List of additional comments: Cloud services market study (interim report)

1.6

Hyperscalers are clear market-leaders, monopolising the market due to their ability to generate cash-flow from their core businesses (Google: Advertising, Microsoft: Licensing, Amazon: E-Commerce) that can be reinvested into cloud infrastructure where it generates outsized returns on capital employed (as outlined in the Ofcom study).

1.7

We believe it is critical from a transparency perspective, that the financial information from individual cloud infrastructure businesses, of each vertically integrated Public Cloud Provider is made publicly available in order to assess the market position of each of them. The most relevant information collected by Ofcom is redacted, which also hinders transparency, civil society, and research to further assess the dominance of these actors and risks associated with it.

1.8

We believe it is important to note that Google is the driving force behind multi-cloud by making a key technology free and open source (Kubernetes). With Kubernetes, IT applications can be provisioned across various 'pools of computing resources' which may come from any IaaS provider. The current limitations are latency and egress fees as already identified by Ofcom.

1.9

The majority of software-based services (both PaaS such as MariaDB-as-a-Service, and SaaS) offered by AWS, Microsoft and Google are packaged (bundled) versions of free and open-source software (potentially in violation of the associated licenses, which is not verifiable as AWS does not disclose what open-source software is powering its services) and digital resources (IaaS).

This bundling creates resultant lock-in effects, but also enables the selling of more resources (improving utilisation of capital-intensive infrastructure) which drives profitability (also identified in the Ofcom study).

In general, cloud services are not original services that provision cloud computing. They are open-source or proprietary software products that combine an application/ software product with digital resources (IaaS). For example, Microsoft offering MS SQL (a proprietary database software) as a Cloud Service, bundled with Azure IaaS resources. Or AWS offering MariaDB, an open-source database, bundled with AWS IaaS resources.

Each type of resource (compute, storage, and networking) can be bought stand-alone from all hyperscalers without the need to purchase or use any cloud services. Yet no cloud service, such as a database can be bought "alone", without digital resources bundled with it (which is addressed under the point of Interoperability in the study, however we believe looking at the problem from a 'bundling' perspective may simplify policy making).

1.13

We believe that it is relevant to point out the systemic depth of the use of credits as an incentive tool for customer acquisition. Especially within the start-up ecosystem, it is essentially a form of betting on potential future workloads by AWS, Microsoft and Google. The idea is that by giving all start-ups credits ranging from 20-100k USD, each start-up will start building on the hyperscaler's infrastructure and be locked-in. When the start-up is experiencing rapid growth, it has no time and no capital to perform a full migration to another provider. This means as the start-up scales the hyperscaler receives a significant proportion of revenue from the start-up, becoming essentially an investor, receiving dividends before any of the shareholders.

This is a successful strategy that has led AWS to acquire customers such as Dynatrace, Datadog (which itself runs on AWS), Netflix, Dropbox (which left due to cost concerns). In the case of Asana, cloud spend represents 63% of the cost of revenue (please refer to an analysis from its own investors: https://a16z.com/2021/05/27/cost-of-cloud-paradox-market-cap-cloud-lifecycle-scale-growth-repatriation-optimization/)

It has also led to direct partnerships between venture capitalists, incubators and accelerators who are authorised to issue credits on behalf of AWS, Google and Microsoft (please refer to: https://aws.amazon.com/activate/portfolio-detail/ for an example). Start-up Investors are becoming channels to sell AWS infrastructure resources in return for credits (which are earned back quickly when the start-up is successful). Again, this positions AWS essentially as an investor, who gets paid first.

1.17

We believe it is important to widen the scope of multi-cloud as in the study, multi-cloud often refers to combining resources and services from the three largest providers and/ or migrating between them. The goal should rather be to create an open, transparent marketplace, akin to the energy market design. This means that UK-based businesses have full price transparency on digital resources (IaaS), there are price signals for infrastructure providers to invest, and any UK or foreign business which is selling digital resources (IaaS) can sell and compete in that marketplace as a fair exchange.

In conjunction with such marketplace, cloud services should be unbundled e.g., they must use digital resources purchased through the marketplace (again, as is the case with energy retailers who must buy through the energy market, hence giving everyone access to the same resources with price transparency) which creates interoperability through market design/ regulation rather through industry standards and consensus building (which is likely a longer process and can again become dominated by the largest actors e.g., hyperscalers).

1.43

This is absolutely the case and a strong hindrance to a competitive market around Microsoft Windows-based digital resource offerings (IaaS with servers running Microsoft Windows Server Edition).

In one example that we have observed, a provider may try to offer a Windows-based virtual machine. To do so they must own a license for the Windows operating system, which adds circa $1 per hour costs to the offering – making the total cost $1.50 per hour. Microsoft Azure on the other hand offers the same virtual machine on its own infrastructure and does not have to pay for the license, which means it can offer the same product for $0.50 per hour – which is impossible to compete with.

This is applicable to any of the proprietary software products offered by Microsoft – they incur a license cost when running anywhere outside Azure; and do not within Azure, making it nearly impossible for any other non-Microsoft actor to compete.

3.5

We believe it is important to point out that the public cloud is made up of the same components as any other IT infrastructure (data centres, servers, network equipment, etc.) – it is only the business model and scale that is different.

3.15

We believe it is important to note that cloud services (PaaS and SaaS) are software products (either open-source or proprietary) which are packaged/ combined/ bundled with digital resources (infrastructure, IaaS).

This is comparable to an energy provider bundling an electric car lease with an energy contract.

3.17

For clarification we also would like to add here that IaaS refers to a business model — provisioning a type of digital/computing resource, whereas SaaS and PaaS are bundled software products which combine infrastructure with a service or services.

3.18

We believe it is important to highlight that IaaS resources are commodities — there are many providers across the UK and Europe who offer much more competitively priced digital resources (IaaS) but do not have the capital resources to either invest in bundling, large-scale credit schemes, discounts, or address the barriers identified by Ofcom.

3.24

We believe it is important to clarify that customer choice should not be about choosing one of the three largest cloud providers (or five) but rather that multi-cloud can refer to any provider — a regional provider, a national provider, a global or multi-national provider — any one offering (digital) infrastructure resources should be compatible with the services, and bundling should be avoided through the introduction of an exchange/marketplace that is fair.

5.26

We would like to highlight that this also can be addressed by introducing an exchange/ marketplace approach (as implemented and evidenced in the energy system), please see:

- https://www.legislation.gov.uk/uksi/2014/3333/contents/made
- https://www.ofgem.gov.uk/publications/amendments-ownership-unbundling-requirements-gas-act-1986-and-electricity-act-1989
- https://fsr.eui.eu/unbundling-in-the-european-electricity-and-gas-sectors/