3 November 2022

OFCOM CLOUD SERVICES MARKET STUDY

Google's response to Ofcom's Call for Inputs, published on 6 October 2022

I. Introduction

1. Google welcomes the opportunity to comment on Ofcom's Call for Inputs (***CFI***) in relation to its UK cloud services market study.

2. The cloud services industry plays an important role in the growth of UK businesses and delivers substantial benefits to the UK economy. Cloud computing is revolutionising IT for UK businesses across all sectors and cloudification of telecoms and broadcast networks is well on its way. The global pandemic further accelerated digital adoption and the cloud industry has contributed significantly to UK businesses' ability to rapidly shift online and scale their presence. Today, many popular broadcasting and online services consumed by UK consumers are supported by cloud infrastructure.

3. The UK is already the largest cloud market in Europe[1] and increased demand for public cloud services is expected to continue in the UK. This is partly due to concerted UK government focus on cloud adoption as part of the UK government's Cloud First Policy. For the UK telecoms and broadcasting sectors, the move to 5G and distributed cloud is expected to accelerate the move to cloud-based services (albeit that this transition, including from private to public cloud services, is expected to be slower compared to other parts of the UK economy).[2]

4. Cloud is the key enabler to facilitate UK companies' digital transformations and significantly reduce their IT spend, which in turn leads to greater innovation, choice and competition. Google agrees that it is important that the market works well for UK businesses and end-consumers while ensuring a fair playing field across all layers of the value chain. These principles are deeply embedded in Google Cloud's proposition which supports multicloud strategies and open cloud architectures that are interoperable with other third-party cloud and software products and services.

5. While interoperability and open source technologies are prevalent across the industry (including in response to increasing demand from customers who seek to deploy a multicloud approach), a small number of cloud providers (in particular, some legacy on-premise IT providers) nevertheless seek to give their own cloud products an unearned advantage, and lock customers into their cloud ecosystems. The result is less user-choice, higher costs, lower quality, and stunted innovation. This market study presents an opportunity to fully unlock competition on the merits and avoid irreparable harm caused by restrictive licensing, tying, and other unfair practices. At this pivotal moment in the migration to cloud, we believe it would be beneficial to UK businesses and the UK technology industry if Ofcom closely scrutinises and addresses these practices in the course of its market study.

6. Google supports openness and interoperability.[3] We have been a leader in promoting fair and open licensing for our customers since the start of the cloud revolution. We were the first to launch a multicloud infrastructure service (allowing customers to run workloads across multiple clouds), the first to launch a multicloud data warehouse (allowing customers to manage data across multiple clouds), and one of the first to build digital sovereignty offerings in Europe.

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[1] See, for example, Europe Cloud Computing Market Share | 2021-2028 Forecast (gminsights.com).
[2] In Google's experience, many UK telecoms operators and broadcasters are still operating on-premise IT infrastructures, although some providers have started moving their workloads to the cloud. For example, telecoms operators are seeking the benefits of cloud-native computing within on-prem network deployments to improve scalability, agility, availability and economics. See also report by Analysys Mason (see here).
[3] Google supports open, interoperable, and fair licensing. | Google Cloud Blog.

7. Google looks forward to further engagement with Ofcom in the coming months. Before turning to Ofcom's individual questions, we set out some initial observations - on the benefits of cloud computing to the UK economy, on Google's own cloud proposition, and on Ofcom's two proposed themes - that should be considered alongside our response to Ofcom's questions (**Annex 1**).

I. The cloud computing industry has enormous potential to contribute positively to the UK economy

8. For most businesses, managing their own IT infrastructure is a burdensome and costly exercise. Public cloud computing offerings dramatically reduce the burdens of managing traditional IT infrastructures by offering quick deployment, scalability, affordability and ease of maintenance, thereby enabling companies to refocus resources on their core businesses. Unlike traditional on-premise IT, cloud computing allows customers to store data remotely and access software programmes on demand. Any business with an internet connection can access a wide range of cloud-based tools and services, from infrastructure to artificial intelligence and data analytics capabilities.

9. Due to its flexible consumption model, cloud computing is highly adaptable to individual customer needs, whether they are large international financial institutions operating in the UK, telecommunications providers and broadcasters, or small and medium-sized start-ups. Customers can "self-serve", using cloud computing systems immediately on a pay-per-use basis. This allows customers to scale up their use of cloud services as demand increases and scale it back (or shut it down entirely) if demand drops. Companies using the cloud for their IT needs do not need to hire or train personnel to operate the stack of hardware and software underlying the services that they use, which are fully managed by the cloud provider. Cloud computing thereby minimises the high costs and delays that characterise the provision of IT services in the pre-cloud era.[4]

10. The shift to cloud also allows greater workload flexibility, better server utilisation rates, and a more energy-efficient infrastructure.[5] In addition to improved operational efficiencies, cloud-enabled businesses are better empowered to derive insights from data, enhance decision-making, and capitalise on new opportunities with cloud-based services and technologies. This accelerates innovation across the economic value chain and helps deliver on the UK's Innovation Strategy.[6]

II. Interoperability and openness are at the heart of Google Cloud's proposition and ensure robust competition and customer choice

11. Google Cloud's infrastructure business incorporates Google's IaaS and PaaS offerings, and officially launched in 2012[7] as a competitor to well-established players like AWS, and legacy hard- and software vendors like Microsoft, IBM and Oracle. Google Cloud was launched with a mission to accelerate every organisation's ability to digitally transform and reimagine their business through data-powered innovation.

12. Since then, many UK companies have been able to build on Google Cloud's services to improve their businesses, ranging from financial services providers and fintechs such as Lloyds Banking Group, HSBC, MoneySuperMarket, Monzo, and Revolut, to broadcasters including Sky, BT and many other household names including Ocado Technology, the Football Association, Deliveroo,

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[4] See, for example, page 12 of the ACM Report on Market Study Cloud Services.

[5] For example, Rightmove chose to migrate to Google Cloud, as Google's sustainability program aligned with Rightmove's own commitments to achieve net zero.

[6] BEIS, UK Innovation Strategy (see here).

[7] Google's first cloud products, including its first PaaS offering, Google App Engine, were released in 2008 as a preview version. Google App Engine became generally available in November 2011. Google's first IaaS offering, Compute Engine was released in June 2012, in the same year that Google's specialist cloud team, Google Cloud, was created, which later combined with the initial team that marketed Google Apps to form the Google Cloud business (as it is known today) in September 2016.

as well as local organisations (such as Citizens Advice Manchester). Within the UK public sector, Google Cloud's customers include, among others, the Department for Transport and the UK Office for National Statistics. Google is also proud to play its part in helping UK consumers live and work in the 'new normal' since the Covid-19 pandemic (see Google's blog post).

13. From the outset, **Google Cloud has been a strong advocate of facilitating multicloud and customer choice** (as explained here). In contrast to the closed proprietary systems of traditional IT players, Google Cloud's services are based on open source technologies that are designed to be compatible and interoperable with other cloud services. This reduces technical barriers, enhances users' ability to multicloud with other cloud providers and helps address many sovereignty requirements by reducing technical dependencies on a single vendor.

14. **Interoperability, openness and portability** are central to Google's customer value proposition:

    a. **Interoperability**, which is the ability of systems to work efficiently and collaborate effectively across different cloud platforms, drives down the costs of multi-homing and intensifies competition between cloud providers who must compete for new and existing business based on the quality and costs of their services.

    b. **Portability** allows a customer to move and suitably adapt their applications and data between: their own systems and cloud services, cloud services of different providers, and potentially different cloud deployment models.[8] An important aspect of this is data portability, which Google believes is key to mitigating potential future risks posed by market concentration, and mitigating against the potential harms caused by technical and contractual lock-in.

    c. **Open Source**: Many modern cloud platforms, including Google's, originated from open source software.[9] As outlined in the 2021 IDC paper on multicloud, open source and open source-based technologies (such as containers, open APIs, and open source databases) are enablers of multicloud and often go hand-in-hand with increasing customer choice, as they support movement of workloads and data across different cloud environments. According to Synergy Research Group and IDC, AWS and Microsoft Azure are the market leaders in the provision of cloud infrastructure services, both globally and in the UK, with respective shares in the region of 30-40% and 20-30% by revenue.[10] Google, by comparison, is a smaller player. Alongside a host of other players such as Cloudera, OVHcloud, and VMware, Google entered the market having developed its cloud services directly in the cloud without building on pre-existing positions in 'on-premise' or legacy IT products. Google and others have been successful in growing their businesses by responding to customer dissatisfaction with traditional IT service providers and offering 'multicloud' options,[11] i.e. ensuring that customers can use more than one cloud provider and that products can work across various cloud environments.

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[8] Interoperability and Portability for Cloud Computing: A Guide Version 2.0 (omg.org)

[9] As discussed above, open source is a foundation of Google's strategy. This started 15 years ago with process containers and has since developed into 9000 active open source projects that Google continues to maintain. See also IDC White Paper: Modernize Applications with Open Source Software on Google Cloud.

[10] Synergy Research Group, 4Q 2021 Cloud Infrastructure Services Global Market Share Report, March 2022; Worldwide Public Cloud Services Revenues Grew 29.0% to $408.6 Billion in 2021, According to IDC. While Google Cloud has grown in recent years, it is inaccurate to describe Google as one of the "three hyperscalers", as seen from the market shares above. The term hyperscaler applies to several other competitors. For example, companies that consider themselves to be "*hyper scale cloud provider[s] with a global presence*" (OVHcloud), "*hyper-scale infrastructure*" (Alibaba) and a "*hyperscaler*" (Oracle, IBM). In Google's experience, the UK cloud infrastructure services market is therefore more competitive and fragmented than Ofcom's classification would suggest.

[11] According to IDC, multicloud has become a preferred way for the public sector to address regulatory concerns and leverage the best services from different providers. Indeed, the UK government's Cloud First Policy encourages governmental departments to use diverse vendors to avoid cloud concentration risk.

15. As explained above, Google is proud to be the first to launch a multicloud infrastructure service and the first to launch a multicloud data warehouse. Google Cloud has a long history of sharing technology through open source—from projects like Kubernetes, which is now the industry standard in container portability and interoperability in the cloud (as discussed below), to TensorFlow, a free and open source software library for machine learning and artificial intelligence. Adoption of these open source technologies enables customers to easily move their applications to or from Google to other cloud providers that support such environments. This is a key differentiator of Google Cloud and lies at the heart of Google's customer-centric proposition.

16. Most recently, in April 2022, Google announced a new Data Cloud Alliance to make data more portable and accessible across disparate business systems, platforms, and environments—with a goal of ensuring that access to data is never a barrier to digital transformation. Data Cloud Alliance works with industry leaders with the aim of promoting open standards and interoperability.[12]

III. The UK cloud infrastructure services market delivers substantial benefits to all stakeholders including UK customers but unfair licensing restrictions could undermine this

17. Beyond the two largest players in the cloud infrastructure market in the UK, AWS and Microsoft Azure, is a dynamic and fragmented set of smaller competitors including a number of multinational providers (such as Google Cloud, Alibaba, IBM Kyndryl, Oracle, VMWare,, Cloudera and Colt) and regional / national players (e.g. OVHcloud, Outscale, Scaleway, Upcloud, BT, eCloud VPC, Memset, Zsah); all competing to win customer business.

18. Contrary to Ofcom's initial observations, a new entrant does not need to incur significant capital costs to begin supplying cloud infrastructure services. For example, instead of building the infrastructure from scratch, a newer provider can reduce the time and capital cost of entry by leveraging third-party telecommunications networks and data centre services (e.g. space, power, HVAC and physical security). There are many such third-party providers, including in the UK.[13] Indeed, in common with many other cloud providers, Google itself uses such third-party network and data centre service providers to support the provision of cloud services in the UK and across Europe. Nor are there significant economies of scale and scope at play - the key building blocks of cloud infrastructure are "scale-out", i.e. they grow by increasing their quantity.[14] For example, in response to the UK government's Cloud First Policy,[15] multicloud providers like Cloudreach have emerged as strong players in the UK public sector, building close and versatile partnership relationships with other major cloud players in the cloud stack. The success of these players shows that entry and expansion is possible – in the UK and internationally.

19. Common pricing models for cloud infrastructure services are further evidence of dynamic competition in this sector. The pay-as-you-go pricing structure is highly scalable to demand, meaning that customers can use as much, and as little, of a cloud provider's services as needed for their particular use case.

20. Google however shares a concern, which others, such as CISPE (a coalition of European cloud infrastructure providers), have also voiced that software licence terms enforced by legacy software companies can distort competition. CISPE's research is an important warning for the

[12] Data Cloud Alliance | Google Cloud.

[13] By way of example, OVH started as a small web hosting service provider in France in 1999. By 2001, it had already opened its first (rented) data centre in Paris, followed by a wholly-owned data centre two years later. Today, it has 33 data centres in 8 countries around the globe, including the UK (OHVcloud, The OHV Story: 20 years of Innovation, see here).

[14] See above OVH example.

[15] Central Digital and Data Office Guidance, Creating and implementing a cloud hosting strategy: "*At a departmental level choosing to have diverse vendors or designing for portability or embracing vendor lock-in to benefit from greater agility and a platform's native capabilities should be a conscious decision.*"

future of cloud computing. With overly complex agreements that lock in clients for years to come, some legacy software vendors are trying to turn their on-premise monopolies into cloud monopolies. In doing so, they are not only forcing customers toward a monolithic cloud model, but also creating downstream effects that would limit choice and potentially disrupt growing and thriving digital ecosystems in the UK and around the world.

IV. Healthy competition in cloud services enables customers to choose a mix of cloud providers, services and product propositions that best suit their needs

21. Looking beyond cloud infrastructure services to the broader supply of cloud services in the UK (including SaaS), it is clear that these markets are even more fragmented and competitive. According to IDC, the cloud SaaS market comprises thousands of independent software vendors (such as Salesforce, SAP, ServiceNow, Accenture, OutSystems, Cisco Systems, Hewlett Packard Enterprise, GitLab, Databricks, Snowflake, Snyk, Quantexa, Checkout.com[16]) which collectively accounted for more than two-thirds of the global market in 2021. On the demand side, the use of SaaS in particular has risen sharply in recent years – according to some estimates, public cloud SaaS revenue in the UK is estimated to reach £7.2 billion in 2021 and will grow to £10.9 billion by 2025.[17]

22. SaaS offerings have been developed to meet an array of functionality and workload requirements (such as databases, server software, accounting software, workflow solutions, and data analysis tools). From a customer perspective, a diverse set of cloud computing solutions may be used to meet these needs and come with varying levels of integration, capabilities and service models. The minimum scale required for this segment is even lower than for IaaS and PaaS, resulting in a market that is highly fragmented and differentiated. Competition among many different independent software vendors (***ISVs***) is strong. According to an IDC report from 2021, the global cloud SaaS market is made up of thousands of software providers, with the largest player having only a 12.4% market share. ISVs accounted for more than two-thirds of this market.[18]

23. The key enabler to healthy inter-ecosystem competition is interoperability and an open cloud approach. As explained above, an open source and open access approach is firmly rooted in Google's DNA, and is a key driver of its cloud strategy. Google is deeply committed to using open APIs across its technology stack, building many of its services on open source solutions and giving customers options to build, migrate and deploy their applications across multiple environments to avoid vendor lock-in (and avoid the creation of any closed ecosystems).

24. It is standard industry practice for cloud providers to offer portfolios of services, including in partnership with ISVs and other cloud providers (i.e. including those that compete with their own offerings) which allow them to better serve their respective customers. Such open "ecosystems" are highly beneficial to ISVs (and ultimately their end-customers) by providing them with an additional marketing and distribution channel, more payment security and facilitating ease of software deployment on public cloud infrastructures.[19] These portfolios of services also better enable multicloud strategies by providing customers with better operational efficiency and functionality with a range of services offered by third parties. As long as there is healthy inter-ecosystem competition and customers are free to switch and mix-and-match, the presence of such portfolio offerings simply shows that the industry is highly dynamic and responsive to customer demand.

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[16] The SaaS Report 2021, Beauhurst.
[17] Conductor, UK B2B SaaS Industry Trends Report 2021.
[18] IDC, Market Analysis Perspective, Worldwide SaaS and Cloud Software, 2021. Paragraph 3.22 of the CFI similarly observes that so-called "hyperscalers' share of global revenue in SaaS in 2021 was under 18%.
[19] For third parties, offering their products on Google Cloud Marketplace allows them to reach, and be discovered by, new customers. Selling through Google Cloud Marketplace also offers third parties a high level of security that they will be paid for products sold and provides them with an easy way to distribute and deploy products to a known cloud environment (and to subsequently distribute updates and bug/security patches to products).

25. Similarly, Google Cloud Marketplace supports thousands of third-party services which play an essential role in improving customers' experience and assisting UK businesses in their digital transformation. These third-party services are widely available to customers through different avenues, including direct-to-customer sales and other cloud marketplace platforms. This is not surprising, given that ISVs are incentivised to make their offerings available on as many cloud infrastructure platforms as possible in order to reach a wider customer base. In fact, the Dutch Authority for Consumers & Markets (***ACM***) recently concluded that while third-party services are widely used on public cloud infrastructures, relatively few are purchased through marketplaces.[20] These findings highlight that marketplaces operated by cloud providers such as Google are not important 'gateways'; nor is there any evidence that they are likely to become so in the future (and for those reasons alone, cloud marketplaces are very different from, say, mobile app stores).

26. Google firmly believes that the benefits of cloud are maximised when customers are free to choose from the full range of cloud solutions that best suit their needs. There are plenty of examples of customers, such as Lloyds Banking Group and Monzo Bank,[21] doing exactly that by mixing-and-matching services from Google and other cloud providers. The important exception to the dynamic competition occurring amongst most participants in the market is the harmful lock-in practices perpetuated by certain legacy players. Google considers that competition is otherwise working well across the entire UK cloud services value chain (IaaS, PaaS and SaaS).

V. Conclusion

27. Cloud computing is delivering transformational benefits across the UK. The benefits of cloud are reinforced by strong competition across all layers of cloud services, allowing customers to choose from a wide array of services, product propositions and payment models that best suits their needs. Widespread adoption of multicloud strategies and switching practices have enhanced competition in this space, which has seen cloud providers competing vigorously to develop new technologies and solutions to meet evolving customer needs / use cases.

28. Ofcom should be alert, however, to the fact that cloud is at an inflection point in the contest between legacy software constructs—restrictive licensing, closed ecosystems, and tying—and the cloud's original promise and potential—open, elastic, and free from artificial lock-ins. At this critical moment when migration to the cloud is progressing at pace, unfair licensing restrictions on cloud services could have harmful impacts resulting in less choice, higher costs, lower quality, and stunted innovation. To avoid irreparable harm to competition and to UK businesses at this pivotal moment in the migration to cloud, we would urge Ofcom to closely scrutinise and address such practices in the course of its market study.

29. The benefits of a competitive cloud industry based on interoperability, portability and open source solutions cannot be overstated. The industry itself is taking steps to further foster best practices across markets, including self-regulatory initiatives such as SWIPO Data Portability CoC and the EU Cloud CoC, CISPE's Fair Software Principles and the Coalition for Fair Software Licensing which aim to develop an open cloud universe that promotes the interests of all cloud users. Google fully supports such initiatives and continues to advocate for widespread industry adoption. However, ultimately, these initiatives can only achieve their envisaged customer benefits if all industry players are willing to play by the same principles of fairness and openness.

30. Google looks forward to further engagement with Ofcom in the course of this market study.

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[20] Pages 41 and 42 of the ACM Report on Market Study Cloud Services.
[21] Lloyds Banking Group collaborates with Google Cloud as part of its multicloud approach. Similarly, Monzo deploys GoogleCloud as part of its multicloud data warehouse.