CCP Response to the Ofcom Consultation: Cloud Services Market Study (Interim Report)

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Please consider this response as public and citable.[1]

This submission draws upon the economic and legal research of Sean Ennis and Ben Evans and the economic research of Franco Mariuzzo and others. It responds to four elements of consultation: the characterisation of the market outcomes in supply of cloud infrastructure services, the validity of 'egress fees' and interoperability and portability as areas of potential intervention and the appropriateness of approaches thereto, including potential unintended consequences.

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Overview

The design and implementation of interventions in the cloud computing sector represents a complex challenge. We find that some seemingly simple solutions could have negative implications for competition and innovation and, ultimately, the availability of options to cloud customers in the UK. If a reference to the CMA is pursued by Ofcom, and if problems are identified, any proposed solutions would require careful consideration of dynamic implications.

Building on our prior work that is publicly available for citation, this submission responds to the following questions posed by the consultation:

- Question 4.2: Do you agree with our characterisation of the market outcomes in supply of cloud infrastructure services?
- Question 8.1: Do you agree that egress fees are an area of potential intervention? How might such an intervention be approached?
- Question 8.2: Do you agree that interoperability and portability are areas of potential intervention? How might such an intervention be approached?
- Question 8.5: What, if any, potential unintended consequences do you anticipate might be associated with the interventions set out above, and how might they interact with each other if implemented?

Our assessment of the validity of 'egress fees' and interoperability and portability as areas of potential intervention, and the appropriateness of approaches thereto, is based to a great extent upon our analysis of potential unintended consequences. We therefore address Question 8.5 under Questions 8.1 and 8.2 in turn. At least with respect to the points we address below, we find some risk in making a market reference based on data that is sometimes noisy and open to multiple interpretations.

We refer to Ofcom's 'Cloud Services Market Study: Interim Report' ('Interim Report')[2], the market research undertaken by Context Consulting ('Market Research')[3], the EU proposal for a Data Act which includes a focus on portability and interoperability for cloud services,[4] the economic and legal research of Ennis and Evans,[5] the economic research of Mariuzzo and others,[6] and wider academic research concerning cloud computing.

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[2] Ofcom, 'Cloud Services Market Study: Interim Report' (April 2023) ('Interim Report'). Available at: https://www.ofcom.org.uk/__data/assets/pdf_file/0029/256457/cloud-services-market-study-interim-report.pdf (accessed 16 May 2023).

[3] Context Consulting, 'Cloud Services Market Research: Summary of Findings' (March 2023) ('Market Research'). Available at: https://www.ofcom.org.uk/__data/assets/pdf_file/0031/256459/context-consulting-cloud-services-market-research-summary-of-findings.pdf (accessed 16 May 2023).

[4] We refer to the legal texts of the European Commission, European Parliament and the European Council: European Commission, Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act) COM/2022/68 final ('Commission text'); Amendments adopted by the European Parliament on 14 March 2023 on the proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act) (COM(2022)0068 – C9-0051/2022 – 2022/0047(COD)) ('Parliament text'); European Council mandate for negotiations with the European Parliament, Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act) 2022/0047(COD) ('Council text').

[5] S. Ennis and B. Evans, 'Cloud Portability and Interoperability under the EU Data Act: Dynamism versus Equivalence' (March 2023) CCP Perspectives Policy Paper 23-01. Available at: https://competitionpolicy.ac.uk/publications/cloud-portability-and-interoperability-under-the-eu-data-act-dynamism-versus-equivalence/ (accessed 16 May 2023).

[6] T. Doan, F. M. Manenti and F. Mariuzzo, 'Platform competition in the tablet PC market: The effect of application quality' (2023) International Journal of Industrial Organization, 88, 102930 and T. Doan, F. Manenti and F. Mariuzzo, 'Platform competition in the tablet PC market: The effect of application quality' (2020) CCP Working Paper 20-08.; T. Doan and F. Mariuzzo, 'Digital platform mergers and innovation: Evidence from the cloud computing market' (2023). Mimeo (available upon request). Forthcoming CCP Working Paper and R&R Managerial and Decision Economics.

Question 4.2: Do you agree with our characterisation of the market outcomes in supply of cloud infrastructure services?

We find that, overall, the characterisation of the market outcomes in supply of cloud services is well-founded and instructive. However, we feel that the study could be enriched by the addition of research concerning the effect of acquisitions on innovation.

We find that the leading firms in the market, referred to in the Interim Report as 'hyperscalers', tend to acquire young start-ups, while non-leading firms tend to purchase more established businesses in order to gain market shares.[7] By undertaking an ex-post evaluation of how mergers in this market have affected innovation, measured by patents, we show a positive but insignificant impact of mergers on innovation. We interpret this finding as preliminary evidence that, in this market and based on this measure of innovation, acquisitions do not necessarily harm innovation. A further breakdown of our empirical analysis shows positive and significant effects when the acquirer cloud computing companies are either 'hyperscalers' or multisided platforms.

We would emphasise that, based upon the findings of our study, the relationship between innovation and quality, and the role of acquisitions, deserves attention.

Question 8.1: Do you agree that egress fees are an area of potential intervention? How might such an intervention be approached?

We are concerned by the scope of data transfers captured under the expansive category of 'egress fees', which are defined in the Interim Report as 'the charges that customers pay to transfer their data out of a cloud,' and are held to be applicable 'when a customer is transferring data to an end user, when a customer is seeking to use integrated cloud solutions which require data transfers (i.e. to use an integrated multi-cloud architecture), or when a customer is looking to switch from services on one cloud provider's infrastructure to another'.[8] According to this definition, the elimination or reduction of 'egress fees' in order to address barriers to switching could also effectively require cloud service providers to provide a free of charge or 'controlled price' data transfer service outside the context of switching. We recommend that Ofcom ensure that 'egress fees' are clearly defined to exclusively capture fees incurred by customers as part of the 'one-off' switching process.

We would draw attention to ambiguity in the Market Research over the extent to which 'egress fees', broadly defined, are of concern and detriment to cloud customers. Despite 55% of respondents referring to 'egress fees / exit fees'[9] as one of 'various aspects of the way the cloud market [IaaS / PaaS] works' that cause concern, this figure might overstate the number of customers who find switching related data transfer costs a concern as. Indeed, in the specific context of barriers to switching, the report concludes that '[a] minority are concerned about egress fees / vendor charges', with only 6% of firms surveyed perceiving that 'data charges' are the main challenge of switching provider completely.[10] Moreover, we note that 'some respondents also expressed concerns about *data ingress fees*, though these are likely to be historical, as vendors now all have zero ingress fees' (emphasis added).[11] Clearly, more research needs to be undertaken in this area and we find that it is not possible to make concrete recommendations either as to the general validity of 'egress fees' as an

[7] T. Doan and F. Mariuzzo, 'Digital platform mergers and innovation: Evidence from the cloud computing market' (2023). Mimeo (available upon request). Forthcoming CCP Working Paper and R&R Managerial and Decision Economics.
[8] Interim Report, pp. 2, 109.
[9] Market Research, p. 131.
[10] Market Research, pp. 116, 121.
[11] Market Research, p. 80.

area of potential intervention or as to the appropriateness of any given approach at this early stage. We, therefore, welcome the second stage of Ofcom's report that promises a deeper assessment of the economics of 'egress fees', which we feel would be necessary before making any further recommendations in this area.[12]

That being said, we provisionally concur with a number of the well-reasoned concerns raised by Ofcom in the Interim Report in relation to each of its proposed approaches to intervention. Given the number of variables that determine pricing, the first proposal to equalise 'egress fees' with other charges appears to be a process inherently flawed by methodological challenges.[13] Secondly, the implementation of price controls should be treated as an intervention of last resort and, therefore, it will be imperative for Ofcom to test its provisional assessment that 'egress fees' are 'not directly linked to costs' against a commensurately rich body of information.[14] The third proposal to prohibit the charging of 'egress fees' by cloud service providers to a great extent mirrors the provisions of the EU proposal for a Data Act.[15] We note that if there is a positive cost to the switching process then a requirement for customers to be able to switch cloud provider at 0 cost would represent a significant intervention in the commercial liberty of firms to recover the costs associated with myriad types of data transfer, which risks undermining the financial position of cloud service providers, in particular smaller or new challenger firms.[16] And we concur with Ofcom's concerns that a prohibition of 'egress fees' may force firms to recover the related costs from other charges, giving rise to a potential 'waterbed effect'.[17]

Finally, we find Ofcom's observation that 'an alliance of smaller cloud providers has been founded with the intention of waiving egress fees' particularly pertinent.[18] This would seem to indicate a certain level of price competition in the market, and we would strongly recommend that, prior to any form of intervention, the effect of emerging market-driven solutions should be assessed. Comparing pricing strategies alone does not demonstrate that some firms are overcharging, given different investment footprints of different companies.

Question 8.2: Do you agree that interoperability and portability are areas of potential intervention? How might such an intervention be approached?

In order to assess the validity of interoperability and portability, which are the two core pillars of switching, as areas of potential intervention, we refer in the first instance to the Market Research. Notably, it is concluded that '[t]he qualitative research process uncovered limited evidence of switching ... together with limited desire to do so'.[19] And we find it striking that while 'most decision-makers acknowledge that a de facto lock-in exists … this is primarily a function of internal factors rather than provider-imposed restrictions.'[20] This position is compounded by the observations that '[f]ew, if any, firms, told us that they wished to switch providers but were impeded from doing so by the policies of their providers,' and 'nearly all [secondary barriers to switching] are internally driven

[12] Interim Report, p. 202.
[13] Interim Report, p. 202.
[14] Interim Report, p. 202.
[15] Commission text, Article 25; Parliament text, Article 25; Council text, Article 25.
[16] S. Ennis and B. Evans, 'Cloud Portability and Interoperability under the EU Data Act: Dynamism versus Equivalence' (March 2023) CCP Perspectives Policy Paper 23-01, pp. 16-17. Available at: https://competitionpolicy.ac.uk/publications/cloud-portability-and-interoperability-under-the-eu-data-act-dynamism-versus-equivalence/ (accessed 16 May 2023)
[17] Interim Report, p. 203. For analysis of the same point in the context of the EU proposal for a Data Act, see S. Ennis and B. Evans, pp. 16-17.
[18] Interim Report, p. 203.
[19] Market Research, p. 110.
[20] Market Research, p. 110.

rather than being 'created' by vendors.'[21] Moreover, despite 52% of firms referring to a 'lack of interoperability' as one of 'various aspects of the way the cloud market [IaaS / PaaS] works' that cause concern, it is remarkable that in the specific context of barriers to switching only 7% of firms surveyed perceive that 'interoperability challenges' are the main challenge of switching provider completely.[22] We draw attention to the conclusion that in fact the '[p]erceived time and cost of making the change are the main barriers to switching provider completely,' and this barrier is found to be 'more of a concern to those who have not considered switching (55% see it as a challenge) than to those who have switched (34%).'[23]

Based upon the findings of the Market Research, it is apparent that interoperability and portability are not directly impeded by cloud service providers, that a minority of firms are concerned about interoperability and that, significantly, the concerns of cloud customers are not always borne out when actually switching. Indeed, when asked about concerns relating to the 'technical difficulties in transferring data' it is found that firms who had not considered switching were found to be 'nearly twice as likely to see this as a challenge (39%) as those who have switched (22%).'[24] In addition, we would emphasise the nascency of the cloud sector, something that is reflected in the characterisation of the 'relative immaturity of firms in their cloud journey', more specifically 'still on the way in, not out, of their IaaS / PaaS environments.'[25] It is arguably, therefore, premature to draw conclusions and design bold interventions.

Turning to the appropriateness of the proposed interventions, we would emphasise the responsibility that cloud customers have to undertake an appropriate level due diligence at the point of service adoption. We find that customers, in particular of IaaS and PaaS services, are likely to account for potential portability issues during the decision making process by, for example, testing *ex ante* whether applications can be ported as required.[26] We also emphasise that inherent to the IaaS model is a heightened level of customer control over data, with customers likely to test whether their data can readily be ported either in-house or to another cloud provider.[27] While the Market Research reveals that '[i]f the company has quickly adopted cloud in an expedited fashion, without really optimising how they've built their applications, then they find it really a challenge from to move,' it does not follow that cloud providers should automatically shoulder an additional burden of responsibility.[28] In the context of switching, we would emphasise the finding that 'skills issues is a major barrier' to switching, and we would welcome the development of best practices, which the Market Research indicates are needed in the areas of 'adopting multi-cloud, architecting solutions to ensure that switching is a viable option, and generally on how to avoid lock-in.'[29] Ultimately, we do not find the proposal to require cloud computing providers to 'significantly increase transparency about the interoperability of their services' to be an appropriate response. We would underscore the well-reasoned concern raised by Ofcom in the Interim Report that '[a]n extensive transparency requirement in a dynamic market might create an unnecessary burden on hyperscalers' and emphasise the depth of the resources already available to firms.[30]

[21] Market Research, pp. 14, 120.
[22] Market Research, pp. 116, 121.
[23] Market Research, p. 121.
[24] Market Research, p. 121.
[25] Market Research, pp. 110, 119.
[26] W. Kuan Hon, C. Millard, and J. Singh, 'Control, Security, and Risk in the Cloud', in C. Millard (Ed.), *Cloud Computing Law* (OUP 2021), as cited in S. Ennis and B. Evans p. 7.
[27] N. Gleeson and I. Walden, 'Cloud Computing, Standards, and the Law', in C. Millard (Ed.), *Cloud Computing Law* (OUP 2021), as cited in S. Ennis and B. Evans, p. 7.
[28] Market Research, p. 117.
[29] Market Research, pp. 117, 143.
[30] Interim Report, p. 204.

A further proposal advanced in the Interim Report to 'make first-party services easier to interoperate with third-party services' reads as a direct response to a number of suggestions made by respondents in the Market Research, of which '[s]ome referenced regulations that have been implemented around consumers being able to easily port their phone numbers, utilities or bank accounts'.[31] We find that such analogies are inappropriate, and in particular the analogy between cloud computing services, which exhibit high degrees of feature complexity and innovation, and banking services, which exhibit both a limited number of key features and a relatively low level of innovation.[32] The first element of the intervention proposes to 'set outcomes rather than define any aspects of the technical design of hyperscalers' services' by a process that would 'effectively separate or 'unbundle' cloud providers' own first-party services into their respective elements'.[33] We strongly question whether a concept of modularity can be applicable to highly heterogenous cloud computing services and would emphasise that, despite the prevalence of a 'building-blocks' metaphor across many different kinds of technical products and services, the practical implementation of a 'building-blocks' approach could be very challenging to achieve for highly complex and interconnected cloud services.[34] And we would emphasise Ofcom's concern that 'quality of experience is reduced when using first-party and third-party services in combination, by comparison to using an integrated service'.[35]

The second element of this proposal entails the 'requirement for cloud providers to 'open up' their cloud infrastructure services' in order to enable access 'on an equivalent basis by other cloud providers or ISVs.'[36] We are deeply concerned by the potential unintended consequences of similar 'equivalence' provisions contained in the EU proposal for a Data Act,[37] which risk having a chilling effect on competition and innovation not only by smaller and new challenger cloud providers, but more broadly those cloud computing services that are competing most assiduously to meet customer needs.[38] We would emphasise that built-in variety seems to be the natural result of competition in the cloud sector, with firms frequently seeking to distinguish themselves from others with particular aspects of their offers.[39] Hence, we would expect that firms' incentive to create purpose built, new solutions would be difficult to justify under far reaching 'equivalence' provisions.[40] We are, therefore, encouraged to see, and would concur with, Ofcom's concerns that '[i]f it leads to less control over the architectural and operational decisions relating to their first-party cloud services, this intervention may also dampen cloud providers' incentives to innovate,' and, further that 'challenges with defining the exact scope, including whether they would apply to specific services or to specific cloud providers' are likely to arise.[41] Ultimately, we are concerned that if the UK follows the EU approach, cloud service providers may respond to the proposed provisions by retrenching to a 'lowest common denominator' with diminished innovation.[42]

The Market Research suggests that '[w]hile it is understood that cloud providers seek to find ways to differentiate themselves with unique features and services, a core set of standard options could be established in order to facilitate comparisons between providers and switching."[43] We find this

[31] Market Research, p. 144.
[32] S. Ennis and B. Evans, p. 3.
[33] Interim Report, p. 205.
[34] S. Ennis and B. Evans, p. 14.
[35] Interim Report, p. 205.
[36] Interim Report, p. 206.
[37] Commission text, Article 23, Article 26, Article 29; Parliament text, Article 23, Article 26, Article 29; Council text, Article 23, Article 26, Article 29.
[38] S. Ennis and B. Evans, p. 1.
[39] S. Ennis and B. Evans, p. 10.
[40] S. Ennis and B. Evans, p. 10.
[41] Interim Report, p. 206.
[42] S. Ennis and B. Evans, p. 10.
[43] Market Research, p. 144.

requirement that cloud providers ensure portability and interoperability between 'plain vanilla' services be much more reasonable than a broad 'equivalence' requirement, and would envisage such services as those that are offered by all relevant cloud providers, rely less heavily upon novel intellectual property rights and could, for example, be established by a standard embodied within one or more APIs.[44] However, the reality that many firms choose to customise their services already provides substantial information about the values and needs of such companies. Indeed, such customisation can represent an explicit decision by the user to make switching to another cloud provider less simple, or technically impossible without substantial re-customisation.[45]

A further proposal advanced in the Interim Report is the 'standardisation of cloud technologies.' We find that the imposition of mandatory interoperability standards would inherently favour incumbents, impede existing competition by differentiation and limit the parameters for future innovation.[46] We would concur with the concerns raised by Ofcom that 'mandating standards is likely to lead to significant implementation costs where they require re-engineering of cloud services and customer applications.'[47] And further, we also concur that standardisation 'carries a risk to innovation in a dynamic market such as cloud, where any standards could become outdated if they are insufficiently flexible to adapt to industry developments.'[48] Rather, we would be far more optimistic about the emergence of market-driven solutions, such as the potential for innovative cloud providers to voluntarily join an open standardisation initiative in order to compete with incumbents operating closed systems in markets where cloud customers perceive a lack of interoperability as a substantial disadvantage.[49]

In related research, we contribute to the broader literature on technology interoperability and compatibility by studying the effect that mobile application (app) quality has on platform competition in the tablet PC market.[50] In a policy counterfactual exercise, we investigate the impact that interoperability (of app quality) would have on tablet PC market outcomes, including consumer welfare for the demand for tablets. A feature of our results, which provides a possible answer to the second part of the question, is that, depending on how interoperability is implemented, it can distort underlying platform competition in the market and create redistributions of rents.

We analyse how the demand for tablets, firms' profits, and consumer surplus change when the average quality of the apps is the same in the two stores. With this policy counterfactual, we are able to, at least partially and in the short run, replicate what could happen if the two platforms were interoperable. Crucially, we find that the lower-quality platform would benefit from interoperability at the expense of the higher-quality platform. In the long run, interoperability could induce the exit of the higher quality platform due to the tipping to monopoly, which is a by-product of network effects. We would emphasise the importance of envisioning the consequences and potential side-effects of interventions aimed at improving switching, in particular the design and implementation of interoperability or compatibility rules. This is likely to be even more important where asymmetries are in place, since the cost of removing or mitigating those has repercussions on competition and the redistribution of rents between competitors, which need to be anticipated.

[44] Parliament text, Recital 72.
[45] S. Ennis and B. Evans, p. 18.
[46] D. Schnurr, Centre on Regulation in Europe: Switching and Interoperability Between Data Processing Services in the Proposed Data Act Report (2022), pp. 19-20, as cited in S. Ennis and B. Evans, p. 10.
[47] Interim Report, p. 207.
[48] Interim Report, p. 207.
[49] D. Schnurr, Centre on Regulation in Europe: Switching and Interoperability Between Data Processing Services in the Proposed Data Act Report (2022), pp. 19-20, as cited in S. Ennis and B. Evans, p. 10.
[50] T. Doan, F. M. Manenti and F. Mariuzzo, 'Platform competition in the tablet PC market: The effect of application quality' (2023) International Journal of Industrial Organization, 88, 102930 and T. Doan, F. Manenti and F. Mariuzzo, 'Platform competition in the tablet PC market: The effect of application quality' (2020) CCP Working Paper 20-08.