Briefing Paper

Competition Issues in the Cloud Service Sector

Cloud services, which facilitate cloud computing services, essentially refer to a model of providing remote access to a multitude of computing resources on demand to customers. A large part of the global economy now relies on cloud computing for a wide range of services. Cloud spending worldwide is expected to grow 18.5 percent in 2023 to US$576.5bn.[1]

This Briefing Paper provides an overview of the nature of the cloud services industry, the various models of cloud computing and the state of play of competition in the industry. It also examines the possible competition law concerns that could arise and provides an update on the regulatory investigations presently being conducted by competition authorities in the cloud services industry.

What are Cloud Services?

Cloud services are primarily application and infrastructure resources that exist on the internet. Third-party providers contract with subscribers for these services, allowing customers to leverage powerful computing resources without having to purchase or maintain hardware and software. Accordingly, cloud services are all those services about the on-demand access to data storage, servers, networks, and other allied

[1] Technology Chiefs Seek Help Wrangling Cloud Costs, The Wall Street Journal (March 03, 2023), https://www.wsj.com/articles/technology-chiefs-seek-help-wrangling-cloud-costs-61ba0b50

services by a wide range of industries.[2] The cloud eliminates the need for individuals and businesses to self-manage physical resources themselves, and as a result, only pay for what they use.

Closely related to understanding the nature of these services is the distinction between cloud computing and cloud storage, where having one without the other is technically impossible. 'Cloud storage' offers a virtual space to store data whereas 'cloud computing' uses internet-based services to perform computer processes or run apps.[3]

The commonly accepted industry-wide definition proposed by the National Institute of Standards and Technology (NIST), (an agency of the US Department of Commerce), lists five essential characteristics of cloud computing: (i) on-demand self-service, (ii) broad network access, (iii) resource pooling, (iv) rapid elasticity or expansion, and (v) measured service.[4] Thus, the term 'cloud services' is predominantly used in the context of cloud computing services.

Benefits

Convenience and cost-effectiveness have been the driving force in the success of the cloud service model. Unlike traditional on-premises IT, cloud computing allows customers to store data remotely and access software programmes anytime on demand. For most businesses, managing their IT infrastructure is an expensive affair. Cloud computing offerings dramatically reduce these burdens by facilitating quick

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2 In its Market Study Notice on Cloud Services dated 6 October 2023, Ofcom states that "*Cloud services means all services involved in the provision of cloud computing. Cloud computing means the provision of remote access to computing resources (computer, storage and network) on demand and over a network.*" (pg.1, para 3)

3 Cloud Storage v. Cloud Computing (January 10, 2023), https://blog.box.com/cloud-storage-vs-cloud-computing#

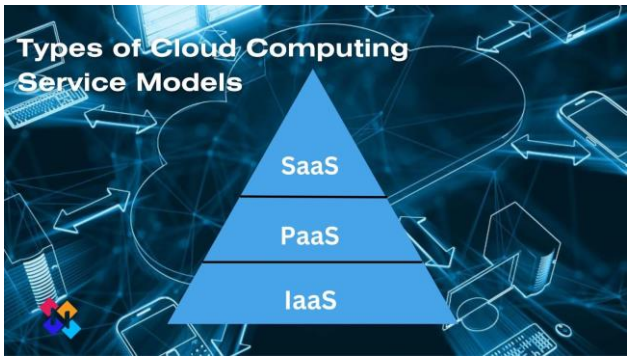
4 NIST Special Publication 800-145, https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf

deployment, scalability, and affordability, along with ease of maintenance, thereby enabling companies to refocus resources on their core businesses.[5]

Another advantage is that cloud computing is highly adaptable to individual customer needs. Further, a move to the cloud also allows greater workload flexibility, better utilisation rates and more energy-efficient infrastructure. An open cloud platform is key to better flexibility and freedom to operate with seamless integration of services.

Models of Services and Deployment

The NIST definition of cloud computing broadly lists three service models and four deployment models that, taken together, categorise ways to deliver cloud services.[6] These models are particularly important considerations when competition authorities have to define markets and determine issues of switching and interoperability of networks by customers.



Service Models

Cloud service models are differentiated by the level of control the customer has over the management and maintenance of the computing resources.[7] In each case, service providers maintain the underlying cloud infrastructure and computing resources are handled by the provider as required by the subscriber's needs. The typical classification according to service models are:

a. *Software-as-a-service (SaaS)*: Providers offer subscribers the use of their software running on a cloud infrastructure, which means the application can be widely distributed and accessed. This is the most visible and commonly used model of cloud services encompassing free online email, and social media

5 Advantages and Disadvantages of Cloud Computing, https://cloud.google.com/learn/advantages-of-cloud-computing

6 *Supra*, Note 4

7 Ofcom Cloud Services Market Research: Summary of Findings (March 2023), https://www.ofcom.org.uk/__data/assets/pdf_file/0031/256459/context-consulting-cloud-services-market-research-summary-of-findings.pdf

services as well as sharing of content stored in the cloud without download or installation required.

b. *Platform-as-a-service (PaaS)*: Platform services provide access to a virtual environment for customers to develop, test, deploy, and run applications. This is especially useful for developers who wish to avoid the need for initial investment in software and hardware, but still require server management.

c. *Infrastructure-as-a-service (IaaS)*: Infrastructure services provide access to raw computing resources for processing workloads and storing data and subscribers can architect an entire environment by configuring a virtual network that is segmented from other networks. As a result, data storage, network capability, and remote computing can be purchased alone or invisibly layered into platform and software service provision.

Deployment Models

Cloud deployment models indicate how cloud services are made available to customers. Cloud-based deployment comprises of:

a. *Private cloud*: exclusive use by a single organisation comprising multiple consumers;

b. *Public cloud*: open use by the general public;

c. *Community cloud*: exclusive use by a specific community of consumers from organisations that have shared concerns; and

d. *Hybrid cloud*: comprising of two or more distinct cloud infrastructures that remain unique entities, but are bound by standardised proprietary technology that enables data and application portability.

Multicloud

Multicloud is a cloud deployment model that involves using services from more than one public cloud provider by a single customer at the same time. The use of multiple public cloud providers can benefit customers by allowing them access to their preferred services and gaining commercial bargaining power against their cloud providers. It also gives customers the flexibility to operate with the best computing environment for each workload, even if these are from different cloud providers.

A multicloud approach provides many customer benefits including:[8]

a. allowing customers to choose the best from each cloud to optimise workloads based on factors like speed, performance, reliability, geographical location, security, and compliance requirements;

b. avoiding vendor lock-in;

c. increased cost-efficiency;

d. benefiting from new innovations from different cloud providers; and

e. increased reliability and redundancy.

The level of flexibility is facilitated through interoperability or the ability for different systems to interact and work together. For cloud service providers, interoperability refers to the ability of cloud services and customer systems to understand each other's application programming interfaces, configurations, authentication, and customer data formats. Openness and interoperability empower faster innovation, tighter security, and freedom from vendor lock-in.[9]

Competition Concerns

While customers are highly aware of the vast range of benefits that cloud technology offers, problems such as high egress fees, lack of interoperability and vendor lock-ins create a set of unsurmountable challenges for new players. Customers are hence forced to choose the easy option of using one cloud, resulting in cloud concentration and this in turn raises potential competition law concerns.

The key market practices which competition authorities have expressed concerns about and are examining in greater detail relate to the issues discussed below.[10]

8 For further details see, https://cloud.google.com/learn/what-is-multicloud

9 Interoperability and Portability for Cloud Computing: A Guide (December 2017), https://www.omg.org/cloud/deliverables/CSCC-Interoperability-and-Portability-for-Cloud-Computing-A-Guide.pdf

10 This has been summarised based on the findings of Ofcom's market study as well as cases filed before the European Commission (discussed in Part VI of this Briefing Paper)

Licencing Restrictions

Licencing restrictions prevent customers from choosing any other cloud provider at the time of migration into the cloud and ultimately lock those customers into its ecosystem. As a result, competition on the merits is prevented, depriving customers of the opportunity to choose the best cloud services tailored to their needs and denying their ability to implement an effective strategy to reap associated benefits. Such harmful practices stifle competition in the cloud services market and result in significant additional costs for customers who wish to deploy services of any other cloud provider.

Egress Fees

Egress fees consist of the charges that customers pay to transfer their data out of the cloud. If dominant players set these at significantly higher rates than other smaller providers, the costs of egress fees can actively discourage customers from using services from more than one cloud provider or switching to an alternative provider. Such constraints could make it harder for smaller cloud providers to win business and compete with market leaders.

Technical Restrictions on Interoperability

These are restrictions that are imposed by certain providers to prevent some of their services from working effectively with services from other providers. As a result, customers are forced to reconfigure their data and applications so that they work across different cloud platforms. Interoperability restrictions are typically viewed as anti-competitive tying arrangements.

Discounts

Discounts can usually be beneficial to customers by reducing their costs. However, how discounts are structured can incentivise a customer to use a single cloud service provider for most of their cloud needs, even when better quality alternatives are available. Such a form of incentivising could raise concerns of potential abuse of dominant position when certain players have a high market share and thereby retain control of the market.

Competition and Regulatory Investigations Globally

In today's times, migration to cloud computing is viewed as highly desirable and companies are at different stages of adoption, with analysts predicting that 45 percent of businesses' IT spending will be on public cloud services by 2026.[11] Amazon Web Services (AWS), Microsoft Azure and Google Cloud are the largest players in the market worldwide for the provision of cloud services.[12] The 'big3' are followed by smaller platforms such as Alibaba Cloud, IBM Cloud, Salesforce, Oracle and Tencent Cloud.[13]

A significant study[14] by Prof. Frédéric Jenny on unfair licensing practices in the cloud computing industry has found that the cloud computing market exhibits increasing concentration with a limited number of players consolidating their market shares to the detriment of smaller providers.[15]

Further, the research indicates that these software providers often bundle the use of their dominant software systems with their cloud infrastructure, making it difficult for customers to switch to independent cloud providers even if they would like to. This also amounts to imposing switching costs on firms if they wish to move to an independent cloud service provider.[16]

In addition, other restrictive software practices found in the study include making it more expensive for firms to transfer data or storage to an independent cloud provider, limiting their software's interoperability with other providers, and giving software discounts to firms that use their cloud infrastructure. Collectively, such practices unfairly reduce competition, raise costs, limit consumer choice and impose difficulties on independent providers to access the market. According to data

11 Cloud services in the competition law spotlight (October 25, 2022), https://www.solicitorsjournal.com/sjarticle/cloud-services-in-the-competition-law-spotlight?pass=505953

12 Statistica, Big Three Dominate the Global Cloud Market (April 28, 2023), https://www.statista.com/chart/18819/worldwide-market-share-of-leading-cloud-infrastructure-service-providers/

13 *Id.,* refer to *the* chart on the worldwide market share of leading cloud infrastructure service providers in Q1 2023

14 Unfair Software Licensing Practices: A quantification of the cost for cloud customers by Prof. Frederic Jenny for CISPE dated June 21, 2023, https://cispe.cloud/new-study-links-unfair-software-licences-to-distortion-of-competition-in-cloud-infrastructure-market/

15 *Id*., pg. 3

16 *Id*., pg. 13

presented in the research, independent providers have gone from holding nearly 50 percent of the cloud infrastructure market share in 2015 to only 18% of the market in 2022.[17]

Globally, various competition agencies have initiated market studies and begun investigations to better understand the business landscape of the cloud services market. There is also extensive international collaboration between authorities which are simultaneously involved in conducting surveys to exchange information and swiftly tackle any potential anti-competitive practices in their respective geographic markets. An update on the progress and findings of some of the most prominent competition authorities is set out below.

The US

In March 2023, the Federal Trade Commission (FTC) put out a request for information (RFI) on the business practices of cloud computing providers.[18] The FTC intends to investigate the competitive dynamics of cloud computing, how reliant certain segments of the economy are on cloud services, and the security risks associated with the industry's business practices.

From the information received, the FTC learnt[19] that there exist competition concerns concerning software licensing, egress fees and minimum spend contracts. Fingers have also been raised on the resiliency and security of cloud services, due to lack of competition. Further, a close relationship between generative AI and cloud computing could lead to vendor lock-in.

Based on the information received and their analysis, the FTC may move ahead in inquiring about the following:[20]

- Are there signs that cloud markets are functioning less than fully competitively, and that certain business practices are inhibiting competition?

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17 *Id*., Figure 7 (*Market Share for laaS*), pg. 47

18 An Inquiry into Cloud Computing Business Practices: The FTC is seeking public comments (March 22, 2023), https://www.ftc.gov/policy/advocacy-research/tech-at-ftc/2023/03/inquiry-cloud-computing-business-practices-federal-trade-commission-seeking-public-comments

19 What FTC learnt (November 16, 2023) https://www.ftc.gov/policy/advocacy-research/tech-at-ftc/2023/11/cloud-computing-rfi-what-we-heard-learned

20 *Id*.

- Are cloud providers incentivised enough by competition to create sufficiently secure systems?
- Will competition alone creates resilient systems, or is government intervention needed to avoid single points of failure? What policy options are available to improve resiliency and avoid single points of failure?
- How will cloud providers respond to a limited supply of specialised AI chips? How will markets for these chips develop given their importance to rapidly developing AI markets and the growing demand for specialised AI chips?

The UK

Along these lines, Ofcom, the UK communications regulator, initiated a similar market research study on cloud services in October 2022. In its summary of findings, Ofcom in March 2023[21] noted that Microsoft is a leading player in the cloud services industry, and is seen as a logical choice due to the ease of integration with existing IT. Based on customer feedback collected as part of the study, Ofcom concluded that customers fear lock-in and the inability to switch to other providers.[22]

As per the report, customers stated that their cloud relationship with Microsoft is a continuation of the de facto lock-in experienced around the wider Microsoft offer.[23] Similarly, several other customers alleged that Microsoft wants to tie users into contracts.[24]

The report highlighted similar concerns regarding AWS, which is also viewed as a computing technology leader with an extensive product range. It concluded that while Google has a small number of loyal customers, it lacks the breadth of offerings provided by AWS and Microsoft. Hence, Ofcom noted that collectively Microsoft and AWS raised 'significant concerns' that they were harming competition in online cloud

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21 Ofcom Study, Cloud Services Market Research - Summary of Findings, p.12, https://www.ofcom.org.uk/__data/assets/pdf_file/0031/256459/context-consulting-cloud-services-market-research-summary-of-findings.pdf. Ofcom initiated the study on October 06, 2022.

22 *Id.*, p. 56

23 *Id.*, p. 59

24 *Id.*, p. 58

services and abusing their market position with practices that make interoperability difficult.[25]

Accordingly, in October 2023, Ofcom referred the public cloud infrastructure services market to the UK Competition and Markets Authority (CMA) for further investigation on competition issues raised, particularly conduct that may create barriers to switching and multi-cloud.[26] It had invited consultation on its interim report before making a formal referral.

European Commission

In its press release dated July 27, 2023, the European Commission (EC) has opened a formal investigation into possible anti-competitive practices by Microsoft regarding tying/bundling Teams, its cloud-based communication and collaboration tool within its cloud-based productivity suites for business customers (including Office 365 and Microsoft 365).[27]

EC's concerns focus on the fact that Microsoft may grant Teams software a distribution advantage by not giving customers any choice on whether or not to include access to the product when they subscribe to their productivity suites. EC will also investigate whether Microsoft may have limited the interoperability between its productivity suites and other competing offerings. This case has the potential to open up issues of abuse of dominant position along with anti-competitive tying and bundling to prevent suppliers of other communication tools from competition in the market. It appears that EC is geared to launch a formal complaint based on its inquiry into this matter in the coming months.[28]

In addition, EC is actively investigating possible cartel activities within the cloud computing market.[29]

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25 Ofcom refers to UK CMA (5 October 2023), https://www.ofcom.org.uk/news-centre/2023/ofcom-refers-uk-cloud-market-to-cma-for-investigation

26 https://www.ofcom.org.uk/data/assets/pdf_file/0024/269124/Cloud-Services-Market-Study-Terms-of-Reference.pdf

27 EC Press Release (July 27, 2023), https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3991

28 https://economictimes.indiatimes.com/news/international/business/european-commission-preparing-formal-complaint-against-microsoft-teams-video-app/articleshow/103766255.cms

29 https://brusselssignal.eu/2023/12/ec-actively-investigating-possible-cloud-computing-cartels/

Close on its heels, German software company Nextcloud had filed a complaint with the EC alleging Microsoft is illegally bundling its OneDrive cloud storage offering with its Windows operating system.[30] The complaint alleged that the OneDrive cloud offering amounts to anti-competitive self-preference based on the market dominance of Windows and it is nearly impossible for other providers to compete with Microsoft's SaaS services.

Similarly, French cloud provider OVHcloud also filed a complaint against Microsoft with the EC, alleging that Microsoft has abused its dominant position in the cloud services market through its licensing practices by making it more expensive to run its software in rival cloud platforms as well as creating technical difficulties to run such programmes. It is reported that the parties are now preparing to settle the complaint.[31]

Nevertheless, the competition law developments in this space are fast-paced and likely to soon offer some significant insight into improving the current market practices adopted by cloud service providers.

Other Competition Agencies

Given the international trend, the French competition authority, Autorité de la concurrence, opened a public inquiry in January 2022 and sought public consultation in July 2022 into the competitive functioning of the cloud sector. While noting that there was a tendency towards concentration around certain powerful stakeholders, Autorité also looked into practices in the cloud sector that could restrict competition. Accordingly, in May 2023 it issued an opinion on certain provisions of the draft law to secure and regulate the digital space.[32]

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30 Microsoft under fire in Europe for OneDrive bundling; legal fight brewing (November 29, 2021), https://www.computerworld.com/article/3642834/microsoft-under-fire-in-europe-for-onedrive-bundling-legal-fight-brewing.html

31 Microsoft kickstarts settlement discussions with European cloud companies over antitrust complaints (20 April 2023) https://techcrunch.com/2023/04/20/microsoft-kickstarts-settlement-discussions-with-european-cloud-trade-body-over-antitrust-complaints/

32 Cloud computing: The Autorité de la concurrence issues an opinion on certain provisions of the draft law to secure and regulate the digital space (12 May 2023), https://www.autoritedelaconcurrence.fr/en/press-release/cloud-computing-autorite-de-la-concurrence-issues-opinion-certain-provisions-draft

In September 2022, the Netherlands Authority for Consumers and Markets (ACM) published a market study highlighting the difficulties users face in switching cloud providers and combining services offered by different providers.[33] In this study, the ACM investigated the structure of the cloud market and the behaviour of market players. Based on its findings, the ACM proposed changes to the EU Data Act to make interoperability easier. The ACM also plans to continue its research into the extent to which switching barriers cause competition problems in practice, and whether such problems can be addressed under the existing competition law framework.[34]

Similarly, in December 2022, the Korean Fair Trade Commission (KFTC) concluded its survey on major cloud service providers and announced its key findings.[35] KFTC found the cloud services market to be fairly concentrated. It identified that cloud customers face difficulties in switching service providers or adopting multi-homing due to a lack of interoperability when switching cloud services or implementing multi-cloud. It also found other restrictions such as cost and time required for migrating data.

Based on these findings, the survey suggested that a closer examination of cloud service providers' transaction practices may be required to confirm whether cloud service providers engage in anti-competitive practices such as self-preferential treatment or setting disadvantageous transaction terms on customers.

The Japan Fair Trade Commission (JFTC) conducted a similar fact-finding survey regarding trade practices in the cloud service sector and concluded that the 'big 3' were expanding their market shares significantly.[36] It noted that there is a trend that most users do not change from the cloud services they are currently using and that the degree of market concentration is likely to continue to increase with indirect network effects and preferential use of services provided by the current providers.[37]

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33 Dutch ACM, Market Study Cloud Services (5 September 2022) https://www.acm.nl/system/files/documents/public-market-study-cloud-services.pdf

34 *Id.*

35 KFTC Announces Results of Cloud Sector Survey (December 28, 2022), https://www.kimchang.com/en/insights/detail.kc?sch_section=4&idx=26451

36 JFTC Report Regarding Cloud Services (June 28, 2022), https://www.jftc.go.jp/en/pressreleases/yearly-2022/June/220628.html

37 JFTC Summary of Report Regarding Cloud Services, https://www.jftc.go.jp/en/pressreleases/yearly-2022/June/220628_2EN.pdf

Competition Law: Compliance Focus

Against the backdrop of several investigations being conducted by competition agencies, there are common concerns that have arisen on the question of market concentration, switching barriers and dominant position, especially by Microsoft and AWS. A key determination in this regard involves the definition and analysis of the 'relevant market' in which a given cloud provider competes. A relevant market encompasses all products that prospective purchasers in a particular geographic area would consider reasonable substitutes for each other.[38]

Closely related to market definition is whether the cloud provider can influence prices or output in that market as a whole, i.e., its market power in the relevant market.[39] Unsurprisingly, competition law would place more limitations on the activities of those cloud service providers who are deemed to have power within a relevant market than on the activities of providers that lack such power.

Also pertinent is the question of whether the customer is locked-in to specific products and cloud services. This brings us to the issue of interoperability, switching costs and other fees that a customer may have to incur to access cloud services from different providers. If these restrictions are high enough to create a lock-in effect once a particular cloud is selected, there could be a case of vertical restraints and abuse of the dominant position. Finally, anti-competitive tying (such as demonstrated in the cases filed against Microsoft in the EC) highlights the importance of the availability of consumer choice.[40]

In light of these identified areas of concern, competition agencies will likely heavily scrutinise the possibility of network effects, unfair licensing terms and the impact of data portability and interoperability. Greater clarity in licensing terms, together with freedom from retaliation for cloud choices, could go a long way in creating a level-playing field. Care needs to be taken by service providers to not hold customers to hostage situations by limiting the ability to operate applications across platforms and ensure better flexibility in being able to use services from different cloud providers based on their unique needs.

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38 See generally, EC Notice on the definition of the relevant market for Community competition law 97/C 372/03

39 See generally, *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585 (1985)

40 See generally, *Jefferson Parish Hospital Dist. No. 2. v. Hyde*, 466 U.S. 2 (1984)

Conclusion and Recommendations

Cloud computing services are delivering transformational benefits all across the global economy. As demand for cloud services continues to grow, ensuring competition in these markets will be increasingly relevant for competition authorities across the world. Therefore, it is crucial to understand how these markets function and examine whether they are working well for consumers.

The benefits of the cloud can be reinforced by strong competition across all layers of services, allowing customers to choose from a wide array of models that best suit their business needs. The availability of switching practices will further enhance competition. As a result, cloud providers will be able to better compete in developing newer technologies and solutions to meet the ever-evolving sphere of customer needs.

The initiatives for a competitive cloud industry based on interoperability, portability and open-source solutions will also play a critical role. Taken together, these will help markets achieve envisaged customer benefits and ensure that cloud service providers adhere to principles of fair play in competition. With competition authorities in developed countries taking active steps to monitor the cloud services sector, it would be interesting to see the course of action and policy direction that developing country authorities, such as the Competition Commission of India, will take in the future to regulate the industry.

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