

Public cloud infrastructure services market investigation

Issues statement

Context of this investigation

1. On 5 October 2023 the Office of Communications (Ofcom), in exercise of its powers under sections 131 and 133 of the Enterprise Act 2002 (the Act), as provided for by section 370(3A)(b) of the Communications Act 2003 read together with section 130A of the Act, made a reference for a market investigation into the supply of public cloud infrastructure services in the UK.¹
2. Ofcom had reasonable grounds to suspect that a feature or a combination of features of the markets for the supply of those goods and services in the United Kingdom prevents, restricts or distorts competition. In particular, conduct which may create barriers to switching and multi-cloud.
3. For the purposes of the reference:
 - (a) 'Cloud infrastructure services' means services that provide access to processing, storage, networking, and other raw computing resources (often referred to as infrastructure as a service, IaaS) as well as services that can be used to develop, test, run and manage applications in the cloud (often referred to as platform as a service, PaaS).
 - (b) 'Public cloud computing' means a cloud deployment model where cloud services are open to all customers willing to pay, and computing resources are shared between them.
 - (c) 'Multi-cloud' means a cloud deployment model involving the use of more than one public cloud provider by a single customer, where multiple clouds may or may not be integrated with each other.²
4. The CMA is required to decide whether any feature, or combination of features, of each relevant market prevents, restricts or distorts competition in

¹ [Terms of Reference \(ofcom.org.uk\)](https://www.ofcom.gov.uk/terms-of-reference)

² [Terms of Reference \(ofcom.org.uk\)](https://www.ofcom.gov.uk/terms-of-reference)

connection with the supply or acquisition of any goods or services in the UK or a part of the UK.³ The decision is made by a group of independent members constituted from its panel, on behalf of the CMA.⁴ If the group decides that there is such a prevention, restriction or distortion of competition, it will have found an ‘adverse effect on competition’ (AEC).⁵

5. If the CMA finds that there is an AEC, it has a duty to decide whether it should take action and if so what action should be taken, and/or whether it should recommend that others take action, to remedy, mitigate or prevent the AEC concerned or any detrimental effect on customers so far as it has resulted from, or may be expected to result from, the AEC.⁶

The purpose of this statement

6. This issues statement is based on the evidence we have seen to date from Ofcom’s Market Study.⁷ It sets out the framework for our investigation, including:
 - (a) our initial hypotheses concerning which features of the markets for the supply of public cloud infrastructure services (cloud services) in the UK, if any, may be adversely affecting competition; and
 - (b) which potential remedies may be suitable to address any AECs that we may find, or any detrimental effect on customers resulting from any such AECs.
7. This statement does not represent the CMA’s emerging or provisional views, findings or conclusions on either the competition issues or remedies, should these be needed. We have yet to determine whether any competition concerns arise in the supply of cloud services in the UK.
8. The hypotheses set out in this issues statement do not imply any pre-judgement of an AEC; they are solely potential hypotheses to be tested during the market investigation. Our investigation is at a very early stage, and the purpose of identifying these hypotheses is to present some early thinking on these issues for comment and to help frame our investigation.

³ Section 134 [Enterprise Act 2002 \(legislation.gov.uk\)](https://www.legislation.gov.uk)

⁴ [Cloud services market investigation](#) Kip Meek (Inquiry Chair), Robin Foster, Paul Hughes and Colleen Keck.

⁵ As defined in section 134(2) of [the Act](#)

⁶ As defined in section 134(4) of [the Act](#)

⁷ [Ofcom Cloud Services Market Study Final Report](#)

9. In planning our investigation, we are mindful of the complexity and size of the markets involved and the time we have available under the 18-month statutory timetable in which to carry out our investigation.
10. We are publishing this statement to assist those submitting evidence to focus on the issues we envisage being relevant to this investigation and any potential remedies to address AECs that we may find. As the investigation progresses, further issues may be identified and explored. We will discuss these issues with relevant parties to the investigation and/or publish our emerging thinking on them in order to engage with relevant parties.

Background

11. Ofcom found that cloud services are increasingly important inputs to many businesses and organisations across the UK economy. They support most sectors including communications, manufacturing, retail, hospitality and financial services as well as public and voluntary sector bodies. Without cloud services many digital businesses providing services to consumers would not be able to function in the way they do today.⁸
12. Cloud services are growing as companies are migrating from their traditional IT infrastructure to cloud computing. According to Ofcom, the market for cloud infrastructure in the UK was worth £7-7.5 billion in 2022. Ofcom expects cloud services to increase in importance over the next few years.⁹
13. Ofcom found that the two largest providers of cloud services in the UK are Amazon Web Services (AWS) and Microsoft with a combined market share of [70-80]%. The next largest provider in the UK is Google with a share of [5-10]% followed by a number of smaller suppliers such as IBM and Oracle.
14. Ofcom found that independent software vendors (ISVs) build their products on the infrastructure provided by AWS, Microsoft and Google but also compete directly with some of the services provided by these three largest providers.¹⁰
15. Ofcom found that competition between the largest providers of cloud services is mainly focused on new customers moving to the cloud for the first time. However, once a customer has moved to the cloud, Ofcom found that some market features limit competition between cloud services providers.¹¹

⁸ See paragraph 3.9 in [Ofcom Cloud Services Market Study Final Report](#)

⁹ See paragraph 12 in [Ofcom Cloud Services Market Study Final Report](#)

¹⁰ See paragraph 1.1 in [Ofcom Cloud Services Market Study Final Report](#)

¹¹ See paragraph 1.1 in [Ofcom Cloud Services Market Study Final Report](#)

16. Ofcom was concerned that if customers have difficulty switching and using multiple cloud service providers, it could make it harder for competitors to gain scale and challenge AWS and Microsoft effectively for the business of both new and existing customers. It considered that there could be long lasting impacts if this led the market to become more concentrated, with barriers to switching and multi-cloud allowing the market leaders to entrench their positions and avoid competing vigorously.¹²
17. We also note that the CMA's recently published report on AI foundation models¹³ and Ofcom's Market Study both identify cloud services as a cornerstone of recent technological innovations. We will consider the potential impact of AI on how competition works in the cloud services market.

Our hypotheses for investigation

18. Our guidelines identify five broad sources of competitive harm:
 - (a) Unilateral market power;
 - (b) Barriers to entry and expansion;
 - (c) Coordinated conduct by firms;
 - (d) Non-horizontal relationships; and
 - (e) Weak customer responses.¹⁴
19. Having reviewed Ofcom's findings and our guidelines on potential sources of competitive harm, we propose to focus our investigation on four groups of high-level hypotheses, also known as 'theories of harm', based on both the structure of the market(s) that we will investigate and the conduct of relevant firms within these or other related markets.¹⁵
20. These hypotheses are not necessarily mutually exclusive, indeed some are closely related and connected to each other. Equally they may not be comprehensive and there may be other issues that we decide to consider further during the investigation as our understanding of cloud services develops. Alternatively, we may find as our investigation progresses that some, or all, of these hypotheses do not hold.

¹² See paragraph 1.1 in [Ofcom Cloud Services Market Study Final Report](#)

¹³ [CMA AI Foundation Models: Initial report](#), September 2023

¹⁴ [CC3 \(April 2013\), Guidelines for market investigations: Their role, procedures, assessment and remedies](#)

¹⁵ See paragraph 155 and following [CC3 \(Revised\), Guidelines for market investigations: Their role, procedures, assessment and remedies \(publishing.service.gov.uk\)](#)

21. The four hypotheses draw on the three features Ofcom was most concerned about and also the software licensing practices that it described:
- (a) the presence of technical barriers that may hinder customers' ability to set up a multi-cloud architecture and switch cloud providers;
 - (b) the presence of fees connected with the transferring of data outside of a cloud provider's infrastructure which may constitute a barrier to multi-cloud and switching. Ofcom calls these egress fees;
 - (c) the discounts offered by some cloud providers which are conditional on customers committing to a certain level of spend with them. Ofcom calls these committed spend discounts. These may increase barriers to multi-cloud and switching; and
 - (d) the software licensing practices by some cloud services providers which may reduce competition or raise barriers to entry.

Theory of harm 1: Technical barriers make switching and multi-cloud harder and limit competition between cloud service providers

22. Ofcom found that technical barriers can hinder customers' ability to work with multiple clouds, switch between them and – to a lesser extent – implement multi-vendor architectures.¹⁶
23. Specifically, Ofcom found that a significant share of customers is likely to face high technical barriers to multi-cloud and switching which make it more difficult and/or costly for customers to multi-cloud or switch provider. Moreover, Ofcom found that some of these technical barriers are not justified by the inherent nature of the technology and might persist going forward.
24. Another concern highlighted by Ofcom is related to the need for customers to develop specific skills for each cloud provider they use. Finally, it found that customers' development of cloud-specific skills can add to these barriers.¹⁷
25. We will investigate whether, and the extent to which, technical barriers prevent or restrict the ability of customers to multi-cloud and switch providers and which may be hindering competition among cloud service providers. We will investigate the extent to which these barriers as well as skills specialisation are contributing to the lock-in of customers. We will also look at

¹⁶ See paragraph 5.105 in [Ofcom Cloud Services Market Study Final Report](#)

¹⁷ See paragraph 5.12, 5.32 and 5.41, 5.50, 5.16 in [Ofcom Cloud Services Market Study Final Report](#)

the extent to which these technical barriers can be overcome or are inherent in the technology.

Theory of harm 2: Egress fees harm competition by creating barriers to switching and multi-cloud leading to cloud service providers entrenching their position.

26. Ofcom defined egress fees as charges to customers when they transfer data out of their provider's cloud. Egress fees apply when a customer is transferring data to an end user or application, when moving data between the cloud and its on-premises data centres, when moving data between different cloud providers, either as part of a multi-cloud architecture, or as part of switching between two cloud providers.¹⁸
27. Ofcom found that a majority of customers cited egress fees as a concern. It found that the extent to which egress fees act as a barrier to multi-cloud is not the same for all customers and that egress fees are likely to be a stronger barrier to the more integrated forms of multi-cloud where a significant amount of data needs to be transferred between the services hosted on different clouds. Ofcom also found that egress fees can create uncertainty and risk for customers as they can make it difficult to compare the cost of using a single provider compared to the cost of hosting solutions across multiple cloud providers.¹⁹
28. We will investigate whether, and the extent to which, egress fees act as a barrier to multi-cloud and switching, contribute to the unpredictability of costs for customers and prevent or restrict or distort competition among cloud service providers.

Theory of harm 3: Committed spend discounts raise barriers to entry and expansion for smaller cloud service providers by incentivising customers to concentrate their business with one provider.

29. Committed spend discounts are agreed between customers and cloud service providers. They involve a customer committing to spend a minimum amount with the provider over a period of years, and in return, receiving an individually negotiated percentage discount on list prices.²⁰
30. Ofcom found that some cloud service providers often use these discounts in negotiations with large customers. It found that committed spend discounts could encourage customers to concentrate spend with a primary cloud

¹⁸ See paragraph 5.108 in [Ofcom Cloud Services Market Study Final Report](#).

¹⁹ See paragraphs 5.117, 5.115, 5.123 in [Ofcom Cloud Services Market Study Final Report](#)

²⁰ See paragraph 5.174 in [Cloud services market study final report \(ofcom.org.uk\)](#).

provider and may represent a major barrier to customers using other cloud providers.²¹

31. Committed spend discounts may result in reduced prices for individual customers, but we will investigate whether, and the extent to which, the way they are structured acts as a barrier to entry and expansion among cloud providers in a way that leads to longer-term harm to competition.

Theory of harm 4: Software licensing practices by cloud service providers restrict customer choice and prevent effective competition

32. Ofcom received submissions regarding the software licensing practices of some cloud service providers, in particular Microsoft, that allege that these practices may make it less attractive for customers to use licensed software products on the cloud infrastructure of rival providers.²²
33. Ofcom heard about two main types of practices:
 - (a) Pricing-related practices, which allege it is cheaper to deploy licensed software on the provider's own cloud infrastructure, compared to the cloud infrastructure of rivals.
 - (b) Quality-related or interoperability-related practices, which allege that software benefits from additional features, or works more effectively when used on the provider's own cloud infrastructure compared to the cloud infrastructure of rivals.²³
34. Ofcom did not undertake an assessment of the submissions it received or the impact of these alleged practices on competition in the cloud services market but noted that it is possible that they could risk dampening competition in cloud services and that it will be for the CMA to decide whether to investigate this matter during the market investigation.²⁴
35. We have decided that, as part of this market investigation, we should investigate the exact nature of the licensing practices of the relevant cloud service providers, and whether these practices disincentivise customers from using rival providers and consequently reduce competition or raise barriers to entry in cloud services.

²¹ See paragraphs 5.177, 5.194, 5.230 in [Cloud services market study final report \(ofcom.org.uk\)](https://www.ofcom.gov.uk/consult/condocs/cloudservices/cloudservices_market_study_final_report/).

²² See Chapter 8 of [Cloud services market study final report \(ofcom.org.uk\)](https://www.ofcom.gov.uk/consult/condocs/cloudservices/cloudservices_market_study_final_report/)

²³ See chapter 8 of [Cloud services market study final report \(ofcom.org.uk\)](https://www.ofcom.gov.uk/consult/condocs/cloudservices/cloudservices_market_study_final_report/).

²⁴ See chapter 8 of [Cloud services market study final report \(ofcom.org.uk\)](https://www.ofcom.gov.uk/consult/condocs/cloudservices/cloudservices_market_study_final_report/)

Market outcomes: prices and profitability

36. Ofcom analysis indicates that AWS's profitability has been consistently high, with returns significantly above the weighted average cost of capital (WACC) and that Microsoft Azure's returns have increased in recent years and are now above its WACC.²⁵
37. In addition to investigating the four theories of harm set out above, we will also conduct analysis of cloud service providers' profitability in order to assess whether prices of cloud services may be above those that would be found in a competitive market.²⁶

Potential remedies

38. We are at a very early stage of considering potential remedies. As our understanding of the market(s) and the potential issues develops, we expect our consideration of potential remedies to evolve. We set out in this section our very early views on potential remedies and invite submissions from parties on these to help inform our initial thinking.

The CMA's approach to remedies

39. When deciding whether (and if so what) remedial action should be taken to address an AEC, the CMA is required 'in particular to have regard to the need to achieve as comprehensive a solution as is reasonable and practicable'.²⁷ In doing so, the CMA considers, individually or as a package, how comprehensively the potential remedy options address the AEC and/or the resulting detrimental effects on customers and whether they are effective and proportionate.²⁸
40. The CMA assesses the extent to which different remedy options are likely to be effective in achieving their aims, including whether they are practicable and, among other considerations, the timescale over which they are likely to have effect. The CMA generally looks to implement remedies that prevent an AEC by addressing its underlying causes, or by introducing measures that can be put in place for the duration of the AEC. The CMA tends to favour

²⁵ See paragraph 1.33 in [Cloud services market study final report \(ofcom.org.uk\)](#)

²⁶ See paragraph 114 in [CC3 \(Revised\), Guidelines for market investigations: Their role, procedures, assessment and remedies](#)

²⁷ Sections [134\(6\)](#) and [138](#) of the Act.

²⁸ See paragraphs 328 and 329 in [CC3 \(Revised\), Guidelines for market investigations: Their role, procedures, assessment and remedies](#)

remedies that can be expected to show results within a relatively short period of time.²⁹

41. The CMA is guided by the principle of proportionality in ensuring that it acts reasonably in making decisions about which (if any) remedies to impose should an AEC be found. The CMA therefore assesses the extent to which different remedy options are proportionate, and in particular is guided by whether a remedy option:
 - (a) is effective in achieving its legitimate aim;
 - (b) is no more onerous than needed to achieve its aim;
 - (c) is the least onerous if there is a choice between several effective measures; and
 - (d) does not produce disadvantages which are disproportionate to the aim.³⁰
42. When assessing the impact of potential remedies, the CMA will consider their potential effects – both positive and negative – on those persons most likely to be affected by them, with particular regard to the impact on customers.³¹
43. The CMA may also have regard to the effect of any remedial action on any relevant customer benefits (RCBs) of a feature or features of the market(s). RCBs may arise where a market feature results, or is likely to result, in lower prices, higher quality, wider choice or greater innovation, and that such benefits are unlikely to arise in the absence of the market feature concerned.³²
44. Where the CMA finds that there is an AEC, the circumstances in which it will decide not to take any remedial action at all are likely to be rare but might include situations in which no practicable remedy is available, where the cost of each practicable remedy option is disproportionate to the extent that the remedy option resolves the AEC, or where RCBs accruing from the market

²⁹ See paragraphs 334 and 337 in [CC3 \(Revised\), Guidelines for market investigations: Their role, procedures, assessment and remedies](#)

³⁰ See paragraph 344 in [CC3 \(Revised\), Guidelines for market investigations: Their role, procedures, assessment and remedies](#)

³¹ See paragraph 348 in [CC3 \(Revised\), Guidelines for market investigations: Their role, procedures, assessment and remedies](#)

³² Section 134(7) and (8) of [the Act](#) and paragraphs 355-359 in [CC3 \(Revised\), Guidelines for market investigations: Their role, procedures, assessment and remedies](#)

features are large in relation to the AEC and would be lost as a consequence of any practicable remedy.³³

Potential remedies in the cloud services market

45. In this section we describe some initial potential remedy options to address any AECs that we may find and how they might work in practice. We invite views on specific issues that we raise in this section as well as any other issues that interested parties wish to put to us.
46. We have included a number of potential interventions identified by Ofcom which it considered could reduce barriers to multi-cloud and switching.³⁴ We have also added some further options based on our previous approach to remedies in market investigations.
47. The list of potential remedies discussed below is by no means exhaustive and we invite suggestions from parties in relation to any remedies not identified below that they believe we should consider.

Technical barriers

48. Potential options to address any concerns around technical barriers to interoperability and/or portability could include:
 - (a) Requiring cloud providers to make their services easier to interoperate with other third party cloud services;
 - (b) Requiring cloud providers to increase the degree of standardisation. This option could be implemented through a set of detailed, specific requirements, or through broader principles-based obligations;
 - (c) Requiring cloud providers to be more transparent about the interoperability of their cloud services;
 - (d) Requiring cloud providers to increase interconnectivity, for example, by connecting their data centres to other cloud providers' data centres; and
 - (e) Seeking to improve the training available to customers' technical staff, for example by requiring the provision of technology-agnostic training including recognised qualifications, or a recommendation to government.

³³ See paragraph 354 in [CC3 \(Revised\), Guidelines for market investigations: Their role, procedures, assessment and remedies](#)

³⁴ [Cloud services market study final report \(ofcom.org.uk\)](#)

49. There are different aspects of interoperability that we are likely to consider, so we may consider potential options that relate to both 'service level' interoperability, data migration processes, and the more holistic process of migrating applications or workloads from one cloud to another.
50. We are also aware that there may be technical limitations which currently make certain aspects of interoperability difficult, or potentially impossible. We welcome views on the extent to which these reflect persistent and unavoidable obstacles, or whether they could be overcome and if so how they might be overcome.

Egress fees

51. Potential options to address any concerns around egress fees could include:
 - (a) Capping egress fees by comparison to the costs incurred by the cloud provider;
 - (b) Capping egress fees by reference to other fees charged by the cloud provider (eg ingress fees or other data transfer fees);
 - (c) Preventing cloud providers from charging egress fees; and/or
 - (d) Increasing the visibility and understanding of egress fees for potential customers, potentially as part of wider requirements to improve the predictability and control spend on cloud.

Committed spend discounts

52. Potential options to address any concerns about committed spend discounts could include:
 - (a) Prohibiting the use of specific discount structures, such as certain rates or volume requirements; and
 - (b) Prohibiting the use of discount structures, such as through a principle-based approach.
53. We would particularly welcome views on whether these remedies would disrupt any pro-competitive discounting strategies that cloud providers may use.

Software licensing practices

54. Potential options to address any concerns around software licensing practices could include:
- (a) Increasing pricing transparency of cloud services that are sold to customers as part of a larger bundle that includes cloud services and software;
 - (b) Prohibiting the sale of cloud services as part of a larger bundle that includes cloud services and software;
 - (c) Requiring cloud providers to ensure version equivalence for software hosted on cloud infrastructure, regardless of who provides the cloud infrastructure; and
 - (d) Allowing customers to port existing software licences to any cloud provider, without incurring any additional charges or fees.
55. These potential remedies could be applied to a subset of market participants or to the market as a whole.
56. If we were to adopt a feature-led package of remedies, there are likely to be interactions and common concerns which arise across any approach, such as distortion and circumvention risks. We would particularly welcome parties' views on how we might best address these.

Crosscutting remedies

57. As well as the more targeted remedies which seek to address specific features identified as contributing to any concerns that Ofcom identified, we are considering the potential for cross-cutting actions which may remedy any AEC(s) as a whole, such as high barriers to entry or expansion, or difficulties for customers to switch or multi-cloud. In either case there may be a need for a package of remedies which combine in order to remedy, mitigate or prevent any AECs or their detrimental effects on customers.
58. Potential crosscutting interventions could include:
- (a) Structural, divestiture measures, such as the sale of particular assets, with the aim of strengthening alternative sources of competition.
 - (b) Behavioural, enabling measures: removing obstacles for effective competition, such as requiring the provision of information, or requiring access to infrastructure to share the benefits from economies of scale; imposing firewalls such as preventing the sharing of data, or common use

of assets; or potential market opening measures such as limiting parties' ability to require customers to enter into long-term contracts or otherwise create switching costs for customers. These measures could include operational separation as an alternative to divestment.

- (c) Behavioural, controlling outcomes: price caps, either targeted or broader, or service level agreements in which elements of quality are at risk of being degraded.³⁵
- (d) Recommendations: to a regulator or government, most commonly where we do not have jurisdiction to implement undertakings or orders directly, for instance where the area concerned is governed by a regulator or government department. Recommendations may also be included as a 'fallback' remedy, if it is uncertain whether we will be able to achieve our preferred remedy ourselves – for example, if this depends on parties being prepared to offer satisfactory undertakings.³⁶

59. If the Digital Markets, Competition and Consumers bill is adopted into law during the course of the market investigation, we may also consider any additional powers conferred on the CMA, for example, the power to regulate firms designated as having Strategic Market Status ('SMS') in respect of digital activities, and how these could interact with potential remedial action.

Responding to this issues statement

60. We are publishing this statement now, in order to assist those submitting evidence to our inquiry to focus on the potential issues we envisage being relevant to this investigation.
61. We invite parties to tell us, with reasons, if they believe either that:
- (a) the issues we have identified should not be within the scope of our investigation or are mischaracterised; or
 - (b) there are further issues we have either not identified but which we should consider.
62. We welcome views on the potential remedies including any general observations and views on each of the separate potential remedies and cross

³⁵ See figure 1 in [CC3 \(Revised\), Guidelines for market investigations: Their role, procedures, assessment and remedies](#)

³⁶ See Annex B, paragraph 94. [CC3 \(Revised\), Guidelines for market investigations: Their role, procedures, assessment and remedies](#)

cutting interventions discussed above and, in particular, on the following specific issues:

- (a) the potential for the remedies to effectively address any AECs;
- (b) the magnitude of associated costs and who would incur them;
- (c) whether there are additional steps needed to ensure that any relevant consumer benefits are not unduly compromised, and if so, what they may be;
- (d) the potential for unintended consequences and/or distortions to competition to arise from these potential remedies and how these could be mitigated; and
- (e) any implications on the effectiveness and proportionality of the potential remedies which might arise from the global nature of some cloud businesses, including the impact of any actions in other jurisdictions on the potential remedies set out above.

63. We ask respondents to support their views with relevant evidence, including original documentation and analysis.
64. **Any party wishing to respond to this issues statement should do so in writing, no later than Thursday 9 November 2023 by emailing CloudMI@cma.gov.uk.**
65. We will hold hearings with interested parties to discuss the issues and potential remedies set out in this statement. As our thinking develops, we expect to issue further documents prior to the publication of a provisional decision report containing our provisional findings on the issues. If we were to provisionally find one or more AECs, the provisional decision report would also contain our provisional decision on remedies. Our administrative timetable will be published on the inquiry case page [Cloud services market investigation](#).

17 October 2023