hybrid Benefit, but you'll need to repurchase your Windows Server license in those clouds.*³⁵

Despite criticism Microsoft appears unwilling to change its licensing policy. Microsoft's 2022 annual report mentions it has "three economies of scale" driving the growth of Azure.

*Our cloud business benefits from three economies of scale: data centers that deploy computational resources at significantly lower cost per unit than smaller ones; data centers that coordinate and aggregate diverse customer, geographic, and application demand patterns, improving the utilization of computing, storage, and network resources; and multi-tenancy locations that lower application maintenance labor costs.*³⁶

The single most important "economy of scale" is not mentioned: Microsoft's licensing provisions designed to leverage its massive legacy software base and march existing customers into Azure. This is a destructive economy of scale advantage *only they have*. Or as Raj Bala of Gartner said, "Microsoft is taking its arsenal of Windows Server, a massive software installed base, and using it punitively against its competitors."³⁷

Much of this is reminiscent of Microsoft's earlier attempt to capture the browser market and put Netscape out of business in the 1990s. Although the specifics of the Netscape antitrust litigation were different, the overall goal and consequences are similar. Using its ubiquitous presence in personal computing, Microsoft bundled its Explorer browser with Windows for free, thereby negating the need for users to seek or pay for another browser.

Microsoft's imposition of penalties on consumers who want to use other clouds while allowing users into Azure for no additional charge is also a form of price predation. Some may perceive free products as beneficial to consumers. But the long-term consequences are destructive. The Department of Justice defines price predation as,

*...a price reduction that is profitable only because of the added market power the predator gains from eliminating, disciplining, or otherwise inhibiting the competitive conduct of a rival or potential rival. Stated more precisely, a predatory price is a price that is profit maximizing only because of its exclusionary or other anticompetitive effects.*³⁸

Any Microsoft attempts to characterize their cloud licensing restrictions as discounts or a loyalty program would be misleading. On the point of free products and price predation, Judge Thomas Penfield Jackson ended his "Findings of Fact," in Microsoft's Netscape antitrust case with these words:

³⁵ Cloud Infrastructure Services: An analysis of potentially anti-competitive practices, Jenny, Frederic, Oct. 2021, paragraph 79.

³⁶ Microsoft Annual Report 2022.

³⁷ The Economist (2020). Briefing Microsoft – after the reboot, <https://www.economist.com/briefing/2020/10/22/how-satya-nadella-turned-microsoft-around>

³⁸ See DOJ Predatory Pricing Strategic Theory, available at <https://www.justice.gov/atr/predatory-pricing-strategic-theory-and-legal-policy>

*Microsoft...deters investment in technologies and businesses that exhibit the potential to threaten Microsoft. The ultimate result is that some innovations that would truly benefit consumers never occur for the sole reason that they do not coincide with Microsoft's self-interest.*³⁹

Although the practice of penalizing Microsoft Office, Windows Server, and SQL Server licensees for using non-Microsoft clouds may not perfectly fit the economic definition of bundling, it has the same effect. Microsoft is effectively using a backdoor licensing technique to bundle its Azure cloud with its operating system, database, and office productivity software.

Microsoft is going even further with its bundling practice, also integrating new AI tools into its Office 365 productivity suite, which includes Microsoft Office and Microsoft Outlook. And it is charging some of its largest customers more for the use of these tools. *The Information* reported in June that more than 600 of Microsoft's largest clients – including Accenture, Bank of America, Ford, and Walmart – are expected to test new AI features of their Microsoft Office 365 subscriptions, paying a \$100,000 annual flat fee for⁴⁰ According to the reporting, this results in subscription costs of some 40 percent more than the classic version of Microsoft's cloud productivity software.

Running AI features in cloud software is costly, to be sure, and Microsoft has also invested billions in developing AI tools as well. Microsoft is covering the cost of these new investments, in running AI tools in its software, by charging its customers more to do so. The price tag to run AI in one's cloud software comes on top of Microsoft raising the prices of its basic version of Office 365 20 percent in March of 2022—passing costs onto its customers.

As with Netscape, there is an important historical precedent to review. In the 1980's and early 1990's there was significant competition for word processing and spreadsheet software. In the word processing category WordPerfect, WordPro, WordStar, and ZyWrite were viable alternatives to Microsoft's Word. Likewise in spreadsheets Lotus-1-2-3, VisiCalc, and Multiplan were viable alternatives to Microsoft Excel. There was rigorous competition driving innovation and keeping prices in check.

The bundling of Word and Excel into Microsoft Office effectively killed the standalone market for two software categories. MS Office was released at the end of 1990.⁴¹ By 1994, both WordPerfect and Lotus-1-2-3, previous market leaders, were on life-support and sold off to larger software companies who eventually retired them or evolved them into totally different products.⁴² There is no significant competition for stand-alone word processing or spreadsheet software in 2023. There hasn't been since the mid to late 1990s. Only Microsoft with the clout of its Windows desktop operating system had the market power to combine those standalone

³⁹ *United States v. Microsoft*, Findings of Fact (November 1999), <https://www.justice.gov/atr/us-v-microsoft-courts-findings-fact#vii>

⁴⁰ Holmes, Aaron, "Microsoft Is Charging Some Office 365 Customers 40% Extra to Test AI Features" *the Information*, <https://go.theinformation.com/r/713241e558eb14cc>

⁴¹ See Evolution of Microsoft Office available at <https://www.thewindowsclub.com/history-evolution-microsoft-office-software>

⁴² Lotus was sold to IBM in 1994. WordPerfect was sold to Corel in 1994.

products into a single bundle and crush two software categories. Office with the integrated bundle of Word and Excel (and PowerPoint) was too hard for consumers to resist particularly if the price point was subsidized, in part, by the profits generated by the massive dominance of Windows.

Even more recently, Microsoft has received complaints about its office messaging platform, Microsoft Teams. Before it was acquired by Salesforce, competitor messaging platform Slack filed an antitrust complaint in the European Union in 2020 for Microsoft's bundling of Teams and its Azure cloud platform. Slack stated, "Microsoft has illegally tied its Teams product into its market-dominant Office productivity suite, force installing it for millions, blocking its removal, and hiding the true cost to enterprise customers."⁴³ It all comes bundled together. It is all integrated by the same company. Why would consumers reject it?

Microsoft's backdoor Azure bundle is designed to do the same thing to its cloud competitors that it had previously done to Netscape, spreadsheets, and word processing. Microsoft's 2022 Annual Report states the importance of cloud to Microsoft and inadvertently reveals the long-term goal. In CEO's Satya Nadella's letter to shareholders, he states,

*"We are building Azure as **the** world's computer...."*⁴⁴

Microsoft does not aim to build the "best" or "most secure" or a "highly innovative" computer. It wants to build the *only* computer. And it is using licensing restrictions and market power to do so.

We urge the FTC to implement measures to block this activity before Microsoft does to cloud what it did to other previously competitive categories of IT products.

Oracle Uses Punitive Terms, Unfair Licensing Restrictions, and Allegedly Predatory Auditing Practices to Drive Users to Its Cloud

Oracle also makes it prohibitively more expensive for consumers to use Oracle software outside its own proprietary cloud. Once again, this behavior is referenced in Professor Jenny's 2021 report.⁴⁵ The database management software (DBMS) marketplace is more competitive than productivity software, but Oracle is the market leader with approximately 45 percent share.⁴⁶

While the market is superficially more competitive, the switching costs to change the database management component are so prohibitively high that a choice to use the Oracle DBMS product is effectively a life of the application decision. Unlike some software, applications are written specifically for the database management system. Once the application is designed for and

⁴³ Espinoza, Javier, "Slack files EU antitrust complaint against Microsoft," *Financial Times*, <https://www.ft.com/content/03798bf5-cdec-438f-879f-f9db8a5b8a07>

⁴⁴ 2022 Microsoft Annual Report, Letter to Shareholders, Chairman and Chief Executive Officer, Satya Nadella, October 24, 2022. (emphasis added)

⁴⁵ Cloud Infrastructure Services: An analysis of potentially anti-competitive practices, Jenny, Frederic, Oct. 2021, paragraph 81.

⁴⁶ Id., paragraph 29.

interwoven into the DBMS, it is not portable. You cannot plug and play an application into another DBMS. To change the DBMS is to rewrite the entire application. In this way Oracle DBMS software is intensely sticky.

Oracle leverages this stickiness to impose a penalty for using non-Oracle clouds. Oracle's onerous licensing restriction is accomplished by charging for "available" virtualized servers in non-Oracle cloud environments rather than for actually implemented and deployed servers. One of the premier benefits of cloud is that new servers may be added to support an application as demand increases. This is accomplished by using virtualization software that sets the parameters for potential expansion as needed. The key word is "potential." The universe of servers is only expanded if demand requires it. Yet Oracle penalizes users by forcing them to pay for the "availability" of servers whether they are used or not. Users may only avoid this uncertainty and surprise charges by using Oracle in Oracle's cloud. In the Oracle cloud you only pay for actually used servers. Unused servers are appropriately irrelevant *only* in Oracle's cloud.

To quote Professor Jenny,

Oracle's licensing restrictions lead to a price multiple of ten times when using Oracle software on third-party cloud infrastructure when compared to running on Oracle [cloud].⁴⁷

The effects of this licensing technique are chilling. In a landmark lawsuit in 2015, Mars, the global candy company, sued Oracle for injunctive relief after Oracle threatened to shut down Mars' entire Oracle estate, crippling the company and leaving 75 thousand Mars employees idle.⁴⁸ Mars was the victim of a similar Oracle licensing restriction involving virtualization. After a superficial audit conducted by Oracle, Mars refused to pay for "potential" or "available" servers. Oracle was seeking tens of millions of dollars in up-charges.

The lawsuit was settled on confidential terms but the dramatic impact of Oracle's willingness to litigate and force users to pay for unused servers is chilling. It is this type of fear that Oracle uses to keep its users inside their native cloud. There is no obvious technical reason that Oracle cannot be used in 3rd party clouds. It is purely licensing restrictions designed to execute a business decision by Oracle in an attempt to grow their cloud business.

Oracle also uses ambiguous and foreboding terminology to discourage customers from using Oracle products in alternative clouds. Their standard support language states that they haven't "certified" that their products work in other clouds. Therefore, they will only provide help when users identify known issues or bugs or can redemonstrate the bug in Oracle's own cloud environment. Effectively this means that if a customer uses Oracle products in competing clouds, Oracle may or may not provide any assistance – at their sole discretion. As stated earlier, with Oracle sitting under about 45 percent of the world's mission critical applications, which user would be reckless enough to risk Oracle's ambiguous offer of support?

⁴⁷ Cloud Infrastructure Services: An analysis of potentially anti-competitive practices, Jenny, Frederic, Oct. 2021, paragraph 81.

⁴⁸ *Mars Incorporated v Oracle Corporation*, Plaintiffs Memorandum and Points of Authorities in Support of Its Motion for Preliminary Injunction (October 23, 2015).

Demonstrating the importance of cloud growth, Oracle was sued in a Class Action suit in 2020 for using predatory practices to force users into its cloud. In this scenario, Oracle was accused of using fraudulent audits to find customers who owed Oracle money for non-compliance and then bargain away those penalties in exchange for purchasing Oracle cloud. To quote the lawsuit,

Oracle would install its on-premises software in the client's ecosystem with a variety of preferences automatically enabled that unbeknownst to the customer, cause the customer to arguably – and unknowingly – exceed the limits of the license. After the customer fell into this trap, Oracle would audit the on-premises customer for violations of its on-premise software license. When it found violations, Oracle would then offer to reduce or eliminate those penalties if the customer agreed to accept a short-term cloud subscription that the customer neither desired nor intended to use.⁴⁹

This form of anti-competitive behavior is pure predation. It also underscores that in some cases, companies have allegedly committed fraud to attempt to lock up consumers in their clouds.

The FCC Rules on Phone Number Mobility Provide an Instructive Model for Cloud Mobility

As detailed above, most of the most pernicious licensing restrictions thwarting competition have been designed to limit consumer mobility between cloud environments. Using legacy software leverage, bundling products and services, and penalizing consumers for movement between clouds is a clear and present danger to competition. The FTC should aggressively prohibit any restrictions that artificially limit mobility between cloud environments.

By analogy, in 2003, the Federal Communications Commission (FCC) promulgated rules that required mobile telecom carriers to facilitate the porting of consumer phone numbers between carriers. Previously, moving to a new mobile phone provider meant starting over with a new phone number. This had the effect of vendor-locking some consumers. The FCC clearly saw this as a threat to competition. As one academic paper stated,

The FCC believed that local number portability would “enhance competition between . . . carriers, as well as promote competition between wireless and wireline carriers.” Number portability was initially supported by many participants in the wireless industry, especially newer wireless providers who were eager to compete with established providers.⁵⁰

The FCC worked on mandating phone number portability starting in 1996, when Congress passed the Telecommunications Act of 1996, but legal challenges by Verizon and the Cellular Telecommunications & Internet Association (CTIA) delayed action for seven years.⁵¹ One can

⁴⁹ Union Asset Management Holding AG v Oracle Corporation, Amended Consolidated Class Action For Violations of the Federal Securities Laws (February 17, 2020), pp. 6-7.

⁵⁰ Wireless Local Number Portability: New Rules Will Have Broad Effects, Stephen M. Kessing; available at <https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1110&context=dltr>

⁵¹ Id.

surmise that like Microsoft and Oracle the large established legacy telecom providers did not want to relinquish their incumbency advantages and compete head to head with new providers on the merits of the phone service alone.

Twenty-years after mobile phone number portability was mandated, it is obvious that choice and competition are thriving. One only need observe the endless television advertisements encouraging Americans to switch mobile phone carriers with their ever-evolving innovative approaches to data plans, upgrade incentives, improved network coverage, and even subsidized phones. It is noteworthy that mobile telecom is likely more capital intensive than cloud, yet the market is vibrant and competitive; just as cloud will likely be if the FTC rules against mobility restrictions.

Opaque Licensing Terms Can Be Unfair and Mislead Consumers

Technology licenses are often not read. One reason is that they are crafted by lawyers attempting to either reduce corporate liabilities or sometimes to obscure unpopular business policies. This can make them incomprehensible to average readers. As one example, Oracle uses an unintelligible support clause as a trap that makes it economically difficult to justify using less Oracle software than originally purchased. It is hard to imagine any consumer would understand this language prior to falling into the trap it creates.

In the event that a subset of licenses on a single order is terminated or if the level of support is reduced, support for the remaining licenses on that license order will be priced at Oracle's list price for support in effect at the time of the termination or reduction minus the applicable standard discount. Such support will not exceed the previous support fees paid, plus any applicable country annual adjustments, for both the remaining licenses and the licenses being terminated or unsupported and will not be reduced below the previous fees paid for licenses continuing to be supported.⁵²

This generally means that if a consumer reduces the amount of Oracle licenses it originally purchased, Oracle will reprice annual support fees so that the consumer still pays the same annual fee even after using less Oracle software. Results of how this trap plays out varies by each individual consumer scenario but the goal is to lock consumers into making it economically foolish to reduce their Oracle software, because the associated cost of ownership cannot be reduced.⁵³ Some Oracle users discover their cost of ownership never changes despite reduction in usage. In this way, Oracle makes it exceedingly difficult to diminish or end the relationship.

The FTC should seek to eliminate clauses that are impossibly opaque, restrict mobility, or cause unfair penalties. There are several good resources that guide best software acquisition practices and demonstrate how to eliminate onerous licensing provisions in agreements. The Cloud Infrastructure Service Providers in Europe (CISPE), and E.U. association of cloud providers has

⁵² Oracle Technical Support Policies, 07-October-2022 at 7.

⁵³ Annual support for Oracle is typically 23 percent of the *actual price paid* for the software. Software list prices are aspirational and often only the starting point for negotiations. Rarely is software sold at list price. To reprice software support against the actual list price, a price rarely paid, is particularly punitive.

produced a handbook entitled “Buying Cloud Services in Public Sector”⁵⁴ which includes model language for licenses. Likewise, The Coalition for Fair Software Licensing has produced a list of specific licensing goals, useful for all IT consumers that the FTC should consider attempting to memorialize to reduce onerous provisions designed to thwart competition.⁵⁵

Some of the principles include:

- Licensing Should Be Clear and Intelligible
- Freedom to Bring Previously Purchased Software to the Cloud
- Freedom to Run On-Premise Software on the Cloud of Choice
- Equal Treatment for Software Licensing Fees in the Cloud
- Permitted Uses of Software Should Be Reliable and Predictable
- Licenses Should Cover Reasonably Expected Uses

At the very least, the FTC should consider holding cloud providers and software licensors to plain language requirements that provide transparency into the obligations and liabilities that consumers accede to in license agreements. According to one study, there are four hundred and ninety-six plain language laws in contracting across the United States.⁵⁶ To the best of our knowledge there has been no effort thus far to specifically hold software and cloud providers to a similar standard.

Conclusion

The FTC has been granted broad authority to take action against deceptive or misleading practices or practices that are unfair and harmful to consumers. In the preceding analysis of the cloud marketplace, the FTC can be confident that there is vibrant competition in the cloud industry among market players: new entrants, innovative offerings, and a strong playing field from which customers can choose. From the largest multi-billion-dollar technology companies to the newest startup players raising their first round of funding, cloud companies are bringing their products to market at a rapid clip.

The FedRAMP authorization process is an excellent case study of strong competition among many different companies in the cloud computing industry. The marketplace, on which potential federal customers can browse hundreds of different companies and select the one that best fits their specific needs. FedRAMP authorization could be seen as a barrier to entry for new cloud providers, due to the cost of pursuing authorization, but ultimately, it is still achievable for smaller companies, as demonstrated by the breadth of offerings in the FedRAMP market.

Yet there is a threat to competition in the cloud market, from a select number of dominant companies in the cloud computing industry, attempting to lock in their market power via

⁵⁴ See “Buying Cloud Services in Public Sector,” available at https://cispe.cloud/website_cispe/wp-content/uploads/2020/06/CISPE-Buying-Cloud-Services-in-Public-Sector-Handbook-v-EN-2020-05-11.pdf

⁵⁵ See the Coalition for Fair Software Licensing available at <https://www.fairsoftwarelicensing.com/>

⁵⁶ See “496 U.S. Laws Require Plain Language Contracts,” available at <https://contractnerds.com/496-u-s-laws-require-plain-language-contracts/>

predatory practices like restrictive or opaque licensing, predatory audits, and punitive pricing structures that keep customers (including U.S. government agencies) locked into their contracts with these select group of companies.

Microsoft, for example, changed its standard licensing terms for its key cloud products in 2019 in order to exclude users from utilizing different cloud providers, effectively locking them into using Microsoft products in its own Azure cloud environment. Oracle, another provider practicing anticompetitive behavior, utilizes punitive audits of its customers to impose a monetary penalty on customers utilizing non-Oracle cloud platforms with other Oracle software products.

Both of these companies are leading cloud providers, and some of the largest companies in the world. Microsoft and Oracle are leveraging these predatory strategies and anticompetitive behavior in order to maintain an attentive, locked-in customer base. Despite the myriad other cloud providers – that may be offering more efficient, innovative, or lower-cost products to potential customers – customers cannot make the change to a different provider. They are locked into their contracts with Microsoft or Oracle.

The FTC’s desire to gain a deeper understanding of the cloud computing industry and competitive marketplace is an important one: the adoption of cloud technologies is lowering barriers to entry and facilitating strong growth for businesses worldwide. There is a strong marketplace that welcomes more and more players each year, innovating their service offerings and differentiating themselves from existing providers. Yet anticompetitive behavior does exist, perpetrated by a select number of dominant cloud providers – not against competitors themselves, but against customers that may desire to switch to a new provider.

Indeed, it is the protection of consumers, customers and users that should most concern the FTC when it comes to the cloud computing marketplace. For small businesses hoping to adopt cloud technology, this predatory, anticompetitive behavior can add huge sums to their annual computing costs.

For the federal government, a 2023 study from researcher Michael Garland found that vendor-lock behavior (including these restrictive licensing terms and punitive audits) among software providers, including cloud providers, costs American taxpayers up to \$750 million each year.⁵⁷ Customers, including U.S. government agencies, are overpaying for their cloud computing services as a result of these practices, and being prevented from switching to a provider that may offer products that better fit their needs. There is a strongly competitive cloud computing marketplace, but customers are being prevented from taking advantage of it.

As the FTC considers all comments submitted in this Request for Information, we urge the Commission to strongly consider the effect that anticompetitive behavior by a few cloud providers has on many cloud customers: businesses of all sizes, government agencies, and ordinary users in all industries.

⁵⁷ Garland, Michael “Vendor-Lock and Lack Of Competition in the Government’s Software Estate” https://netchoice.org/wp-content/uploads/2023/01/NetChoice_Garland_The-Pernicious-Consequences-of-Vendor-Lock.pdf