Cloud services market investigation

Licensing working paper

6 June 2024

This is one of a series of consultative working papers which will be published during the course of the investigation. This paper should be read alongside the Issues Statement published on 17 October 2023 and other working papers published.

These papers do not form the inquiry group's provisional decision report. The group is carrying forward its information-gathering and analysis work and will proceed to prepare its provisional decision report, which is currently scheduled for publication in September/October, taking into consideration responses to the consultation on the Issues Statement and responses to the working papers as well as other submissions made to us. Parties wishing to comment on this paper should send their comments to CloudMI@cma.gov.uk by **27 June 2024.**

Contents

1. Introduction and framework

1.1 This working paper presents our initial analysis of the potential impact of software licensing practices by Microsoft on competition between cloud providers. We set out our emerging views based on our analysis and the evidence we have seen to date.

1.2 We have focused our evidence gathering and analysis on Microsoft, for the reasons set out in paragraph 1.6 below. In this paper, we set out in turn:

(a) background on software licensing and how this is relevant to the provision of public cloud infrastructure services;

(b) our conceptual framework for assessing the potential impact of Microsoft's licensing practices on competition;

(c) a description of the licensing practices;

(d) our initial analysis of whether Microsoft has market power in relevant software markets;

(e) our initial analysis of the effect of Microsoft's licensing practices on customer choices; and

(f) our early thinking on potential remedies, together with some specific questions on which we would welcome views.

1.3 Parties wishing to comment on any part of this paper should send their comments to CloudMI@cma.gov.uk by 27 June 2024.

Background

1.4 Traditionally, customers purchased licences for software and operating systems so that they could be installed and used on a customer's premises. As customers migrate software systems to the cloud, the licensing arrangements have evolved in different ways. Some customers have been able to use their existing on-premises licences to use the relevant software in the cloud. Other customers have had to procure a new licence to use the software in the cloud.

1.5 As set out in our Issues Statement,[1] Ofcom received submissions regarding the software licensing practices of some cloud providers, in particular Microsoft. Providers and customers raised concerns that software providers – and especially Microsoft – had made it so that their software was more expensive, had fewer

[1] CMA, Issues statement (publishing.service.gov.uk), paragraph 32.

features and/or worked less effectively when run on a rival's cloud infrastructure, and this had disadvantaged rival cloud providers.[2]

1.6 In our investigation to date, we have received submissions raising concerns similar to those received by Ofcom. We have focused our further evidence gathering and analysis on Microsoft's software licensing practices because:

(a) the majority of the concerns raised in submissions we have received relate to Microsoft; and

(b) there are indicators that Microsoft has significant market power in cloud services compared to other software providers.[3] As such, the potential for Microsoft's licensing practices to have an adverse effect on competition is greater than is the case for other cloud providers.

1.7 Although we received some submissions relating to Oracle's software licensing practices, we have decided not to prioritise the investigation of Oracle's licensing practices because:

(a) Oracle's market share of cloud is relatively small ([0-5]% for infrastructure as a service (IaaS) and [0-5]% for platform as a service (PaaS))[4] and it is not seen by large customers we spoke to as a suitable alternative to their main cloud providers.[5] In addition, the Jigsaw report notes that none of the respondents used Oracle as their sole cloud provider, and their main use was secondary, for example, for supporting legacy systems.[6] As such, the potential for Oracle's licensing practices to have an adverse effect on competition for cloud infrastructure services is far less than is the case for Microsoft;

(b) we have received far fewer submissions raising concerns about Oracle's licensing practices; and

(c) the provision of cloud infrastructure services is complex and the CMA's resources are limited. As such, we have prioritised the use of those limited resources to the areas where there is the potential for greater harm to arise.

1.8 Ofcom identified five software products as potentially relevant to the consideration of Microsoft's software licensing practices, namely Microsoft's Windows Server (which includes Active Directory functionality), Windows 10/11, SQL Server, Visual

[2] CMA, Issues statement (publishing.service.gov.uk), paragraphs 32 and 33.
[3] See CMA, Competitive landscape working paper (publishing.service.gov.uk)
[4] CMA, Competitive landscape working paper (publishing.service.gov.uk), paragraphs 5.16 and 5.19.
[5] CMA, Competitive landscape working paper (publishing.service.gov.uk), paragraphs 2.146 to 2.149.
[6] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 3.4.8.

Studio and Microsoft 365. We have also chosen to focus on these five products because they are the products in relation to which licensing concerns were raised.

Conceptual framework and analysis structure

1.9 In our Issues Statement, we set out a theory of harm relating to software licensing practices. We indicated that we would investigate the nature of the licensing practices, and whether these practices disincentivise customers from using rival cloud providers, consequently reducing competition or raising barriers to entry and expansion in cloud infrastructure services.[7]

1.10 Microsoft's software practices may be more likely to harm competition in the markets for cloud infrastructure services if:

(a) the licensing practices relate to software products where Microsoft has market power, such that customers of cloud infrastructure services that purchase those software products would find it difficult to switch away from them;

(b) Microsoft's rivals in providing cloud infrastructure services do not have an effective counter strategy; and

(c) Microsoft's software products are provided at a higher price or lower quality to customers that choose one of Microsoft's rivals in cloud infrastructure services to be their cloud provider, weakening competition between Microsoft and other cloud providers.

1.11 Competition may be harmed such that it leads to foreclosure. Foreclosure can involve rivals being forced to exit from the market, being prevented from entering, or being materially disadvantaged and consequently competing less effectively.[8]

1.12 We are considering two related ways in which a weakening of competition may occur. The first is that the practice of making software licences more expensive when used with rival cloud infrastructure compared to Microsoft's Azure service may serve to raise rivals' costs of supplying cloud infrastructure services. Microsoft's rivals may have the incentive to pass on a proportion of this cost increase to their customers to optimise their profitability, thereby weakening the competition faced by Azure.

1.13 The second is that Microsoft's licensing practices may have the effect of making a significant proportion of customer demand less contestable to rivals. Over the longer term this may weaken its rivals' ability to acquire sufficient customers to

[7] CMA, Issues statement (publishing.service.gov.uk), paragraph 35.
[8] CC3 (Revised), Guidelines for market investigations: Their role, procedures, assessment and remedies (publishing.service.gov.uk), paragraph 269.

benefit from scale advantages in supplying cloud infrastructure services, such as economies of scale, learning effects and/or network effects.[9]

1.14 A number of factors would make it more likely for Microsoft's licensing practices to weaken rival cloud providers as competitors to Microsoft:

(a) where the proportion of cloud infrastructure customers using Microsoft software licences is significant;

(b) where Microsoft software accounts for a significant share of cloud expenditure for some customers;

(c) where there is a significant difference in the price or quality of Microsoft software when used on rival infrastructure as compared to where it is used on Azure;

(d) where customers face barriers to multi-cloud, and therefore licensing practices may induce customers to use the same cloud provider not only for workloads that involve Microsoft software but also for other workloads that do not;

(e) where there are economies of scale in the supply of cloud infrastructure services; and

(f) where Microsoft has a strong market position in the supply of cloud infrastructure services (and is therefore more likely to gain from any weakening of rivals).

1.15 We are considering some of the issues set out above in other working papers.[10] In this paper, we set out the following:

(a) We describe the software licensing practices of Microsoft, including how they have changed over time. We explain the ways in which customers can use Microsoft's software on the public cloud and also provide a brief summary of the differences between using the software products on Azure compared to rival clouds.

(b) We consider evidence on whether, and to what extent, Microsoft has market power in relation to the software products we are considering as part of our investigation. To the extent Microsoft has market power in supplying these software products, customers that want to use rival cloud suppliers may find it difficult to switch to rival software products, increasing the scope for

[9] CC3 (Revised), Guidelines for market investigations: Their role, procedures, assessment and remedies (publishing.service.gov.uk), paragraph 268.
[10] Potential barriers to multi-cloud, whether there are economies of scale in the supply of cloud infrastructure and Microsoft's position in the supply of cloud infrastructure services are discussed in other working papers.

Microsoft's licensing practices to have an impact on customer choice and on competition in cloud infrastructure services.

(c) We present customer views on factors affecting their choice of cloud (including asking about the differences, if any, between using the Microsoft software products we are considering[11] on Azure compared to using those products on other public clouds), as well as views from cloud providers and other third parties.

1.16 We are considering a range of evidence on the scope for Microsoft's licensing practices to have an impact on customers' choice of cloud provider, including ongoing data analysis on the implied difference in the licensing costs for Windows Server and SQL Server on Azure compared with AWS or Google.

1.17 We have undertaken initial analysis to explore these issues. Our evidence gathering is still ongoing and our thinking will continue to evolve as this market investigation progresses. We have not made any provisional findings on whether Microsoft's licensing practices constitute a feature that harms competition.

1.18 In order to assess whether Microsoft's licensing practices are having an impact, or are likely to do so, on competition, we asked customers a range of questions. In this paper, we set out the evidence gathered from customers on the role of Microsoft's licensing practices on their choice of cloud provider.

1.19 In line with the qualitative nature of the evidence we gathered, we have given a narrative summary of the key points that we consider emerge from the evidence.

1.20 We also commissioned qualitative customer research from Jigsaw Research. This research was intended to capture a wider range and a different set of customers from those we spoke to through direct channels. We are still considering the full details of this research and have only incorporated key takeaways where relevant in this working paper. The evidence is set out in full in a separate paper (the Jigsaw report)[12] and we will consider the evidence from this research alongside other evidence outlined in this paper in our ongoing work.

[11] SQL Server, Windows Server, Windows 10/11, Microsoft Office and Microsoft 365. The questions also included reference to Active Directory/Azure AD.
[12] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024.

2. Description of software licensing practices

Background and context to Microsoft's licensing practices

2.1 In this section, we provide some background and context to Microsoft's software licensing practices. We set out below:

(a) a brief history of Microsoft's recent changes to its licensing practices;

(b) the ways in which customers use Microsoft's software on the public cloud; and

(c) a summary of the differences in using Microsoft software on Azure versus other clouds.

Timeline of practices

2.2 Although our analysis is focused on Microsoft's licensing practices as of today, it is useful to put these in the context of historical conditions.

Pre-2019

2.3 With certain specific exceptions, prior to October 2019 customers with perpetual on-premises licences for certain Microsoft software did not have the right to deploy these licences on the shared hardware (ie the public cloud) of non-Azure cloud providers on a 'bring your own licence' ('**BYOL**') basis.[13,14,15,16] However, in relation to dedicated hardware (ie the private cloud), customers could use their licences on any cloud on a BYOL basis, whether that was on Azure or the cloud infrastructure of a third party.[17,18]

2019 changes

2.4 In 2019 Microsoft modified its licensing terms.[19, 20] Microsoft created a new category of 'Listed Providers' of cloud services (Microsoft, Alibaba, Amazon, and Google), and changed its licensing terms such that customers with perpetual on-

[13] [✂] response to [✂].
[14] For certain specific Microsoft products, such as SQL Server, customers that also purchased Software Assurance subscriptions with eligible on-premises perpetual Microsoft products could BYOL their licence to dedicated or shared hardware (ie the public cloud) via Microsoft's "License Mobility via Software Assurance" policy. See, License Mobility & Software Assurance | Microsoft Volume Licensing, accessed on 6 May 2024.
[15] This term is explained further at paragraph 2.28 below.
[16] A cloud provider submitted that customers were also able to BYOL specific Microsoft products to the shared hardware of non-Listed Providers that were part of Microsoft's Qualified Multitenant Hoster Program.
[17] [✂] response to [✂].
[18] A cloud provider submitted that customers who BYOL their licences to non-Azure dedicated infrastructure are not necessarily able to carry over the same rights that they would be able to if they migrated to Azure.
[19] [✂] submission to the CMA [✂].
[20] Updated Microsoft licensing terms for dedicated hosted cloud services, accessed 8 May 2024.

premises software licences could no longer deploy these existing licences on the dedicated hardware offered by Listed Providers.[21,22,23,24] That is, customers of Listed Providers could now no longer use their pre-existing licences for Microsoft software on a BYOL basis on dedicated hardware of Listed Providers.[25]

2.5 These changes did not apply to non-Listed Provider customers, or Listed Provider customers with existing software licences purchased before 1 October 2019.[26,27,28]

2.6 Whilst the 2019 changes do not impact the public cloud, it is useful to set these changes out as they introduce concepts such as the "Listed Providers" and the Azure Hybrid Benefit, which are relevant to some of Microsoft's licensing practices that we consider in this working paper.

2.7 Microsoft includes itself as a Listed Provider, so the conditions for Listed Provider customers also apply to Microsoft. However, we have been told Google and CISPE that Microsoft applies a different set of rules to itself and its own cloud offering.[29,30,31] In particular, we were told that Microsoft has excluded Azure from the same restrictions as other Listed Providers, and markets this exclusion as the "Azure Hybrid Benefit".[32]

2.8 According to Microsoft's website, the Azure Hybrid Benefit ('AHB') allows customers with existing on-premises Windows Server or SQL Server core licences with Software Assurance subscriptions to migrate these licences onto Azure at a discount.[33]

2.9 In reality, customers cannot simply 'migrate' their licences to Azure, instead Microsoft will give customers a discount when purchasing virtual machines on Azure that include Windows Server as the operating system or SQL Server as the database.[34] For Windows Server, the discount is generally determined to charge the customer the same amount that Microsoft charges for a virtual machine (VM) with Linux on Azure.[35]

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[21] [✂] response to [✂].
[22] Updated Microsoft licensing terms for dedicated hosted cloud services, accessed on 10 May 2024.
[23] [✂] submission to the CMA [✂].
[24] Nor could customers use their pre-existing licenses on shared hardware of Listed Providers, however this was the case prior to Microsoft's modification of its licensing terms.
[25] For completeness, customers could still use their pre-existing licence for certain products, such as SQL Server, that were eligible for License Mobility via Software Assurance, on a BYOL basis on either shared or dedicated hardware of a Listed Provider. And as noted above the changes did not apply to Listed Provider customers with existing software licenses purchased before 1 October 2019. [✂] submission to the CMA [✂]; [✂] submission to the CMA [✂].
[26] Updated Microsoft licensing terms for dedicated hosted cloud services, accessed on 10 May 2024.
[27] [✂] response to [✂].
[28] [✂] submission to the CMA [✂].
[29] https://www.microsoft.com/licensing/docs/view/Listed-Providers, accessed on 8 May 2024.
[30] [✂] response to [✂].
[31] [✂] response to Ofcom's information request [✂].
[32] [✂] response to [✂].
[33] Azure Hybrid Benefit - Hybrid Cost Calculator | Microsoft Azure, accessed on 8 May 2024.
[34] [✂] response to Ofcom's information request [✂].
[35] Microsoft submission to the CMA; Responses to the CMA's information requests [✂].

2.10 Microsoft submitted that it updated its licensing terms to correct a 'licensing loophole' that AWS and Google were exploiting and to better align Microsoft's existing on-premises licensing model with its licensing of solutions for use in the public cloud.[36] The 'licensing loophole' related to AWS and Google using customers' outsourcing rights to effectively create a public cloud service on dedicated hardware (ie the private cloud) using on-premises licensing models and pricing.[37,38]

2.11 Microsoft said that its 2019 changes to its licensing terms weren't applied to smaller cloud providers because their offering was closer to operating as a genuine outsourcing partner, and as such, they were a better fit for Microsoft's outsourcing model.[39]

2.12 We have also received submissions on how cloud providers were selected to be included as a Listed Provider and the likelihood of other providers being added:

(a) CISPE said that these Listed Providers are unilaterally identified by Microsoft and include Microsoft's major current competitors. It added that the list can be extended at Microsoft's own discretion to add new competitors as and when they become a threat.[40]

(b) Google said that the list is relatively arbitrary,[41] and that the Listed Providers are Microsoft's largest competitors and likely among the most capable of competitively constraining Microsoft.[42]

2.13 [✂].[43] [✂].[44] [✂].[45]

2.14 [✂].[46]

2022 changes

2.15 In the summer of 2021 Aruba S.p.A, OVHcloud, and the Danish Cloud Community complained to the European Commission that their customers faced higher prices and more licensing restrictions than Azure customers when trying to use

[36] Microsoft submission to the CMA [✂].
[37] Microsoft submission to the CMA [✂].
[38] 'Outsourcing rights' refers to rights included in Microsoft's software licensing terms which allowed customers to run their software on servers built, managed and run by 'outsourcers'. Microsoft submission to the CMA [✂].
[39] Microsoft submission to the CMA [✂].
[40] CISPE submissions to the CMA [✂].
[41] Note of meeting with Google [✂].
[42] Google response to the CMA's information request [✂].
[43] [✂] submission to the CMA [✂].
[44] [✂] submission to the CMA [✂].
[45] Note of meeting with [✂].
[46] [✂] submission to the CMA [✂].

Microsoft's licensed software on their cloud infrastructure, and also that they could not use some versions of Microsoft's products.[47]

2.16 Microsoft said that whilst it disagreed with the complaint, in response on 1 October 2022 it introduced licensing changes globally that were designed to enable customers to use subscription licences in any non-Listed Provider cloud free of any additional charge.[48,49] In a blog post announcing the changes, Brad Smith, Microsoft's President & Vice Chair, acknowledged that while not all of the European cloud providers' claims were valid, some of them were and that Microsoft would make changes soon to address them.[50]

2.17 While there were many detailed aspects to the changes, in particular, Microsoft introduced the 'Flexible Virtualisation Benefit', which enables customers of non-Listed Providers to use either their existing subscription or perpetual licences with Software Assurance on non-Listed Provider cloud infrastructure, whether dedicated or shared.[51,52]

2.18 Microsoft submitted to the CMA that these changes 'comprehensively resolved the concerns of all but the largest hyperscale cloud providers' and submitted that the complaint filed by Aruba, OVHcloud and the Danish Cloud Community had been withdrawn.[53] Microsoft said that the changes amounted to granting like-for-like economics on Microsoft software whether used on Azure or on another non-Listed cloud provider.[54]

2.19 Another change that was introduced with the 2022 changes was that, from 30 September 2025 onwards, customers will no longer be able to buy and deploy Microsoft licences from independent managed service providers if those providers host their services on Listed Providers' clouds.[55,56]

Using Microsoft software products on public cloud

2.20 This section explains the ways in which customers can use Microsoft's software on the public cloud, setting out: (i) the providers through which customers can obtain

[47] [✂] submission to the CMA [✂].
[48] Microsoft submission to the CMA [✂].
[49] See Microsoft's announcements: Microsoft responds to European Cloud Provider feedback with new programs and principles - EU Policy Blog; and New licensing benefits make bringing workloads and licenses to partners' clouds easier (microsoft.com), accessed on 5 June 2024.
[50] See, Microsoft responds to European Cloud Provider feedback with new programs and principles - EU Policy Blog, accessed on 5 June 2024.
[51] See, New licensing benefits make bringing workloads and licenses to partners' clouds easier (microsoft.com); New options for partner hosted cloud (microsoft.com), accessed on 8 May 2024.
[52] [✂] submission to the CMA [✂].
[53] Microsoft submission to the CMA [✂].
[54] Microsoft submission to the CMA [✂].
[55] See, New licensing benefits make bringing workloads and licenses to partners' clouds easier (microsoft.com), accessed on 5 June 2024.
[56] [✂] response to [✂].

the rights to use Microsoft software on the cloud; and (ii) the routes to obtaining the right to use Microsoft's software on non-Azure clouds, ie how customers can deploy their rights to use Microsoft software on non-Azure clouds.

The providers

2.21 There are a few providers through which customers can obtain the rights to use Microsoft software on the cloud:

(a) directly from Microsoft;

(b) through Cloud Solution Provider programme licensors (CSPPs) and CSP-Hosters; and

(c) through non-Azure cloud providers or independent managed service providers.

Directly from Microsoft

2.22 There are two ways through which customers can obtain rights to use Microsoft software products on the cloud directly from Microsoft. The first is to buy a licence for the Microsoft products through Microsoft's volume licensing programme and to BYOL that licence to the cloud.[57] The second is to purchase cloud services directly on Azure, incorporating the Microsoft products – this option does not require a licence as the products on Azure will be 'license-included'.[58]

Cloud Solution Provider programme licensors (CSPPs)

2.23 The Cloud Solution Provider programme is a reseller programme that enables partners to sell licences to Microsoft cloud solutions on Azure (rather than the Microsoft products themselves).[59] Over time, and subject to partner feedback, Microsoft has enabled Microsoft 365 Apps sold by CSPPs via this program to also be run in non-Listed Provider clouds.[60] In addition, Microsoft has enabled the resale of on-premises licences by CSPPs for certain Microsoft products, such as Windows Server, which a customer can BYOL onto the cloud.[61]

2.24 The CSP-Hoster programme is an expansion of the CSPP programme, as it enables partners to pre-build hosted cloud desktop and server solutions that can be sold alongside licences in the CSPP programme.[62] These solutions can be licence-included hosted solutions offered through CSPP or the opportunity for

[57] [✂] response to the CMA's information request [✂].
[58] [✂] response to the CMA's information request [✂].
[59] [✂] response to the CMA's information request [✂].
[60] [✂] response to the CMA's information request [✂].
[61] [✂] response to the CMA's information request [✂].
[62] [✂] response to the CMA's information request [✂].

customers to BYOL their licences to access partner-provided solutions, but either way the licences for the Microsoft software products must belong to the end client.[63]

Alternative cloud providers or independent managed service providers

2.25 Customers that want to use Microsoft's software products on non-Azure clouds may purchase cloud services incorporating the Microsoft products through an alternative cloud provider (whether Listed or non-Listed).[64,65] The alternative cloud provider acquires the licences to use the Microsoft software in its own cloud services through a Services Provider Licensing Agreement, or '**SPLA**'.[66]

2.26 Alternatively, a customer may also purchase cloud services incorporating the Microsoft products in a similar way but through an independent managed service provider, which instead of hosting the cloud services on its own cloud infrastructure, hosts its services on another cloud providers' cloud.[67] As noted above, from 1 October 2025, independent managed service providers will not be able to host these licences on Listed Providers' clouds.[68,69]

The routes

2.27 The route to obtaining the right to use Microsoft's software on non-Azure clouds depends on: (a) the type of provider the customer purchases the rights from (as discussed above); and (b) the Microsoft software product the customer wants to use. The two possible routes are:

(a) Bring your own licence (BYOL); and

(b) SPLA.

BYOL

2.28 BYOL is a term used when a customer relies on their on-premises Microsoft product licence to deploy the Microsoft product on the cloud (whether Azure, non-Azure, Listed, non-Listed, public or private).

[63] [✂] response to the CMA's information request [✂].
[64] [✂] response to Ofcom's information request [✂].
[65] [✂] submission to the CMA [✂].
[66] [✂] response to Ofcom's information request [✂]; [✂] submission to the CMA [✂]; [✂] response to the CMA's information request [✂].
[67] [✂] response to [✂].
[68] [✂] response to [✂].
[69] New licensing benefits make bringing workloads and licenses to partners' clouds easier (microsoft.com), accessed on 8 May 2024.

2.29 Since 2022, for the majority of Microsoft's products, provided customers also have the relevant software subscription licence, they can BYOL their on-premises Microsoft product licence to non-Listed Providers' public or private clouds.[70,71]

2.30 BYOL rights are included with certain subscription licences, which includes licences that are either covered by Microsoft Software Assurance or for which the underlying licence right is itself a subscription.[72] Software Assurance is a Microsoft subscription offering that customers can add to their underlying licences for certain benefits, including licence mobility, which *inter alia* allows customers to BYOL the software to non-Listed Provider clouds.[7374]

SPLA

2.31 Microsoft's SPLA programme provides cloud providers with the right to integrate certain Microsoft products into their own cloud services and offer those cloud services to their end customers directly.[75] The licence purchased under the SPLA covers the right to use the software on the hardware that the service provider uses to provide their services to their end customers.[76] From Microsoft's perspective, the service provider is Microsoft's customer – the service provider pays Microsoft for its usage monthly in arrears based on how much Microsoft software the service provider actually used, and in turn charges its own end customer. SPLA is not a reseller programme for Microsoft software.[77]

Differences between using Microsoft software products on Azure compared to on non-Azure clouds via SPLA

2.32 We received a number of submissions setting out various types of issues and concerns with regard to Microsoft's software licensing practices, relating both to price and non-price factors.

2.33 The price factors relate to:

(a) price differences between using Microsoft products on Azure compared to rivals' clouds as a result of BYOL restrictions (whereby customers cannot BYOL to Listed Providers' clouds);

[70] [✂] response to Ofcom's information request [✂].
[71] [✂] submission to the CMA [✂].
[72] [✂]; [✂] response to Ofcom's information request [✂].
[73] [✂] submission to the CMA [✂].
[74] See: Microsoft Volume Licensing - Microsoft Software Assurance and License Mobility & Software Assurance | Microsoft Volume Licensing, accessed on 13 May 2024.
[75] [✂] submission to the CMA [✂]; [✂] response to Ofcom's information request [✂].
[76] [✂] submission to the CMA [✂].
[77] [✂] submission to the CMA [✂].

(b) the AHB offered by Microsoft, which allows customers with on-premises core licences with active Software Assurance or qualifying subscription licences to use their on-premises Windows Server and SQL Server licences on Azure at a reduced cost;[78] and

(c) the prices charged to other cloud providers via the SPLA for licensing Microsoft software.

2.34 The non-price factors set out in the submissions are wide-ranging and include (but are not limited to) submissions that Microsoft refuses to supply certain of its products via the SPLA to other cloud providers (eg Microsoft 365, Desktop 10/11 and Visual Studio) and limiting security updates and features for Microsoft products that are being run in other clouds.

2.35 Our evidence gathering and analysis so far has focussed on the price factors. We are currently considering the evidence we have received on non-price factors and how this impacts our analysis.

[78] See Explore Azure Hybrid Benefit for Windows VMs - Azure Virtual Machines | Microsoft Learn and Azure Hybrid Benefit - Azure SQL Database & SQL Managed Instance | Microsoft Learn, accessed on 17 May 2024.

3. Market power in related software markets

3.1 This section sets out:

(a) why market power in software markets is relevant to our theory of harm;

(b) the frameworks we will use to define the relevant markets and assess the extent of any market power held by Microsoft in the supply of software; and

(c) evidence and analysis relevant to the assessment of market definition and market power in relation to each of the five relevant software markets.

Framework

Why market power in related software markets is relevant to the theory of harm

3.2 If Microsoft has limited or no market power in the software products relevant to the licensing concerns, customers that want to use rival cloud suppliers could switch to rival software products in response to the licensing practices, mitigating any effect of the licensing practices in potentially distorting customer choice towards Azure. We are therefore assessing the extent of any market power held by Microsoft in the relevant software products.

3.3 In this section we set out our framework for assessing the extent of any market power held by Microsoft in the supply of the relevant software products, structured as follows:

(a) considerations we have applied within the frameworks for market definition and market power; and

(b) cross-cutting considerations relevant to the sources of evidence used in our assessment of market definition and market power.

Market definition

3.4 The principles of our approach to market definition were set out in the Competitive Landscape working paper.[79] In this section we set out some additional considerations we have applied to market definition in relation to the relevant software products. We are considering the definition of the relevant software markets here as a useful tool to inform our subsequent emerging market power analysis.

[79] CMA, Competitive landscape working paper, section 4 – Market definition.

3.5 One consideration worth setting out is the interaction between market definition and various tools used in competition economics, namely the hypothetical monopolist test and the assessment of market power and, in particular, the issue of the 'cellophane fallacy'. The hypothetical monopolist test (HMT) is a tool which can be used to identify effective substitutes and to check that the market is not defined too narrowly. The principle behind it rests on defining a market as a product, or collection of products, a sole supplier of which could hypothetically impose a small but significant non-transitory increase in price (referred to as the SSNIP test). The test can help to identify the constraints that would prevent a hypothetical monopolist from exercising market power. In practice it may often be used as a conceptual framework rather than quantitatively.[80] When defining the related software markets, we considered this by reference to customer views on the closeness of substitutes.

3.6 The cellophane fallacy refers to a mistake in the context of trying to define the market which can happen in circumstances where an existing supplier already has market power (or may even already be a monopolist). Where this is the case, the existing supplier may already have raised prices above the competitive level, which makes alternative products that would be distant or poor substitutes at competitive prices look more like valid substitutes to a consumer. The cellophane fallacy therefore highlights that applying a SSNIP test starting from prevailing prices would incorrectly indicate that these poor substitutes should be included within the market. We have considered the extent to which this may limit the usefulness of the HMT in this case.

3.7 The precise delineation of the boundaries of a market may not always have a significant bearing on the assessment of the competitive effects of a feature of the market. If a relevant constraint is marginal as to whether it should be included in the market or not, the marginal constraint may be excluded (but accounted for as an out-of-market constraint) or included in the market (and treated as a factor that dilutes market shares and potentially causes the market power of some suppliers to be understated). In either circumstance, the competitive assessment would reach the same conclusion irrespective of where the 'line is drawn'. We have considered this issue in our assessment of each of the relevant products.

Market power

3.8 Market power can be understood as the ability of a firm to make profits while sustaining prices that are above competitive levels, or output or quality levels that are below competitive levels. A firm with market power might have the ability and

[80] CC3 (Revised), Guidelines for market investigations: Their role, procedures, assessment and remedies (publishing.service.gov.uk), paragraph 138.

incentive to harm the process of competition; for example, by weakening existing competition, raising entry barriers, or slowing innovation.

3.9 One factor which can contribute to market power is product differentiation. Where customers value that differentiation between products, and therefore may not be willing to switch to an alternative, products become poorer substitutes for each other.

3.10 We make the following general observations relevant to our assessment of market power.

(a) In our assessment, we have focused on whether Microsoft has unilateral market power in relation to the relevant software products. In doing so, we are carefully considering the strength of any competitive constraints that would be likely to prevent Microsoft from profitably sustaining prices above competitive levels. This includes within-market and out-of-market constraints.

(b) The extent to which a supplier has market power is not a binary question. We will therefore consider in our assessment the degree of market power held by a particular firm.

(c) While we are considering the extent of any market power held by Microsoft in relation to each software product individually, we are also considering whether there is any cumulative effect of Microsoft's position across all of the relevant software markets.

3.11 The extent of any market power held by Microsoft may originate from customers historically purchasing licences to use its software on-premises and building up an estate with Microsoft which could make it hard to change provider, for example because staff build up knowledge and skills in the Microsoft software product or using multiple Microsoft products that interoperate. As such, evidence relating to on-premises licences, including shares of supply, is relevant.

3.12 However, for the practices to effectively leverage market power into public cloud it must also be the case that customers cannot readily switch to alternative software products as they migrate to the cloud. Therefore, we consider any market power held by Microsoft across the two deployment types: on-premises and in the public cloud.

Evidence used in each assessment

3.13 Before setting out our assessment of market definition and market power for each of the relevant software products, we explain some cross-cutting points we considered in relation to the sources of evidence we will use as relevant across those sections. In particular, we note any caveats to the evidence and use these cross-cutting considerations when interpreting the evidence in the assessments

below. The sources of evidence are product characteristics, market shares, and customer and provider views.

Product characteristics

3.14 Substitutability between two products can be assessed by reference to the characteristics and purpose of the relevant products. Where two products are designed to meet the same customer requirement, they are more likely to be substitutable for each other. Where two products satisfy quite different needs, they may be weaker substitutes or not substitutable at all.

3.15 Nevertheless, we recognise that product characteristics should be interpreted cautiously as they do not map directly to substitutability. Two products may have different characteristics and still be substitutable, or two products may ostensibly satisfy the same broad requirement and yet not serve as particularly good substitutes from a customer's perspective.[81] We take these factors into account when considering product characteristics and alongside other types of evidence.

Market shares

3.16 In a competitive market with some level of concentration, market shares will tend to change over time as other market participants and new entrants capture or exchange market share. In general, a highly concentrated market might be an indicator that one or more firms hold unilateral market power.[82]

3.17 Market shares depend on market definition and therefore can be subject to the binary fallacy[83] as well as the cellophane fallacy. Market shares should therefore be interpreted in the context of those factors. We have noted in our assessment whether market shares may overstate or understate market power.

Customer and provider views

3.18 Where customers find it difficult to switch or substitute away from a supplier's product, this may give rise to market power on the supplier's part. For example, if it is hard for customers to switch, a firm may find it profitable to charge higher prices than it otherwise would have, because customers are less inclined to respond to

[81] An example of this may be seen in the advent of new, efficient technologies. While both technologies aim to meet the same requirement in principle, if the new technology does so with considerably greater efficiency, the older technology may no longer represent a good substitute once price and quality factors are taken into account. Another example may be where high switching costs or a weak customer response may mean that substitutability may be limited even in the presence of similar product characteristics.
[82] CC3 (Revised), Guidelines for market investigations: Their role, procedures, assessment and remedies (publishing.service.gov.uk), paragraph 187.
[83] The binary fallacy refers to a situation whereby an overemphasis on market definition can lead to the incorrect assumption that competitor products outside the relevant market exert no constraint on those within the market.

those higher prices by switching to alternatives. A lower propensity of customers to switch away increases the likelihood that higher prices will be more profitable.

3.19 For each of the relevant software products, we asked Microsoft's customers who use the products on the public cloud about the likelihood that they would switch away from Microsoft products if Microsoft was to raise its prices by 5% from the price customers are being charged today.[84] We used this evidence when assessing any market power Microsoft may have in the related software markets, to understand customer views on their likelihood of switching to alternative products and thus the degree of closeness of competition between Microsoft's products and those of its rivals. We did not use this evidence in the form of a SSNIP test to support the market definition assessments as we considered there was the possibility that the cellophane fallacy may limit the usefulness of this tool.

3.20 It is important to note that we asked customers to think about an increase in prices from the currently prevailing prices. If those prevailing prices have already been set at a level that is above the price level under fully effective competition, then responses to our request may signal a greater willingness to switch away than would be the case if asked about a price increase relative to competitive prices. It is not possible or pragmatic to ask customers what they would do if prices were increased from a hypothetical alternative price, not least because competitive prices may never be observable. Customers may find it difficult to consider a situation that is so hypothetical.

3.21 In light of the above, we have taken into account that the responses to our questions may understate the overall extent of market power. This would create some ambiguity in how to interpret responses, particularly if customers demonstrate a high willingness to substitute away from Microsoft products. However, where customers demonstrate a low willingness to substitute away from Microsoft products this is less likely to affect the interpretation of the responses.[85]

3.22 As set out above, the customer evidence we have collected is qualitative and so we have given a narrative summary of the key points that we consider emerge from the evidence.

3.23 Most of our evidence gathering has been focussed on demand side substitution factors. We have also gathered some evidence on supply side substitution such as views from Microsoft and other providers on barriers to entry into the relevant markets. We also asked Microsoft and other providers about competitive constraints they face in the relevant markets. Understanding the market from the

[84] In evidence gathering so far, we prioritised asking customers about their use of products on the public cloud. We may explore customers' use of products on-premises in subsequent analysis.
[85] Because the fact that they are understated would in that case be consistent with the same interpretation.

perspective of providers can help with interpretation of other forms of evidence (such as customer responses).

Market definition and market power assessments

3.24 In this section we:

(a) set out our emerging view on geographic market definition, which is common to all of the software markets considered and so is set out first; and

(b) discuss each of the Microsoft software products, which are (as set out at paragraph 1.81.8), Windows Server (which includes Active Directory functionality), Windows 10/11, SQL Server, Visual Studio and Microsoft 365, in turn, outlining:

(i) product market definition; and

(ii) market power assessment.

Geographic market

3.25 Geographic markets can be defined by considering the degree of substitutability, and in particular the extent to which suppliers can switch their areas of supply and the extent to which customers in one area may be served in another area.[86]

3.26 Market characteristics in the relevant markets point towards a global market definition as:

(a) the same product is sold internationally for each of the Microsoft products (with language differences);

(b) consumers can use the same Microsoft product licence across multiple countries; and

(c) barriers to the flow of goods are minimal as the Microsoft software can be downloaded anywhere.

3.27 Therefore, based on the evidence we have seen to date, our emerging view is that there is a global geographic market for all the relevant products.

[86] CC3 (Revised), Guidelines for market investigations: Their role, procedures, assessment and remedies (publishing.service.gov.uk), paragraph 147.

Microsoft Windows Server

Introduction

3.28 Server operating system (OS) software is designed to run a server's hardware and provide a platform for the use of application software. This is similar to how a desktop OS is used to run applications on a personal computer. For example, in a typical corporate use case, Microsoft Windows Server (Windows Server) can be installed on a central computer to coordinate and manage employees' access to shared storage, printers, or other devices.[87]

3.29 Microsoft Windows Server is one of the most popular types of server OS. Other types of server OS provide the same basic functionality and include variants of Linux and UNIX OSs. Customers using on-premises versions of server OSs may install it on a physical computer to which other devices on the same network connect. Customers using a cloud version of a server OS may install it on a virtual machine hosted in the cloud.[88]

3.30 There are various ways in which customers use Windows Server on a virtual machine 'in the cloud'.[89]

3.31 Active Directory is software that is included in Windows Server. It can be used to set up a so-called 'directory service'. In a network of Windows PCs or servers, a directory service can be thought of as a list of objects—for example names, users, company locations, printers, and lists—that describe who has access to what.

3.32 For the purposes of this investigation the relevant focal product is server OSs, as we consider this as the narrowest plausible candidate market Windows Server sits within.

3.33 In the following section, we consider whether the market should be widened to include desktop OSs. We then consider the extent of any market power held by Microsoft in relation to the relevant market.

[87] Panek C (2019), Windows Server Administration Fundamentals, Wiley.
[88] 'Virtual Machines (VMs) for Linux and Windows | Microsoft Azure', accessed on 15 April 2024.
[89] Ways Windows Server is used in the cloud include: (1) as a 'work group server', meaning an operating system that runs on a central network computer that provides services to office workers in their day-to-day work, such as file and printer sharing, security, and user identity management; (2) to set up Virtual Desktop Infrastructure (VDI) services; (3) to host customers' custom software applications, such as custom web applications; and (4) installed on an organisation's server to host off-the-shelf enterprise applications, such as Customer Relationship Management (CRM) software. References: Microsoft Corp. v Commission of the European Communities; Recommended configuration for VDI desktops | Microsoft Learn, accessed on 14 May 2024; [✂] response to [✂]; Responses to the CMA's information requests [✂].

Providers' submissions

3.34 We asked Microsoft and competitors whether there were certain use cases where a desktop OS could be used as a substitute for a server OS.

(a) Microsoft said this was possible in theory but believed it would not be a common scenario as it is unclear why any customer would install a desktop OS to control a much more powerful server. Microsoft also said both server OSs and desktop OSs can be used to provide desktop as a service offerings.[90]

(b) AWS and IBM are other providers of server OSs. AWS said desktop OSs are generally not substitutable for server OSs because server OSs are built for multiple users logging in at the same time while desktop OSs are not.[91]

(c) IBM said the degree of substitutability depends on the application and whether the application will sufficiently and effectively run on the desktop OSs, and considered the opposite is more common (server OSs can be used as a desktop OS).[92]

3.35 Views from providers suggest that the relevant market should not be expanded to include desktop OSs.

Customers' views

3.36 We asked customers that use Windows Server on the public cloud to identify any alternatives to Windows Server that they could use for the same purpose. Most customers we spoke to identified other server OSs.[93] No customers suggested that a desktop OS would serve as an alternative. This suggests that customers do not view them as substitutes on the demand side.

3.37 We asked the same customers (that use Windows Server) which other server OSs they used, if any. All customers submitted that they currently used both Windows Server and various Linux distributions (ie versions), suggesting that customers may value differentiated functionality of Linux.[94] We considered whether each server OS could be used for different purposes, and that evidence is explained below.

[90] Microsoft response to the CMA's information request [✂].
[91] AWS' response to the CMA's information request [✂].
[92] IBM response to the CMA's information request [✂].
[93] Responses to the CMA's information requests [✂].
[94] Responses to the CMA's information requests [✂].

Emerging view

3.38 Based on the evidence we have seen to date, our emerging view is that the relevant product market is the market for server OSs and that it should not be widened to include desktop OSs.

3.39 A market no wider than the market for server OSs means Linux/UNIX server OS distributions would be included within the market. However, as set out below, these products are differentiated, which may weaken the extent to which they are substitutes. We consider this further in our market power assessment below.

Market power

Product characteristics

3.40 Evidence we have seen so far suggests that Windows Server is differentiated from other server OSs. One of the main differences is that Windows Server is proprietary, and Linux distributions are open-source.[95] Features of open-source sever OSs include that they tend to be more flexible and are supported by the open-source developer community in terms of identifying and fixing bugs. Individual distributions of Linux or UNIX may be free or paid for, as shown in the table below.

Table 3.1: Types of open-source server OSs (paid and free)

	Linux	*UNIX*
Paid for	• Ubuntu (Ubuntu Pro for more than 5 machines)[96] • SUSE Linux Enterprise Server[97] • Red Hat Enterprise Linux[98] • Amazon Linux (included within Amazon EC2 and AWS charges)[99]	• IBM AIX[100] • Oracle Solaris[101]
Free	• Debian[102] • CentOS Linux[103]	

Source: CMA analysis

3.41 To interpret whether product differentiation by functionality may act as a source of market power, we considered customers' reasons for choosing the Microsoft products to understand whether customers value the differences, ie whether these differences are relevant drivers of choice. We asked customers to explain the

[95] Dalheimer, MK and Welsh, M (2005), Running Linux, 5th Edition, O'Reilly.
[96] Ubuntu Pro | plans and pricing | Ubuntu, accessed on 09 April 2024.
[97] Shop Online: Linux Enterprise Server | SUSE, accessed on 09 April 2024.
[98] Buy Red Hat Enterprise Linux Server, accessed on 09 April 2024.
[99] Amazon Linux 2 FAQs, accessed on 09 April 2024.
[100] IBM® Power pricing and configuration, accessed on 09 April 2024.
[101] Free with Oracle cloud product (Oracle Solaris 11.4 - Oracle - Oracle Cloud Marketplace, accessed on 09 April 2024) and paid for on non-Oracle hardware (Product Category (oracle.com), accessed on 09 April 2024).
[102] Debian -- About Debian, accessed on 09 April 2024.
[103] About CentOS, accessed on 09 April 2024.

reasons they chose Windows Server rather than the alternatives they listed. Some customers provided reasons that relate to functionality of Windows Server.[104]

(a) Many customers we spoke to said other software or applications require it, or integrate with it.[105]

(b) One customer said security and technical support was an additional reason.[106]

3.42 In light of the above, our current view is that Windows Server is differentiated from the next-closest products and therefore product differentiation may act as a source of market power with respect to Windows Server.

Market shares

3.43 Windows Server and Linux distributions are differentiated products. In cases with differentiated products, market shares may overstate the degree of competition between players in the market. If Linux distributions and Windows Server are used for very different purposes, then these shares may be misleading.[107] If a customer uses Linux distributions for the majority of its work, but nevertheless uses Windows Server for a significant proportion of that work and is unlikely to switch away from Windows for that segment of demand, then there is scope for Microsoft to hold significant market power over that segment of demand (even if the share is relatively modest).

3.44 Microsoft provided us with two datasets that describe the shares of supply of Windows Server and other server OSs. In particular, the datasets show:

(a) server OS installed base forecast (published 2022) – which we understand to be a measure of historical demand, or existing server OSs in use; and

(b) server OS shipments forecast (published 2022) – which we understand to be a measure of new demand for server OSs.[108]

3.45 Before setting out shares of supply based on these datasets, we make the following observations relating to the data:

(a) we are continuing to gather information on the methodology with which these shares were calculated, and further information may affect the interpretation of these shares; and

[104] Other reasons are discussed below in 'Customers' views'.
[105] Responses to the CMA's information requests [✂].
[106] [✂] response to the CMA's information request [✂].
[107] Customer use cases for Windows Server and Linux are explored further in 'Customers' views' below.
[108] [✂] response to the CMA's information request [✂].

(b) the Linux category describes a family of OSs, which comprises many different companies, each providing their own Linux distribution. The market share data we currently have aggregates those firms to consider the Linux family's share overall. Given those firms all share a common base OS, we might expect those firms to be closer substitutes for each other than for Windows Server. In subsequent analysis we may segment by individual Linux distributions, which would give a more representative picture of who the largest players are in the server OS market.

3.46 Table 3.2 shows global market shares for server OSs for all deployments (cloud and non-cloud).

Table 3.2: Market shares for server operating system, global basis, 2020 – 2022

%

	Installed base			*Shipments*		
	2020	*2021*	*2022*	*2020*	*2021*	*2022*
Microsoft	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Linux	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: [✂], [✂] and CMA analysis.

3.47 The data shows that in 2022, Windows had a high share of the 'installed base' data set at [✂] which was similar to Linux's share. Linux had the highest share of the 'shipments' data set [✂] [✂]. Linux's share of both data sets grew slightly over the period 2020-2022.

3.48 Because the shipments data set is a measure of new demand for server OSs, this could suggest Microsoft's overall market share could diminish in future, as people increasingly move towards Linux distributions for new workloads. Whether this also means any market power Microsoft might have will also reduce over time depends in part on the extent to which customers have use cases for which there are no alternatives to Windows Server.

3.49 Microsoft and Google both submitted evidence on shares of Windows Server workloads but with a key difference: Microsoft considered shares on the cloud and Google considered shares on-premises.

(a) **Shares on the cloud:** Microsoft submitted the majority (ie, about 75%) of cloud-computing applications are based on open-source solutions like Linux, and not on Microsoft products like Windows Server. Microsoft said this matters because for the vast majority of workloads that customers migrate to the cloud, the customer does not need any Microsoft software, and

Microsoft's licensing practices are irrelevant to those customer opportunities.[109]

(b) The [✂] server OS installed base forecast described above can be segmented by deployment type (cloud and non-cloud[110]). When segmenting for cloud deployments only, it shows that in 2022, Linux distributions had [✂] share of global server OSs and Windows had [✂]. This shows that the Linux family's share is also high using a share of deployments rather than share of applications measure.

(c) **Shares on-premises:** One cloud provider provided analysis which outlines that Windows Server workloads make up [✂] of all spending on on-premises workloads running in the UK and it therefore considers that a significant proportion of the addressable demand for IT infrastructure services (ie, both on-premises and in the cloud) is made up of workloads in which Windows Server plays a part.[111]

(d) The server OS installed base forecast described above also shows that Windows' share is very high on-premises. When segmenting for on-premises deployments, it shows that in 2022, Windows had [✂] share of global server OSs and Linux distributions had [✂].

3.50 This evidence suggests that for existing (installed) server deployments, Microsoft has the largest share of the on-premises market and Linux distributions collectively have the highest share of the cloud market. As explained above, market shares on-premises are relevant to the assessment of any market power Microsoft may have.

3.51 When products are somewhat differentiated, market shares might understate a product's degree of market power. As described above, our emerging view is that Windows Server is differentiated from the next-closest products, so these shares might understate Microsoft's market power. The data suggests Windows Server represents a significant share (but non-majority) of all customers using servers on the cloud. If Microsoft was to retain strong market power over those customers, that would still give significant scope to influence a material proportion of server OS demand.

[109] Microsoft submission to the CMA [✂].
[110] In this context we have interpreted 'cloud' to mean operating systems installed on virtual machines hosted in a public cloud, and 'non-cloud' to refer to other types of installation including on-premises.
[111] [✂] response to the CMA's information request [✂].

Customers' views

3.52 We asked customers that use Windows Server on the public cloud to identify any alternative products to Windows Server they could use for the same purpose.

(a) Most customers we spoke to listed server OSs from the Linux family, for example Ubuntu, SUSE, RedHat, Amazon Linux, CentOS and Debian.[112]

(b) One said server OSs from the UNIX family, for example IBM AIX and Oracle Solaris,[113] and a few said VMWare.[114]

(c) Some customers said there were no alternatives.[115] These customers all have some use of Linux, so we infer they mean no alternatives for certain use cases (rather than all).

3.53 This shows the most popular alternative family of server OSs is the Linux family.

3.54 We asked customers to explain the reasons they chose Windows Server rather than the alternatives they listed, and to explain to what extent it would be likely or unlikely for them to switch away from Windows Server to an alternative they mentioned, if the price of Windows Server rose by 5%.

3.55 Reasons customers gave for choosing Windows Server included: staff skills, technical requirements, required by third party software providers or other software, integrations with other Microsoft software, support provided by Microsoft, required to run a legacy code base and 'market dominance'. The need to forgo software the customer currently uses or retrain its staff on Linux seem to be significant barriers to switching.[116]

3.56 Most customers said they would be unlikely to move away from Windows Server in response to a 5% price rise.[117] Reasons included it is required for some software, cost to re-build custom applications, requirement to re-train staff, loss of functionality, and integrations with other Microsoft products.

3.57 Some customers indicated their preference was to move away from Windows Server regardless of a 5% price rise.[118] Reasons included wanting to move individual workloads to Linux to improve portability, or that Linux is their preferred type of server OS.

[112] Responses to the CMA's information requests [✂].
[113] [✂] response to the CMA's information request [✂].
[114] Responses to the CMA's information requests [✂].
[115] Responses to the CMA's information requests [✂].
[116] Responses to the CMA's information requests [✂].
[117] Responses to the CMA's information requests [✂].
[118] Responses to the CMA's information requests [✂].

(a) We consider that customers that already have a preference to move away from Windows Server regardless of a price rise are not really 'Windows Server customers' in the counterfactual (ie they would not be consuming Windows Server in the absence of the price rise). Their responses are still relevant, but we should put more weight on customers that do use Windows Server in the counterfactual.

(b) Those customers switching away told us they were likely to still have some workloads on Windows Server. One customer explained it was unlikely it would move away from Windows Server entirely due to software requirements.[119] It may be the case that some customers have to use Windows Server for some workloads – this is explored further below (see paragraph 3.61).

3.58 We asked customers that also use a server OSs other than Windows Server to explain which one(s) they use.

(a) All of the customers we spoke to that were customers of Windows Server also used one or more Linux distributions alongside Windows Server.[120]

(b) The reasons for choosing Linux included cost, efficiency, reliability, availability, and compatibility with certain workloads/applications.[121]

3.59 The customers' responses show that the use of Linux distributions is widespread among the customers that responded to our request for information. To understand the extent of the competitive constraint posed by Linux distributions on Windows Server, we asked customers to tell us how important different types of server OSs (Windows Server, Linux, other types of server OSs) were to their overall business IT requirements.

(a) Almost all customers we spoke to described Windows Server as very important, using words like key, critical, fundamental or foundational.[122]

(b) Most customers also said Linux distributions were important,[123] though some of these said Linux was less important than Windows Server.[124]

(c) Other server OSs (other than Windows or Linux) were most often said to be not important.

[119] [✂] response to the CMA's information request [✂].
[120] Responses to the CMA's information requests [✂].
[121] Responses to the CMA's information requests [✂].
[122] Responses to the CMA's information requests [✂].
[123] Responses to the CMA's information requests [✂].
[124] Responses to the CMA's information requests [✂].

3.60 We asked customers to tell us which types of workloads run on each type of server OS (Windows Server, Linux, other types of server OSs), which business functions these workloads perform and whether the customer considers them to be critical to the operation of its business. Customers had a mixture of different but important reasons for using both Windows and Linux distributions, and it was difficult to identify patterns of usage from the responses. Examples of workloads customers run on Windows Server include authentication of Windows applications, SQL Server, web applications, various business applications, file servers and cyber security.[125] This shows there are a wide variety of reasons for using Windows Server.

3.61 We asked customers to tell us why they chose each type of server OS (Windows Server, Linux, other types of server OSs). The most frequently given reasons for choosing Windows were that it was required for other software or applications to run, or because staff were skilled in it.

(a) Some customers' reasons referred to Windows being used for a long time either by them or in their industry.[126] For example one customer described itself as being a 'Windows shop'.[127]

(b) Only one customer mentioned reasons related to functionality (other than software compatibility).[128]

(c) Reasons customers gave for choosing Linux distributions included cost effectiveness, corporate preference, required for software, flexible, open-source/ support from open-source community.[129]

3.62 We asked customers to tell us, when deciding where to locate new workloads, whether they would consider each server OS (Windows Server, Linux, other types of server OSs) and why.

(a) Most customers would consider both Windows Server and Linux for new workloads.[130] However, reasons for considering each were often different, for example one customer would consider Windows Server because staff are skilled in it, Debian because it is well supported and understood by staff, Ubuntu for AWS, and Red Hat Enterprise Linux if required by a workload.[131]

[125] Responses to the CMA's information requests [✂].
[126] Responses to the CMA's information requests [✂].
[127] [✂] response to the CMA's information request [✂].
[128] [✂] response to the CMA's information request [✂].
[129] Responses to the CMA's information requests [✂].
[130] Responses to the CMA's information requests [✂].
[131] [✂] response to the CMA's information request [✂].

(b) A few customers said they prefer Linux,[132] while some prefer Windows Server.[133] A few customers said they choose the server according to the use case or workload.[134]

3.63 We asked customers to tell us what proportion of workloads run on each type of server OS (Windows Server, Linux, other types of server OSs) as a percentage of all workloads.[135] We categorised responses into four quartiles.[136]

(a) No customer had more than 25% of workloads deployed on a server OS other than Linux or Windows, supporting that they are the leading two.

(b) In terms of split between Windows and Linux, most customers had at least 25% of their workloads running on Windows. Linux usage was either focused in the bottom quartile (customers have less than 25% of their workloads running on Linux distributions) or in the third quartile (customers have between 50-74.9% of their workloads running on Linux distributions).

3.64 In the round, this customer evidence suggests that Windows and Linux distributions are the leading options for server OSs and there is a mix of approaches and preferences among customers in terms of which they prefer to use and why. Most customers told us they would be unlikely to switch away from Windows Server in response to a 5% price rise, that there are potential barriers to switching such as the need to forgo software the customer currently uses or retrain staff, and that Windows Server is very important to their overall business IT requirements.

Providers' submissions

3.65 We asked Microsoft to identify its main competitors in supplying Windows Server. Microsoft listed other types of server OS.[137]

3.66 We asked Microsoft to explain the three most important alternative products to Windows Server and to what extent these impose a competitive constraint on Windows Server. Microsoft said that [✂].[138]

3.67 We asked Microsoft to explain what barriers (if any) a typical customer would face if it wanted to switch to an alternative server OS product and how a customer could address or minimise these. Microsoft considers that there is generally no 'typical customer' for these products and said that customers' switching

[132] Responses to the CMA's information requests [✂].
[133] Responses to the CMA's information requests [✂].
[134] Responses to the CMA's information requests [✂].
[135] Responses to the CMA's information requests [✂].
[136] The first quartile contained customers where 0-24.9% of their workloads are run on the relevant server, second quartile for 25-49.9% etc.
[137] Microsoft response to the CMA's information request [✂].
[138] Microsoft response to the CMA's information request [✂].

considerations would vary depending on the customers' particular characteristics and preferences.[139]

3.68 We asked Microsoft to explain which types of customers' workloads have historically been deployed on Windows Server. Microsoft said Windows Server can support any number of applications and workloads for on-premises customers. One significant area of its usage would be running other Microsoft Server applications, such as Exchange Server or SharePoint Server.[140]

3.69 We asked Microsoft to explain how it monitors the competitive conditions, market shares and competitors in relation to the supply of Windows Server in the UK and provide example documents. Microsoft's response included a survey on the decision making of server OS purchasers. Survey responses about an organisation's future plans regarding deployment of existing Windows Server workloads showed that [✂] would stay on Windows Server rather than switch to Linux. [141] This suggests that for existing Windows Server workloads, it is more likely than not that customers will keep using them on Windows Server rather than switch to an alternative server OS.

3.70 We asked IBM and AWS to identify the main competitors for the supply of their products that compete with Windows Server.

(a) IBM listed other types of server OSs.[142]

(b) AWS said its offering, Amazon Linux, is not proprietary, it wants its customers to use the OS of their choice and did not list any competitors.[143]

3.71 We asked AWS which of its products compete with Windows Server and to describe the main customer use cases. AWS said Linux is currently the most commonly used alternative to Windows Server, which AWS offers in the form of Amazon Linux, a free open-source operating system. AWS said its customers can choose to use other Linux builds as well, such as Ubuntu, Red Hat, and Debian, and it wants its customers to be able to use the operating system of their choice in conjunction with AWS' services. [144]

3.72 [✂]. This is an example of a use case where a customer may not have an alternative to Windows Server.

3.73 We asked IBM which of its products compete with Windows Server and why, and to describe the main customer use cases. IBM, which owns Red Hat, listed Red

[139] Microsoft response to the CMA's information request [✂].
[140] Microsoft response to the CMA's information request [✂].
[141] Microsoft response to the CMA's information request [✂]; and CMA analysis. We note there may be limitations with this survey.
[142] IBM response to the CMA's information request [✂].
[143] AWS response to the CMA's information request [✂].
[144] AWS response to the CMA's information request [✂].

Hat Enterprise Linux (RHEL), and described it as an open-source OS used for running commercial workloads on physical or virtual servers. IBM said RHEL runs many of the same commercial applications as Microsoft Server. They also both support Microsoft .NET, a software application development framework.[145]

3.74 We asked IBM to list competitors to any Red Hat products that compete with Microsoft Server OS, and to describe the most important factors of competition. IBM said RHEL's main competitors would be other types of server OSs. IBM said the most important factors of competition are supported applications, price, life cycle and support.[146] The list of competitors is a similar list to those specified by Microsoft as competitors to Windows Server.

3.75 We asked Microsoft and other providers of server OSs to describe the extent to which factors such as regulatory requirements, development cost (sunk and ongoing) and economies of scale act as barriers to entry or expansion for its supply of Windows Server or products that compete with Windows Server.

(a) Microsoft said that, in relation to cloud OSs, there are no material barriers to entry. It said historically the primary barrier to supplying an OS in an on-premises environment was ensuring that there are sufficient applications to run on the OS to meet the customer's needs.[147]

(b) One server OS provider said Windows Server is viewed by customers as a critical software and seen by many as a 'must have' service and the ability to access this software often affects a customer's decision whether or not to use a particular IT provider.[148]

(c) Another server OS provider said barriers exist to an extent in terms of regulatory requirements, cost, economies of scale and distribution.[149]

3.76 This suggests there are some barriers to entry and expansion, and they differ depending on the provider.

Emerging views

3.77 Based on the evidence we have seen to date, our emerging view is it is likely that Microsoft has a significant degree of market power in relation to Windows Server. This is because evidence suggests Windows Server is differentiated from other server OSs, Microsoft has a high share of the market for installed server deployments across cloud and on-premises deployments combined (noting Linux

[145] IBM response to the CMA's information request [✂].
[146] IBM response to the CMA's information request [✂].
[147] Microsoft response to the CMA's information request [✂].
[148] [✂] response to the CMA's information request [✂].
[149] [✂] response to the CMA's information request [✂].

distributions collectively have a high share of deployments on cloud[150]), and customer evidence suggests most customers would be unlikely to switch away from Windows Server in response to a 5% price rise.

3.78 We consider that this emerging conclusion would not be different, even if we had defined the market more widely to include desktop OS. This is because based on the evidence we have seen to date, our emerging view is that Microsoft also has a degree of market power in the market for desktop OS. In addition, customer evidence suggests customers would be unable or unwilling to switch away from Windows Server regardless of frame of reference.

Microsoft Windows 10/11

Introduction

3.79 Desktop OS software is designed to run a personal computer's hardware and provides a platform for the use of application software.[151]

3.80 Microsoft Windows 10/11 (Windows 10/11) is the most popular desktop OS. Other types of personal computer (PC) OS provide this same basic functionality and include macOS, ChromeOS and deployments of Linux OS eg Unbuntu. We understand that there are also a variety of use cases in which customers use Windows 10/11 in combination with public cloud infrastructure services. For example, we have seen evidence that:

(a) a customer who uses a virtual desktop infrastructure (VDI) cloud service, such as AWS' WorkSpaces, can allow its staff to access a Windows 10/11-based virtual desktop;[152] and

(b) a version of Windows 10/11 can be installed on a cloud-hosted virtual machine in a 'multi-session' configuration, meaning that multiple users can concurrently use a single instance of the OS.[153]

3.81 For the purposes of this investigation the relevant focal product is desktop OSs as we consider this as the narrowest plausible candidate market Windows Desktop 10/11 sits within.

3.82 In the following section, we consider whether the market should be widened to include OSs for servers or for mobile devices. We then consider the extent of any market power held by Microsoft in relation to the relevant market.

[150] Though this should be interpreted in light of the context provided at paragraph 3.45(b).
[151] [✂] response to the CMA's information request [✂].
[152] What is Amazon WorkSpaces? - Amazon WorkSpaces, AWS online documentation, accessed on 15 April 2024.
[153] [✂] submission to the CMA [✂]; [✂] submission to the CMA [✂], and 'Windows 10 or Windows 11 Enterprise multi-session remote desktops', accessed on 15 April 2024.

Providers' submissions

3.83 We asked Microsoft whether there were certain use cases where a server or mobile OS could be used as a substitute for a desktop OS. Microsoft said server OSs can be used to provide 'Desktop-as-a-Service' offerings (ie, virtual desktops).[154] Microsoft also said mobile OSs could be seen as a substitute for desktop OSs, eg by a developer of a web browser because web browsing can be done on both types of OSs.[155] This is in contrast to the customer evidence (below) which suggests enterprise customers do not see desktop and mobile OSs as substitutes.[156]

3.84 IBM said it was possible for a server OSs to be a substitute for a desktop OS and gave the example of Windows Server providing virtual desktops to many users.[157]

Customers' submissions

3.85 We asked customers that use Windows 10/11 on the public cloud to identify any alternatives to Windows 10/11 that they could use for the same purpose. Customers identified other desktop OSs (Linux, MacOS and ChromeOS).[158] MacOS was the most frequently mentioned alternative. Some customers said there were no alternatives.[159]

3.86 No customers suggested that a server OS would serve as an alternative. One customer suggested Android – we understand this was for a specific use case for a segment of staff. This suggests that customers do not generally view server and mobile OSs as substitutes for desktop OSs on the demand side.

Emerging views

3.87 Customer responses indicated that customers would not be able to switch from a desktop OS to a server or mobile OS easily, suggesting there is limited demand side substitution from desktop OSs to server or mobile OSs. In addition, the functionality and intended use for each of these types of OSs is very different to a desktop OS. For example. Microsoft said desktop OSs are used to manage the

[154] Microsoft response to the CMA's information request [✂].
[155] Microsoft response to the CMA's information request [✂].
[156] We note that Microsoft viewed its PC OS as distinct from its other operating systems in the European Commission Digital Markets Act designation decision.
[157] IBM response to the CMA's information request [✂].
[158] Responses to the CMA's information requests [✂].
[159] Responses to the CMA's information requests [✂].

hardware of a PC device and allows applications to run on it, and server OSs manage the hardware of a server device and allows applications to run on it.[160]

3.88 Based on the evidence we have seen to date, our emerging view is that the relevant product market is the market for desktop OSs and should not be further widened to include server or mobile OSs.

3.89 A market no wider than the market for desktop OSs means MacOS/ChromeOS would be included within the market. However, as set out below, these products are differentiated, which may mean they are weak substitutes. We consider this further in our market power assessment below.

Market power

Product characteristics

3.90 At a product level, all desktop OSs perform the same basic functions, providing software to run a personal computer. Evidence suggests there is some differentiation between different types of desktop OS.

3.91 Apple's MacOS is differentiated from Windows 10/11 because it comes preinstalled on Apple hardware, is proprietary, and may be harder to run on non-Apple products.[161]

3.92 A Microsoft internal document described points of difference between Windows 11 and MacOS, such as [✂].[162]

3.93 Google's ChromeOS is differentiated from Windows 10/11 because it comes pre-installed on Chromebooks and generally minimal data can be stored on the hardware. Applications are accessed through the web browser, and not all applications can be run.[163]

3.94 The same Microsoft internal document as mentioned above (paragraph 3.92) described points of difference between Windows 11 and ChromeOS, such as [✂]. It did not compare Windows 11 to any Linux distributions.[164]

3.95 Some customers told us using MacOS or ChromeOS would require specific types of hardware.[165]

[160] Microsoft response to the CMA's information request [✂].
[161] Lakka, S et al. (2012), 'Competitive dynamics in the operating systems market: Modelling and policy implications', Technological Forecasting & Social Change, pages 88-105.
[162] Microsoft response to the CMA's information request [✂].
[163] Miller, MR (2019), My Google Chromebook, 4th Edition, Que Publishing, page 12.
[164] Microsoft response to the CMA's information request [✂].
[165] Responses to the CMA's information requests [✂].

3.96 Various Linux distributions also provide desktop OS. These are open-source, can be installed on a variety of hardware and may be free or contain proprietary software.[166] A customer said they may need to re-architect applications when moving to a Linux desktop OS from Windows 10/11, if they could run on a non-Windows OS at all.[167]

3.97 The same Microsoft internal document as mentioned above (paragraph 3.92) did not compare Windows 11 to any Linux distributions.[168] One interpretation of this could be that Microsoft considers Windows 11 to be substantially differentiated from them.

3.98 To interpret whether product differentiation by functionality may act as a source of market power, we used customers' reasons for choosing the Microsoft products to understand whether customers value the differences, ie whether these differences are relevant drivers of choice.

3.99 We asked customers to explain the reasons they chose Windows 10/11 rather than the alternatives they listed. Some customers responded that they value the additional functionality of Windows 10/11.

(a) Several customers said a reason was support/compatibility/integration with a large ecosystem of applications.[169]

(b) Several customers said a reason was usability/ user familiarity.[170]

(c) One customer said a reason was using the virtualised and hosted desktop capability,[171] one said the features suit its intended use,[172] and another said a reason was security capabilities.[173]

3.100 In light of the above, our current view is that Windows 10/11 is highly differentiated from the next-closest products and therefore product differentiation may act as a source of market power with respect to Windows 10/11.

Market shares

3.101 Microsoft provided us with data which describes the shares of supply of Windows 10/11 and other desktop OSs.[174]

[166] Dalheimer, MK and Welsh, M (2005), Running Linux, 5th Edition, O'Reilly.
[167] [✂] response to the CMA's information request [✂].
[168] Microsoft response to the CMA's information request [✂].
[169] Responses to the CMA's information requests [✂].
[170] Responses to the CMA's information requests [✂].
[171] [✂] response to the CMA's information request [✂].
[172] [✂] response to the CMA's information request [✂].
[173] [✂] response to the CMA's information request [✂].
[174] Microsoft response to the CMA's information request [✂].

3.102 Before setting out shares of supply based on this dataset, we make the following observations relating to the data:

(a) we are continuing to gather information on the methodology with which these shares were calculated, and further information may affect the interpretation of these shares; and

(b) as described above, our emerging view is that Windows 10/11 is differentiated from the next next-closest products, so these shares might understate Microsoft's market power.

3.103 Table 3.3 shows global market shares for desktop OSs.

Table 3.3: Market shares for desktop operating system, global basis, 2020 – 2022

	%		
	2020	*2021*	*2022*
Microsoft	[✂]	[✂]	[✂]
Other	[✂]	[✂]	[✂]

Source: ✂ and CMA analysis.

3.104 This shows that Microsoft's share of the desktop OS market is at least [✂]. This share has remained stable over the period 2020-2022, is very high and significantly higher than the next-closest competitor, which is MacOS.

Customers' submissions

3.105 We asked customers to (i) identify any alternative products to Windows 10/11 they could use for the same purpose and (ii) explain the reasons they chose Windows 10/11 rather than the alternatives they listed. A caveat to these responses is that not all customers answered all questions.

(a) Most customers we spoke to said they could use Linux and/or MacOS for the same purpose as Windows 10/11.[175] Some said there were no alternatives.[176]

(b) As explained above in 'Product characteristics', reasons provided by these customers for choosing Windows 10/11 included: staff preference and skillset, support for required applications, compatible with a wide range of hardware, required by other applications and significant cost to move to an alternative. These reasons suggest there could be barriers to switching such as switching costs and lack of available alternatives.

[175] Responses to the CMA's information requests [✂].
[176] Responses to the CMA's information requests [✂].

3.106 We asked customers to explain to what extent it would be likely or unlikely for them to switch away from Windows 10/11 to an alternative they mentioned, if the price of Windows 10/11 rose by 5%.

(a) Most customers would be unlikely to switch away from Windows 10/11 in response to a 5% price rise for reasons such as effort and cost of re-architecture, re-training, loss of functionality and lack of support for some applications.[177]

(b) Some customers already use, or are considering moving to, alternatives, regardless of a price rise.[178] For example, some use MacOS for some staff or use cases, or were considering allowing users to bring their own device in future.

3.107 We asked customers to what extent they would be able to deploy their business applications on a desktop OS other than Windows 10/11.

(a) Most customers said they would be able to deploy some of their applications on an alternate desktop OS.[179]

(b) Customers told us that some applications are more likely to be compatible with other desktop OSs than others. Applications that tend to be easier to move are software as a service (SaaS) or browser-based or are sold by a major vendor .[180] Applications that tend to be harder to move include those developed in house or by a smaller third party, Internet Explorer based and those requiring client installation.[181]

(c) No customers said they would be able to deploy all of their applications on an alternate desktop OS. That these customers use some applications that can only be deployed on Windows desktop OSs may explain why most customers reported they would be unlikely to switch away from Microsoft Windows OS. This suggests there is a lack of available alternatives for these customers.

3.108 We also asked customers that told us they used Linux or MacOS desktop OSs, why they chose these and if there are specific workloads they are suitable for.

(a) Only one customer told us that they permit the use of Linux desktop in 'bring your own device' scenarios[182] and some use MacOS.[183] Common reasons for choosing the alternative desktop OSs were: staff preference, needing to

[177] Responses to the CMA's information requests [✂].
[178] Responses to the CMA's information requests [✂].
[179] Responses to the CMA's information requests [✂].
[180] Responses to the CMA's information requests [✂].
[181] Responses to the CMA's information requests [✂].
[182] [✂] response to the CMA's information request [✂].
[183] Responses to the CMA's information requests [✂].

develop applications to run on Apple devices, and needing to run Adobe Creative suite of applications.[184] Some customers said MacOS was a small share of their overall desktop OS usage.[185]

Providers' submissions

3.109 We asked Microsoft to identify its main competitors in supplying Windows 10/11. Microsoft listed other forms of operating systems across different device types including desktop and mobile.[186]

3.110 We asked Microsoft to explain how it monitors the competitive conditions, market shares and competitors in relation to the supply of Windows 10/11 in the UK and provide example documents. Microsoft's response included the following relevant extracts in relation to its view of competitors to Windows 10/11.

(a) One document showed evidence of limited substitutability between Windows 11 and Chrome OS: '[✂]'[187]

(b) The same document showed there are costs of moving away from Windows 11: [✂]'[188]

(c) This shows that Microsoft is aware of the costs to customers of switching to alternatives, [✂] and switching would incur additional licence costs.

3.111 We asked Microsoft to explain the three most important alternative products to Windows 10/11 and to what extent these impose a competitive constraint on Windows 10/11.[189]

(a) Microsoft said it does not track a list of the desktop OS products that provide the most important competitive restraint on Windows 10/11 and that different customers will have different preferences for OS.

(b) Microsoft said historically with on-premises deployments, a key consideration for any OS was whether there were a significant number of third party applications available to run on that OS, and that operating systems across different device types all have sufficient applications to be strong substitutes for Windows.

[184] Responses to the CMA's information requests [✂].
[185] Responses to the CMA's information requests [✂].
[186] [✂] response to the CMA's information request [✂].
[187] Microsoft response to the CMA's information request [✂].
[188] Microsoft response to the CMA's information request [✂].
[189] Microsoft response to the CMA's information request [✂].

(c) This shows Microsoft recognises the role of network effects in software, as customers will be drawn towards an OS that is able to run a wide variety of applications.

(d) Microsoft said that the nature of the cloud is for developers to create their own solutions running in the cloud and the availability of other applications running on that same operating system is much less relevant.

3.112 We asked Microsoft to explain what barriers (if any) a typical customer would face if it wanted to switch to an alternative product and how a customer could address or minimise these. Microsoft said migrating to other OSs or to other clouds will depend on the specifics of the customer.[190] However, customer evidence highlighted various barriers to switching including cost and staff retraining.

3.113 We asked Microsoft to describe the extent to which factors such as regulatory requirements, development cost (sunk and ongoing) and economies of scale act as barriers to entry or expansion for its supply of Windows 10/11. Microsoft said historically the primary barrier to providing an on-premises desktop OS was ensuring that there are sufficient applications to run on the OS to meet customer needs. It said on the cloud the customer can choose the OS that works best for it without worrying as much about how many other applications run on the OS, so Microsoft does not believe there are any material barriers to entry.[191]

Emerging views

3.114 In the round, based on the current evidence base, we consider it is likely that Microsoft has a significant degree of market power in relation to Windows 10/11. This is because evidence suggests Windows 10/11 is highly differentiated from the next-closest products, has a very large share of the desktop OS market and customer evidence suggests that customers are unwilling or unable to switch away.

3.115 Regardless of the precise market definition, we would have the same emerging views concerning Microsoft's market power. This would be the case if we had defined the market more widely to include server and mobile OSs, as we consider Microsoft has a degree of market power in the market for server OSs, and customer evidence suggests mobile OSs are a potential substitute for desktop OSs in only specific use cases. In addition, customer evidence suggests customers would be unable or unwilling to switch away regardless of the frame of reference.

[190] Microsoft response to the CMA's information request [✂].
[191] Microsoft response to the CMA's information request [✂].

Microsoft SQL Server

Introduction

3.116 Microsoft SQL Server (SQL Server) is a Relational Database Management System (RDBMS). A RDBMS is a type of Database Management System (DBMS) which manages and stores data in separate tables and defines relationships between those table.[192] All RDBMS provide this same functionality.

3.117 Therefore, for the purposes of this investigation the relevant focal product is RDBMS, as we consider this is the narrowest plausible candidate market SQL Server sits within.

Product market definition

3.118 We considered whether we should widen the market to include other types of database management systems such as non-relational database management systems (NRDBMS).

Providers' submissions

3.119 We asked providers to explain whether they would consider RDBMS and NRDBMS as substitutes, and whether they would consider any other types of DBMS as substitutes for RDBMS.

(a) Microsoft submitted that a relational database management system such as SQL Server can be substituted with a non-relational database management system depending on the specific requirements and characteristics of the customer seeking to switch database management system.[193]

(b) Oracle submitted that it considers RDBMS and NRDBMS as substitutes, although they may have historically had advantages over one another. It submitted that other forms of DBMS have also started to serve as substitutes for RDBMS in recent years, for example non-schematic (also called NoSQL) DBMS, multi-model DBMS and in-memory DBMS ('IMDBMS').[194]

(c) IBM submitted that it does not consider that RDBMS and NRDBMS are substitutes, as each type of system has unique features and areas in which

[192] SQL Server can be installed on either Windows operating systems (such as Windows Server) or Linux, either on a physical computer or a cloud-hosted virtual machine. We note that SQL Server can be accessed on-premises, as software run on VMs, or as a managed service in the public cloud through Microsoft and other cloud providers. More broadly, RDBMS can be software which is on-premises or cloud based and can be accessed through similar channels.
[193] Microsoft response to the CMA's information request [✂].
[194] Oracle response to the CMA's information request [✂].

they would provide a better service.[195] It explained that the applications for which an RDBMS or NRDBMS would be best suited for would differ on a case-by case basis, substituting one with the other is usually not possible without major effort and requires significant changes to the application(s). IBM explained that there is a large ecosystem of existing systems that depend on RDBMS [✂].[196]

Customers' submissions

3.120 We asked customers which use SQL Server on the public cloud to identify alternative products which they could use for the same purpose as SQL Server. Customers we spoke to set out a number of alternatives, but mostly listed alternative RDBMS solutions.[197]

3.121 We asked the same customers (which use SQL Server) considering their organisational use cases for SQL Server software, to what extent, if at all, they would consider other types of database management systems (relational, non-relational, data analytics services or any other types of database management system) as alternatives.[198]

3.122 A small number of customers responded with the extent to which they would consider the alternative types of database management system as alternatives.

(a) **Other relational databases:** some of these customers reported that they would consider relational database management solutions as an alternative to SQL Server.[199]

(b) **Non-relational databases:** All customers that addressed the question responded that they would not consider non-relational database management systems as alternatives.[200]

(i) One customer highlighted that non-relational database management software packages tend to be more specialised in how they work and which use cases they are suitable for.[201]

[195] It explained that for example, in an account system, an RDBMS would be better suited because atomicity and consistency is a paramount priority, while at the same time relations between entities need to be tracked, and that for a social network, an non-RDBMS would be better suited because availability and scalability is of higher importance than eg, returning the correct order and amount of comments for a picture that was posted. IBM response to the CMA's information request [✂].
[196] IBM response to the CMA's information request [✂].
[197] The most frequently listed alternatives were 'Oracle' or Oracle Database, MySQL and PostgreSQL, which are RDBMS solutions.
[198] A large number of customers did not answer this question in their response and instead listed the different types of DBMS solutions their organisation uses.
[199] Responses to the CMA's information requests [✂].
[200] Responses to the CMA's information requests [✂].
[201] [✂] response to the CMA's information request [✂].

(ii) Another nuanced its answer explaining that NRDBMS would typically not be a good choice to replace SQL Server due to the need to refactor the application and its lack of technical suitability in most use cases where an existing RDBMS database has been deployed.[202]

(c) **Data analytics services:** One customer highlighted that even though SQL Server has analytics capabilities this is not its primary use case and that they use further analytics tools.[203] A further customer explained that its use of SQL Server as a data analytics tool is minor compared to its use as an RDBMS.[204]

(d) **Any other types of DBMS:** A few customers did not answer the question, or said they did not use any other type of DBMS.[205] One customer said it was looking into Graph Database Technologies as an alternative to structured/relational databases.[206] One customer mentioned that any transition from SQL Server would be to an alternative RDBMS system available within the organisation and not to a new technology.[207]

3.123 In response to this question a larger number of customers detailed their use of different database management systems in addition to their use of SQL Server. The use of multiple solutions across a range of customers suggests that customers view different DBMS solutions as somewhat suited for specific use cases and/or applications.

Emerging views

3.124 Our emerging view is that it the evidence suggests other forms of database management systems may not be effective demand side substitutes for RDBMS. However, we are continuing to gather evidence on this question. Below, we assess market power with reference to both RDBMS and DBMS.

Market power

Product characteristics

3.125 At a product level, all DBMSs perform the same basic functionality, providing a system to store and retrieve data. The way in which this is done depends on the data form and user preference.

[202] [✂] response to the CMA's information request [✂].
[203] [✂] response to the CMA's information request [✂].
[204] [✂] response to the CMA's information request [✂].
[205] Responses to the CMA's information requests [✂].
[206] [✂] response to the CMA's information request [✂].
[207] [✂] response to the CMA's information request [✂].

3.126 We consider that there is a degree of product differentiation between different types of RDBMS. RDBMS products can be open-source, for example PostgreSQL or MySQL, or they can be proprietary like SQL Server or IBM DB2. Open-source software variants can be accessed as a self-hosted variant (through a deployment type of the organisations' choice), or in a supported version provided by a supplier (typically in the cloud as a PaaS service). Proprietary RDBMS can also be provided in a managed service (such as Microsoft's Azure SQL[208]). Different types of RDBMS offer different levels of scalability, performance and security, which might affect how substitutable they are for individual customers. This may in turn depend on the customer's workload or specific requirements.

3.127 There may however be more significant product differentiation if we define the market more widely, to include all DBMS, for example in the type of coding language used to access the database and the way data is stored.

Market shares

3.128 In response to the CMA's request for internal documents, a database provider has provided us with data which describe the shares of supply of SQL Server and other competing DBMS solutions. Of the DBMS market, the RDBMS segment made up [✂] of the market in 2022.[209] The data shows that [✂] of revenue received by providers in 2022 was associated with the public cloud.[210]

3.129 Before setting out the shares of supply based on this data, we make the following observations relating to the data:

(a) as we observe some degree of differentiation between the different types of RDBMS and a significant degree of differentiation between different types of DBMS, market shares may overstate the degree of competition between players in the market. If SQL Server and other (R)DBMS solutions are used for very different purposes, then these shares may be misleading. It is possible that Microsoft may hold significant market power for a segment of demand (even if the share is relatively modest); and

(b) we are continuing to gather information on how revenue from different types of DBMS solutions is classified in relation to these shares, and further information may affect the interpretation of these shares.

3.130 Table 3.4 shows the shares of supply for RDBMS and DBMS.

[208] Microsoft provides two managed services which share a common code base with SQL Server, Azure SQL MI and Azure SQL DB. Details about the functionalities of these services are explained here: Compare Azure SQL database engine features - Azure SQL Database & Azure SQL Managed Instance | Microsoft Learn.
[209] [✂] response to the CMA's information request [✂].
[210] [✂] response to the CMA's information request [✂].

Table 3.4: Market shares for RDBMS and DBMS, global basis, 2020 – 2022

%

	RDBMS			*DBMS*		
	2020	*2021*	*2022*	*2020*	*2021*	*2022*
Microsoft	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Oracle	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
AWS	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
IBM	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
SAP	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: ✂ and CMA analysis.

3.131 The data shows that, although there are a number of alternative suppliers for (R)DBMS, Microsoft has the largest share considering both RDBMS and DBMS. We note that for 2020-2021 Oracle had the largest share in RDBMS. Microsoft's share has remained stable over the period 2020-2022 across both RDBMS and DBMS.

3.132 We note that these shares might be poor indicators of market power for several reasons. Customers may choose to self-host an open-source RDBMS solution (for example using PostgreSQL software), which would not be accounted for in these shares, therefore shares by revenue might overstate the market power of proprietary RBDMS. Revenue is not disaggregated by underlying RDBMS or DBMS product. It is unclear whether these shares include revenue from managed services. If this is the case, these shares might understate Microsoft's market power in relation to SQL Server, as for example, revenue allocated to another provider might be for a managed service which uses SQL Server software.

Customers' submissions

3.133 We asked customers that use SQL Server on the public cloud to identify alternative products to SQL Server which they could use for the same purpose.[211] Customers listed a variety of alternative products including Databricks, Oracle RDBMS, MySQL, Informix & NoSQL alternatives, Oracle, MySQL, PostgreSQL, IBM DB2, Database as a service alternatives, Amazon RDS, Mongo DB, Sybase, Amazon Aroura, IBM, SAP and Microsoft access.[212] One customer said that there were no alternatives for its use of SQL Server.[213]

[211] Responses to the CMA's information requests [✂].
[212] Responses to the CMA's information requests [✂].
[213] [✂] response to the CMA's information request [✂]

3.134 We asked customers to explain the reasons for choosing SQL Server over the alternatives they had listed.[214]

(a) Several customers we spoke to mentioned their internal application landscape or requirements.[215]

(b) Some customers mentioned integration with other elements of business architecture, for example one customer highlighted server stack integration[216] and another mentioned back-office integration or integration with the Microsoft ecosystem.[217]

(c) In a handful of cases customers mentioned existing skills.[218] One further mentioned software engineering preference.[219]

(d) Some customers mentioned the quality of the product as a factor, or the lack of functionality of alternatives, for example one customer noted the availability of features;[220] a few customers noted the availability of support;[221] and one customer mentioned that alternative open-source offerings can present security and scalability challenges with varying levels of support available.[222]

3.135 We asked customers that use SQL Server on the public cloud to explain to what extent it would be likely or unlikely for them to switch away from SQL Server to an alternative they mentioned, if the price of SQL Server rose by 5%, providing reasons for their answer.[223] Most customers we spoke to mentioned being unlikely to or having a very small chance of switching away from SQL Server.[224]

3.136 Customers we spoke to reported a variety of reasons for not switching away from SQL Server:

(a) Some customers reported monetary considerations such as increased costs,[225] high cost of porting applications/database migration,[226] or return on investment.[227]

[214] [✂] response to the CMA's information request [✂].
[215] Responses to the CMA's information requests [✂].
[216] [✂] response to the CMA's information request [✂].
[217] [✂] response to the CMA's information request [✂].
[218] Responses to the CMA's information requests [✂].
[219] [✂] response to the CMA's information request [✂].
[220] [✂] response to the CMA's information request [✂].
[221] Responses to the CMA's information requests [✂].
[222] [✂] response to the CMA's information request [✂].
[223] [✂] response to the CMA's information request [✂].
[224] Responses to the CMA's information requests [✂].
[225] Responses to the CMA's information requests [✂].
[226] Responses to the CMA's information requests [✂].
[227] [✂] response to the CMA's information request [✂].

(b) One customer mentioned that its software only runs with SQL Server.[228]

(c) A few customers mentioned that while they wouldn't consider short term change, they might consider alternatives in the longer term or for new workloads.[229] Drivers mentioned for this were a trend towards increased support for open-source and PaaS services[230] and that new products or solutions might not require traditional relational databases.[231]

(d) One customer highlighted that it already uses alternatives, that the choice of SQL Server for operational use cases is dependent on internal skills and that it adopts alternatives where vendor or functional reasons exist.[232]

(e) One customer mentioned moving away from Oracle to Microsoft SQL Server as it has all the required capabilities at a better price.[233]

3.137 There were few customers who were able/willing to switch away from SQL Server and even though there are alternatives available, most customers would not switch to these.

Providers' submissions

3.138 We asked providers about the competitive landscape, about which products compete with Microsoft SQL Server and its competitors and about any important factors of competition.

(a) Microsoft listed other forms of DBMS as competitors.[234]

(b) Oracle submitted that the database market is highly competitive and its competitors include Microsoft, AWS, IBM, SAP, amongst others. It submitted that in the past decade, traditional database players have been challenged by new entrants due to the emergence of new database technologies, including NoSQL databases, cloud databases, and virtualised databases.[235] Consistent with there being some differentiation in different types of RDBMS, Oracle submitted that generally, all of the Oracle database products compete with Microsoft SQL Server but dependent on the type of workload, the Oracle product which competes most closely with SQL Server may vary. It submitted that for more complex workloads (requiring the high levels of scalability, performance and security), Oracle Database would compete most closely,

[228] [✂] response to the CMA's information request [✂].
[229] Responses to the CMA's information requests [✂].
[230] [✂] response to the CMA's information request [✂].
[231] [✂] response to the CMA's information request [✂].
[232] [✂] response to the CMA's information request [✂].
[233] [✂] response to the CMA's information request [✂].
[234] Microsoft response to the CMA's information request [✂].
[235] Oracle response to the CMA's information request [✂].

but that for simpler workloads, MySQL database would be a closer competitor.[236]

(c) A DBMS provider submitted that the competitor set is different for its different products. It submitted that the important factors of competition differ when considering customers looking for a database solution for a new workload, where the decision is usually based around price or features, or customers that were already using a database service, where additional considerations would be taken into account.[237]

(d) Another DBMS provider submitted that Microsoft SQL Server competes with its range of relational and non-relational database services.[238] It outlined when choosing a database, customers typically consider a range of factors, including price, performance (speed of reads/writes, latency), security, durability, availability, scalability, interoperability, support and maintenance, or breadth of features.[239]

3.139 We asked providers to explain what barriers (if any) a typical customer would face if it wanted to switch to an alternative product.

(a) Microsoft submitted that the extent to which it is difficult or easy to move a particular workload out of SQL Server will depend on the nature of the workload in question. It highlighted a customer can move a workload between clouds and continue to use SQL Server, as SQL Server is made available on all clouds.[240]

(b) Oracle submitted that the ease and speed of switching databases depends to an extent on the similarity of the databases and the degree of unique dependencies in the particular application's design and architecture. It submitted that customers which choose to switch database software components typically do so in the context of migration to the cloud or another software deployment project that in itself involves deployment, implementation, and training effort. It submitted that customers are undertaking these migrations regularly (ie modernizing by migrating to cloud applications). It outlined that customers have access to migration tools which help facilitate the process of database migration (provided by the software vendors).[241] Oracle explained that it has successfully aided many customers moving from Microsoft SQL to Oracle.[242]

[236] Oracle response to the CMA's information request [✂].
[237] [✂] response to the CMA's information request [✂].
[238] [✂] response to the CMA's information request [✂].
[239] [✂] response to the CMA's information request [✂].
[240] Microsoft response to the CMA's information request [✂].
[241] Oracle response to the CMA's information request [✂].
[242] Oracle response to the CMA's information request [✂].

3.140 We asked another DBMS provider to broadly describe the steps a customer would have to take to switch away from its products. The DBMS provider said that to migrate away from a DBMS based on open-source software, a customer would need to migrate the application data and then update all the applications to the new database. A customer migrating from a proprietary DBMS may also need to adjust the applications to work with the target SQL dialect if its applications used specific SQL dialect or extensions.[243]

3.141 We asked providers to explain the concept of data gravity and whether it would apply to a typical business using its product or a competing product.

(a) Microsoft submitted that in the context of a customer using SQL Server or another relational-database management system, data gravity would apply in the sense that when a customer chooses to store a very large amount of data in a database, it can become more challenging to move the data to a different location or platform. It submitted that the cloud has reduced the data gravity effect for databases: when customers run databases on-premises, the hardware and software architecture is dedicated to that customer, and switching databases can require completely new equipment and software; by contrast, cloud providers and ISVs manage much of the stack needed for a database, so the customer will generally have much less rebuilding to do when migrating a database between locations or platforms in the cloud.[244]

(b) Oracle submitted that the general concept is that that data and applications are naturally attracted to each other, primarily because the closer apps are to data, the more they can avoid latency and increase throughput. As you amass more data in one cloud, and more of your applications and services rely on that data, it can become increasingly difficult or costly to move that data to another cloud. It said that the term may be used by some CSPs describe what happens in systems because customers find it easier to work with one vendor, but there is no technical limitation to move data around where it might need to be used and Oracle helps customers use their data where it makes most sense for the customer.[245]

3.142 We asked providers to describe the extent to which factors such as regulatory requirements, development cost (sunk and ongoing) and economies of scale act as barriers to entry or expansion for the supply of their products or competing products.

[243] [✂] response to the CMA's information request [✂].
[244] Microsoft response to the CMA's information request [✂].
[245] Oracle response to the CMA's information request [✂].

(a) Microsoft submitted that it does not believe there are any material barriers to entry or expansion for database management solutions.[246]

(b) Oracle submitted that none of the factors listed are more of a barrier to entry or expansion in the UK than elsewhere and in any event, there are no significant technical, legal or capital barriers to entry or expansion into the database software market. It submitted that this is proven by the history of entry and exit in this business and current explosive growth of certain players (MongoDB, Datastax, Cloudera, Snowflake, Databricks, Cockroach Labs and the open source MariaDB and Couchbase).[247]

Emerging views

3.143 The evidence suggests that Microsoft has a large market share considering both RDBMS and DBMS and that customers are generally unwilling to switch to alternative products. Based on the evidence we have seen to date, our emerging view is that it is likely that Microsoft has a significant degree of market power with respect to SQL Server. Regardless of the precise market definition, the evidence we have seen, in particular evidence on customer switching, would support our emerging view, whether we consider the product frame of reference as DBMS or RDBMS.

Microsoft Visual Studio

Introduction

3.144 Microsoft Visual Studio (Visual Studio) is a type of Integrated Development Environment (IDE). IDEs are a type of software containing a range of tools that software engineers use to build applications, web pages or services.

3.145 We understand that, as for Microsoft's productivity suites, customers either use Visual Studio:

(a) on-premises;[248] or

(b) as part of a VDI solution, for example by installing Visual Studio on a virtual machine, using a cloud infrastructure service such as AWS EC2.[249]

3.146 IDEs typically include a code editor (a text editor designed for editing source code). They may also have additional features such as intelligent code completion,

[246] Microsoft response to the CMA's information request [✂].
[247] Oracle response to the CMA's information request [✂].
[248] [✂] response to the CMA's information request [✂].
[249] [✂] response to the CMA's information request [✂].

a compiler/interpreter, build automation tools, debugger, testing or project management tools and AI integration.

3.147 Customer evidence (see below) suggested that one reason customers choose to use Visual Studio is because they want to develop applications to run in the Windows environment. Therefore, for the purposes of this investigation the relevant focal product is IDEs specialised in Windows development as we consider this as the narrowest plausible candidate market Visual Studio sits within.

3.148 In the following section we consider whether the market should be widened to consider all IDEs. We then consider the extent of any market power held by Microsoft in relation to the relevant market.

Product market definition

Providers' submissions

3.149 Microsoft explained that Visual Studio can be used for building applications to run on non-Windows environments (in addition to Windows environments).[250]

3.150 One software provider said that in its experience, customers report that Visual Studio subscriber software is critical for developing software to run on Windows desktop because it offers unlimited non-production use of Microsoft software for development and testing purposes.[251]

Customers' submissions

3.151 We asked customers that use Visual Studio on the public cloud to identify any alternatives to Visual Studio that they could use for the same purpose.

(a) Some customers we spoke to listed one other IDE focused on Windows development: Visual Studio Code.[252] As this is a Microsoft product it does not present a competitive constraint to Visual Studio and we will not consider it separately from Visual Studio.

(b) Some customers listed other IDEs for non-Windows development or cross platform IDEs: Jetbrains' Rider, Jetbrains' IntelliJ IDEA, Jetbrains' PyCharm, Eclipse, Apache NetBeans, Xcode, Android Studio and Github's Atom.[253] Some of these are specialised eg Xcode is specialised in Apple development.

[250] Microsoft response to the CMA's information request [✂]; [✂].
[251] [✂] submission to the CMA [✂].
[252] Responses to the CMA's information requests [✂].
[253] Responses to the CMA's information requests [✂].

(c) Other customers listed examples of software that are slightly different to IDEs eg VIM (a lightweight text editor) and GitHub (a developer platform).[254]

(d) A few customers said there were no alternatives.[255]

3.152 Overall, this suggests there could be a wide range of alternative products to Visual Studio.

3.153 We asked customers for more information to understand their views on alternatives to Visual Studio. We asked customers to tell us whether they would consider, and if so to what extent, an IDE tailored to other types of software development, eg Java, to be a substitute for Visual Studio. The purpose of this was to explore whether customers can use IDEs that are not specialised in Windows development for the same purposes as they use Visual Studio.

(a) Most customers said they wouldn't, or would be unlikely to, consider another IDE to be a substitute for Visual Studio.[256] Reasons included the effort of re-training, impact on staff recruitment/hiring, effort to re-integrate with other software, that Microsoft provides good support, Visual Studio integrates well, strategic alignment with Microsoft, and other IDEs are less functional.

(b) A few customers said they would consider other IDEs to be a substitute for Visual Studio, for example Eclipse and IntelliJ were mentioned as alternatives.[257] One customer said Visual Studio is still required for some purposes.[258]

(c) A few other customers didn't express a strong opinion, explaining they tend to use the IDE most suited to each task or let the developer choose their preferred tool.[259]

3.154 This suggests that customers have mixed views on whether an IDE tailored for non-Windows development would be a good substitute for Visual Studio.

3.155 We asked customers to tell us whether they can use an IDE tailored to other types of software development, eg Java, to build applications for the Windows environment. The purpose of this was to explore if Visual Studio is the only IDE that has capability to build Windows applications.

[254] Responses to the CMA's information requests [✂].
[255] Responses to the CMA's information requests [✂].
[256] Responses to the CMA's information requests [✂].
[257] Responses to the CMA's information requests [✂].
[258] [✂] response to the CMA's information request [✂].
[259] Responses to the CMA's information requests [✂].

(a) Some customers said this was possible.[260] Of these, some spoke positively of it: one said it was common,[261] and one said that it gives them access to more solutions.[262] One was less positive, saying there would be fewer features.[263]

(b) Some indicated it may be possible to an extent, but they don't do this;[264] one of these explained the efficiency of the developer would be reduced.[265] Another customer said they cannot use another IDE for development of Windows applications built in C#/VB.net which we understand are programming languages developed by Microsoft and closely associated with Microsoft technology.[266, 267]

3.156 This suggests that other IDEs can be used for Windows development, but Visual Studio may be the most well suited for this.

Emerging views

3.157 The evidence we have seen to date suggests that customers view IDEs not specialised in Windows development as alternatives to Visual Studio, that IDEs not specialised in Windows development can still be used for Windows development, and customers have mixed views on whether they would consider an IDE tailored for non-Windows development to be a good substitute for Visual Studio. In addition, Microsoft explained that Visual Studio can also be used for building applications to run on non-Windows environments. Therefore, there does not seem to be a good reason to draw a line between IDEs specialised in Windows development, and those that do not. Based on the evidence we have seen to date, our emerging view is that the relevant product market is the market for IDEs.

Market power

Product characteristics

3.158 Evidence we have seen so far suggests that there are multiple substitute products for Visual Studio. At a product level, IDEs perform the same basic functionality, enabling software developers to build applications, web pages or services.

[260] Responses to the CMA's information requests [✂].
[261] [✂] response to the CMA's information request [✂].
[262] [✂] response to the CMA's information request [✂].
[263] [✂] response to the CMA's information request [✂].
[264] Responses to the CMA's information requests [✂].
[265] [✂] response to the CMA's information request [✂].
[266] [✂] response to the CMA's information request [✂].
[267] Something Pretty Right: A History of Visual Basic | Retool, accessed on 3 May 2024.

Evidence suggests there is some differentiation between different types of IDEs eg specialisation for development in a particular environment.

3.159 To interpret whether product differentiation by functionality may act as a source of market power, we use customer reasons for choosing the Microsoft products to understand whether customers value the differences, ie whether these differences are relevant drivers of choice.

3.160 We asked customers to explain the reasons they chose Visual Studio rather than the alternatives they listed. Many customers responded that they value the additional functionality of Visual Studio.[268] Examples of specific functionality that customers valued included wanting to develop .Net code (for Windows environments),[269] and integrations with other Microsoft products.[270]

3.161 Customer evidence seen to date suggests Visual Studio is highly differentiated from the next-closest products as it is specialised for a particular and widespread use case – for Windows development. Therefore, product differentiation may act as a source of market power with respect to Visual Studio.

Market shares

3.162 So far, we have limited evidence on Microsoft's market share in the market for IDEs.

3.163 Microsoft did not provide any market shares. It said developers often use multiple development tools at the same time for the same and different projects, depending on the requirements, preferences, and availability of the tools, so it would be difficult to determine market shares for developer tools like Visual Studio, and it does not know of any resources that reliably estimate market shares for developer tools.[271]

3.164 An IDE provider provided a report which bundles IDEs with five other software categories. [272] [273] This shows that Microsoft has a [✂] market share in "worldwide development languages, environments, and tools".

3.165 This is broader than the market we are looking at. It is not clear what Microsoft's market share would be in the other five software categories, and hence whether this is an over or underestimate of Microsoft's market share for integrated

[268] Responses to the CMA's information requests [✂].
[269] Responses to the CMA's information requests [✂].
[270] Responses to the CMA's information requests [✂].
[271] Microsoft response to the CMA's information request [✂].
[272] [✂] response to the CMA's information request [✂].
[273] [✂].

development environments. We are exploring whether more granular data exists for our further analysis.

Customers' submissions

3.166 The product market definition section discussed customer evidence we received regarding the alternative products to Visual Studio customers could use for the same purpose.

3.167 We asked customers to explain the reasons they chose Visual Studio rather than the alternatives they listed. Reasons customers gave for choosing Visual Studio included: wanting to build in the Windows environment, integrations with other Microsoft products, staff skills, functionality, and it is an embedded product.[274]

3.168 We asked customers to explain to what extent it would be likely or unlikely for them to switch away from Visual Studio to an alternative they mentioned, if the price of Visual Studio rose by 5%.

(a) Most customers we spoke to said they would be unlikely to move away from Visual Studio (or Visual Studio Code).[275] Reasons given included: cost of change, integrations with other software, more or desired functionality, cost of re-training staff, little perceived benefit, Visual Studio is best for Windows development.

(b) Some customers said they already use alternatives to Visual Studio (or Visual Studio Code), for example Eclipse for Java development or Python where the project is suitable.[276] Another said its decision to stay with Visual Studio was becoming marginal in terms of cost saving, explaining using it in the public cloud is more expensive than on-premises (because of the need to buy individual licences), though it would need to balance this with the re-training costs incurred in leaving and it still considers Visual Studio to be the most productive IDE for Windows development.[277]

3.169 We asked customers to tell us to what extent, if at all, they would face switching costs when switching from Visual Studio to an alternative IDE.

(a) Most customers said there would be significant or some switching costs including: retraining, impact on developer efficiency, staff recruitment issues, re-working/migrating projects, re-aligning development processes, loosing integrations with Microsoft infrastructure, licensing costs.[278]

[274] Responses to the CMA's information requests [✂].
[275] Responses to the CMA's information requests [✂].
[276] Responses to the CMA's information requests [✂].
[277] [✂] response to the CMA's information request [✂].
[278] Responses to the CMA's information requests [✂].

(b) Some customers said there would be no or low switching costs.[279] Some of these made reference to seeing IDEs as quite interchangeable, including one that said it should be negligible as developers write tool agnostic code.[280]

Providers' submissions

3.170 We asked Microsoft to identify its main competitors in supplying Visual Studio. Microsoft listed other IDEs.[281]

3.171 We asked Microsoft to explain the three most important alternative products to Visual Studio and to what extent these impose a competitive constraint on Visual Studio. Microsoft said there are countless developer tool offerings available to cloud developers. Microsoft does not track a list of the products that provide the most competitive restraint on Visual Studio. Different customers will have different preferences for products.[282]

3.172 We asked Microsoft to explain what barriers (if any) a typical customer would face if it wanted to switch to an alternative product and how a customer could address or minimise these. Microsoft said developers would simply have to learn how to use the new tools to which they are switching and it does not believe that there any major barriers.[283]

3.173 We asked Oracle to list any Oracle products that compete with Microsoft Visual Studio and describe the main customer use cases they fulfil. Oracle its offerings do not compete directly with Visual Studio but Visual Studio is a tool or broad applicability whereas Oracle tools are more targeted to different parts of the technology stack, for example Java and Visual Studio may compete in some instances at different levels of the technology stack.[284]

3.174 We asked Microsoft and Oracle to describe the extent to which factors such as regulatory requirements, development cost (sunk and ongoing) and economies of scale act as barriers to entry or expansion for the supply by Microsoft of Visual Studio or by Oracle of products that compete with Visual Studio.

(a) Microsoft said it does not believe there are any material barriers to entry or expansion for developer tools. [285]

[279] Responses to the CMA's information requests [✂].
[280] [✂] response to the CMA's information request [✂].
[281] Microsoft response to the CMA's information request [✂].
[282] Microsoft response to the CMA's information request [✂].
[283] Microsoft response to the CMA's information request [✂].
[284] Oracle response to the CMA's information request [✂].
[285] Microsoft response to the CMA's information request [✂].

(b) Oracle said for Oracle Java, none of these factors are significant barriers to expansion.[286]

Emerging views

3.175 Based on what we have seen to date, the evidence is mixed but we consider it is likely that Microsoft has a significant degree of market power in relation to Visual Studio. This is because customer evidence suggests Visual Studio is highly differentiated from the next-closest products, that some customers are unwilling or unable to switch away for some use cases, and there are various barriers to switching including cost and staff re-training.

3.176 We consider this emerging conclusion would not be different, even if we had defined the market more narrowly, to consider a market for IDEs used for Windows development only. For example, customer evidence suggests customers would be unable or unwilling to switch away regardless of frame of reference, and if we had defined a narrower market, customer evidence suggests that Visual Studio would be the leading product.

Microsoft's productivity suites

Introduction

3.177 Microsoft has various packages of products which provide some productivity functionality. For the purposes of this investigation, we consider solutions only for enterprise consumers.

3.178 We note that customers use a variety of different packages under the 'Microsoft 365' label, including Office 365, Microsoft 365 Apps for business and various enterprise Microsoft 365 packages.

3.179 These packages include desktop installed versions of the software as well as access to the software through a SaaS solution in the browser. On the cloud, a customer can also access Microsoft 365 functionality through a virtual desktop (VDI) solution provided by Microsoft.[287]

[286] Oracle response to the CMA's information request [✂].
[287] Note, this functionality is only available for those using Microsoft 365 in Azure. Recently, Microsoft has made some functionalities of Microsoft 365 (the Microsoft 365 Apps for enterprise [namely Word, Excel, PowerPoint, Outlook and OneDrive]) available through Amazon Workspaces. Microsoft 365 Apps for enterprise now available on Amazon WorkSpaces services, accessed on 23 May 2024. This is discussed later considering VDI in section 5.

3.180 For the purposes of this investigation, the relevant focal product is productivity suites[288] for enterprise as we consider this as the narrowest possible plausible candidate market which the Microsoft suites sit within.

Product market definition

3.181 We then considered whether the relevant market is wider than productivity suites. Considering product functionality, the next-closest alternative which would perform the functionality of a productivity suite is a 'mix and match' approach considering different applications which, combined, would perform similar functionality to the Microsoft suites of products.

Customers' submissions

3.182 Almost all of the customers we spoke to had some Microsoft 365 for enterprise usage.[289] A few customers reported use of Office.[290]

3.183 We asked customers for alternatives to the Microsoft products that they could use for the same purpose.[291]

3.184 When asked for alternatives to Microsoft 365 which they could use for the same purpose customers almost exclusively listed only alternative productivity suites.

(a) Almost all customers we spoke to responded listing Google Workspace as an alternative which they could use for the same purpose as Microsoft 365.[292]

(i) Of these, most customers listed only Google Workspace as an alternative which they could use for the same purpose as Microsoft 365.[293]

(b) A few customers listed a component of Google Workspace (Google Docs).[294] In addition, one customer mentioned Microsoft Office on-premises (desktop installed apps) as an alternative.[295] Some customers also listed open-source productivity suites as alternatives to Microsoft 365.[296]

[288] For the purposes of this investigation, we consider productivity suites at a minimum to cover word processing, presentation and spreadsheet functionalities, however we note that most suites include a number of applications beyond these core functionalities.
[289] Customers reported using the E5, E3, E1, F3 and A3 Microsoft 365 for enterprise packages. The Microsoft packages are outlined in Microsoft's package comparison pages. Responses to the CMA's information requests [✂].
[290] Responses to the CMA's information requests [✂].
[291] [✂] response to the CMA's information request [✂].
[292] Responses to the CMA's information requests [✂].
[293] Responses to the CMA's information requests [✂].
[294] Responses to the CMA's information requests [✂].
[295] [✂] response to the CMA's information request [✂].
[296] Responses to the CMA's information requests [✂].

(c) One customer also listed substitutes for component elements of Microsoft 365 including substitutes for security services and eDiscovery services.[297]

(d) One customer also listed an alternative productivity application (Click Up) [298,299]

(e) No customers listed a complete mix and match solution which included individual applications which would fully cover Microsoft 365 functionality.

3.185 When asked for alternatives to Office which they could use for the same purpose, customers we spoke to largely listed a subset of the above responses.

3.186 Customer responses do not support widening the market to include other productivity applications which cover some functionality of the Microsoft packages.

Emerging views

3.187 Based on the evidence we have seen to date, our emerging view is that the relevant market is no wider than productivity suites for enterprise, however in our market power assessment we may consider the competitive constraint exerted by alternatives to individual applications within productivity suites.

Market power

Product characteristics

3.188 Product differentiation may act as a source of market power as other products in the market may not be as close substitutes where the differentiating factors are drivers of choice, and therefore customers may not be willing to switch to them.

3.189 Microsoft 365 is somewhat differentiated from its next-closest competitor, Google Workspace. For example:

(a) there are different products included in the Microsoft packages (including additional applications, security and advanced identity and access management functionality with Microsoft 365); and

(b) Google Workspace is only available through a browser.

3.190 To interpret whether product differentiation by functionality may act a source of market power, we used customers' reasons for choosing the Microsoft products to

[297] [✂] response to the CMA's information request [✂].
[298] We do not consider productivity applications which are included in a suite and not available for purchase separately as alternative productivity applications, as an enterprise customer would purchase this as part of a productivity suite.
[299] ClickUp is an application which combines multiple functionalities such as documents, project management and communication into one application. [✂] response to the CMA's information request [✂].

understand whether customers value the differences, ie whether these differences are relevant drivers of choice.

3.191 We asked customers the reasons for choosing Microsoft 365 over alternatives they had listed.[300]

(a) Many customers mentioned they value the large ecosystem of applications/functionality.[301]

(b) Some customers mentioned they value collaboration functionality (for example Microsoft Teams).[302]

(c) Some customers mentioned valuing security capabilities.[303]

(d) One customer mentioned directly valuing device management capabilities,[304] however several more mentioned valuing integration, or having to re-integrate systems as a reason for choosing Microsoft 365.[305]

3.192 Therefore, we find some evidence that customers value the different products included in the Microsoft 365 package over packages by competitors. In this instance, product differentiation may act as a source of market power with respect to Microsoft 365.

Market shares

3.193 Microsoft submitted shares of supply analysis. Before setting out the shares of supply based on the analysis provided, we highlight that:

(a) we are continuing to gather information on the methodology with which these shares were calculated, and further information may affect the interpretation of these shares; and

(b) we have some evidence that the Microsoft products are meaningfully differentiated from their next-closest competitors, therefore these market shares might understate Microsoft's degree of market power.

3.194 The analysis provides, for a worldwide market for enterprise productivity suites, 2022 revenue figures from which the following shares of supply can be calculated:

[300] Responses to the CMA's information requests [✂].
[301] Responses to the CMA's information requests [✂].
[302] We note since these responses were received Microsoft has announced that there will no longer be sale of enterprise suites to new subscribers including Teams, Important Notice: Changes to Microsoft 365, Office 365, and Microsoft Teams licensing. - Microsoft Community Hub; Realigning global licensing for Microsoft 365, accessed on 29 April 2024. Responses to the CMA's information requests [✂].
[303] Responses to the CMA's information requests [✂].
[304] Responses to the CMA's information requests [✂].
[305] Responses to the CMA's information requests [✂].

(a) Microsoft had [✂] share of supply;

(b) Google had [✂] share of supply; and

(c) other productivity suites had [✂] share of supply.[306]

3.195 Microsoft's market share is very high and significantly higher than its next-closest competitor.

Customers' submissions

3.196 We asked customers that use Microsoft 365 on the public cloud to what extent it would be likely or unlikely for them to switch away from Microsoft 365 to an alternative they have mentioned, if the price of Microsoft 365 rose by 5%.[307]

3.197 Almost all customers we spoke to who use Microsoft 365 on the public cloud said they were unlikely or had a very small chance of switching away.[308] The customer who was theoretically open to switching mentioned being open to alternatives but unable to switch within the next five years.[309]

3.198 Customers responses highlighted that the alternatives they had listed had reduced functionality which made them not as good substitutes for Microsoft 365. Several customers raised the lack of functionality of alternative products.[310]

3.199 Customers directly highlighted a number of switching costs.[311]

(a) Many customers reported a high cost of change and/or re-architecture.[312]

(b) Many customers highlighted re-training staff as a cost of switching away from Microsoft 365.[313]

(c) Many customers reported that with alternatives there would be a loss of compatibility or integration with other apps or services and/or the broader Azure infrastructure.[314]

(d) One customer raised portability issues between Microsoft 365 and alternatives.[315]

[306]CMA analysis based on response to the CMA's information request [✂].
[307] We note since these responses were received Microsoft has announced that there will no longer be sale of enterprise suites to new subscribers including Teams (see footnote 302).
[308] Responses to the CMA's information requests [✂].
[309] [✂] response to the CMA's information request [✂].
[310] Responses to the CMA's information requests [✂].
[311] Responses to the CMA's information requests [✂].
[312] Responses to the CMA's information requests [✂].
[313] Responses to the CMA's information requests [✂].
[314] Responses to the CMA's information requests [✂].
[315] [✂] response to the CMA's information request [✂].

3.200 Some customers reported not wanting to switch away because they wanted to use the same solution as other companies.[316] One mentioned having to use Office because of its clients.[317] Another highlighted it would not switch away as Microsoft 365 is the corporate standard.[318]

3.201 Concerning Office, customers raised additional reasons highlighting that they were unlikely to completely switch away.[319]

(a) One Google Workspace customer mentioned where there are external factors or functional limitations in alternatives it is likely that there will always be some Microsoft Office usage.[320]

(b) One customer mentioned that, given that it wouldn't switch its cloud-based solution, it would not operate a different on-premises solution due to it being unmanageable in terms of user support and interoperability.[321]

Providers' submissions

3.202 We asked Microsoft to explain the three most important alternative products to Microsoft Office and Microsoft 365 and to what extent these impose a competitive constraint on the packages. Microsoft said that does not track a list of the products that provide the most important competitive restraint on the Microsoft 365 Apps. [✂].[322]

3.203 We asked Microsoft to explain how it monitors the competitive conditions, market shares and competitors in relation to the supply of Microsoft 365 Apps in the UK and provide example documents. Microsoft responded with a number of documents.

(a) [✂].[323] These are not comprehensive alternatives to the Microsoft offering, therefore we consider these competitors act as out of market constraints which may incentivise improvements in quality and product functionality.

(b) Microsoft outlined that Google Workspace may lack functionality. [✂].[324] [✂].[325]

[316] Responses to the CMA's information requests [✂].
[317] [✂] response to the CMA's information request [✂].
[318] [✂] response to the CMA's information request [✂].
[319] Responses to the CMA's information request [✂].
[320] [✂] response to the CMA's information request [✂].
[321] [✂] response to the CMA's information request [✂].
[322] Microsoft response to the CMA's information request [✂].
[323] Microsoft response to the CMA's information request [✂].
[324] Microsoft response to the CMA's information request [✂].
[325] Microsoft response to the CMA's information request [✂].

3.204 We asked Microsoft to explain what barriers (if any) a typical customer would face if it wanted to switch to an alternative product and how a customer could address or minimise these.

3.205 Microsoft said that it does not believe there are any barriers to switching, with the reason that all the file formats relied upon by Microsoft 365 Apps are documented and supported such that other productivity solutions can open the files and use them in their applications.[326]

3.206 [✂].[327]

3.207 We also note that Microsoft's response contrasts with customer evidence which highlights various barriers to switching including cost and staff retraining.

3.208 We asked providers to describe the extent to which factors such as regulatory requirements, development cost (sunk and ongoing) and economies of scale act as barriers to entry or expansion for its supply of its product and competing products.

3.209 Microsoft said that it does not believe there are any material barriers to entry or expansion for the creation of productivity software.[328]

3.210 One software provider responded that it does not consider the factors listed to act as barriers to entry or expansion in relation to the supply of enterprise productivity software. It said that it instead considers that barriers to entry and expansion are substantially increased by: Microsoft's practices of bundling productivity software with other non-related products and [Microsoft's] aggressive pricing tactics. For example, the software provider explained that if customers do not wish to purchase Microsoft's enterprise cloud-based productivity applications but still wish to purchase Windows Desktop, Intune, and/or other Microsoft products, they must purchase those must-have Microsoft products individually, resulting in a significantly higher total cost than if purchasing one of Microsoft's enterprise packages.[329]

Emerging views

3.211 Based on the evidence we have seen to date, our emerging view is that it is likely that Microsoft has a significant degree of market power in relation to its productivity suites. This is because there are limited competitive alternatives to the

[326] Microsoft response to the CMA's information request [✂].
[327] [✂] response to the CMA's information request [✂].
[328] Microsoft response to the CMA's information request [✂].
[329] [✂] response to the CMA's information request [✂].

Microsoft packages and customer evidence suggests that customers are unwilling or unable to switch away.

3.212 If we had defined a broader market for productivity software, or a narrower market for only Microsoft packages, we would have the same emerging views concerning Microsoft's market power. For example, customer evidence suggests customers would be unable or unwilling to switch away regardless of frame of reference.

Cumulative effect when considering Microsoft's market power

3.213 The assessment above of Microsoft's market power in each individual software market may understate its market power vis-a-vis those customers which use more than one of those software products. If a customer is more likely to use one Microsoft product as a result of using another, any market power with respect to one product may reinforce any potential market power with respect to the other.

3.214 We are considering whether, and if so the extent to which, links between the Microsoft products may reinforce any market power that Microsoft might have. The key factors we are going to explore when considering the cumulative effect of any market power Microsoft may have are:

(a) how the Microsoft products are sold or purchased; and

(b) actual or perceived technical benefits or limitations to using the Microsoft products together.

3.215 These factors may make customers more likely to use multiple Microsoft products by impacting customer decision making in two ways: when a customer is selecting a software product for the first time; and by increasing barriers to switching.

(a) For example, if a customer is looking to purchase a new software product (eg productivity software), and it already uses a different Microsoft product (eg desktop OS), it may be more likely to select the Microsoft productivity product if it is easier and/or cheaper to buy them together.

(b) Having chosen the Microsoft productivity product, a customer may be less willing to consider alternative desktop products in future if they think the functionality of the Microsoft productivity product could be reduced by switching away from Microsoft's desktop product.

3.216 The effectiveness of these mechanisms, and therefore the degree of potential cumulative market power Microsoft may be able to exercise, may depend on the number of workloads a customer runs on Microsoft products, the extent to which those workloads are business critical, and the extent to which the workloads interoperate.

3.217 We have seen some initial evidence related to the factors set out above.

(a) Windows Server and SQL Server: Some customers who use Windows Server have reported one of the workloads they run on Windows Server to be SQL Server.[330] Although we understand that SQL Server can also be run on Linux server OSs, Microsoft submitted that it is designed well to integrate with Windows Server[331] and one cloud provider has submitted that customers are most likely to run this workload on Windows Server.[332]

(b) Entra ID: Entra ID (formerly Azure AD) is a cloud-based identity and access management (IAM) product, which interoperates entirely with Active Directory (the on-premises feature of Windows Server).[333] Entra ID is also provided as part of the Microsoft 365 for enterprise packages.[334]

(c) Windows 10/11 and Microsoft 365: Microsoft includes Windows 10/11 as part of its Microsoft 365 for enterprise packages.[335]

3.218 We will explore this potential effect further in subsequent analysis.

[330] Responses to the CMA's information requests [✂].
[331] Microsoft response to the CMA's information request [✂].
[332] [✂] response to the CMA's information request [✂].
[333] [✂] response to [✂].
[334] Package constituents can be found by consulting Modern-Work-Plan-Comparison-Enterprise.pdf
[335] Package constituents can be found by consulting Modern-Work-Plan-Comparison-Enterprise.pdf

4. Price difference between Azure and rival clouds

4.1 This section sets out the evidence we have received and provides a description of our ongoing analysis into any differences in the licensing costs for Windows Server and SQL Server on Azure compared with AWS or GCP.

4.2 Although we have received submissions relating to Microsoft's practices in relation to both price and non-price aspects, customers primarily raised issues related to pricing (as set out in paragraph 4.9). Our analysis therefore focuses on price aspects and, at this stage, does not encompass any non-price differences. To the extent that there are non-price differences between using Microsoft software on Azure versus other clouds and customers take non-price differences into account in choice of cloud, our analysis could understate the difference between deploying Microsoft workloads on Azure compared to rival cloud providers.

4.3 In this section, we set out:

(a) submissions from cloud providers;

(b) evidence from customers; and

(c) a description of our ongoing analysis on the cost to customers of deploying Microsoft workloads on different cloud providers' clouds.

4.4 In relation to our ongoing analysis of costs to customers, we seek to compare the licensing spend by customers for use of Microsoft software licences on Azure with the input costs AWS and Google would incur to host the same volumes of usage via the SPLA.[336] Note that this analysis seeks to compare the cost of the software licence component of relevant cloud services only and not the underlying compute costs.

4.5 We have not analysed licensing spend differentials between Microsoft and non-Listed Providers. Any such differential is likely to be minimal or zero based on our current understanding of Microsoft's licensing arrangements.[337]

Submissions from cloud providers

4.6 Microsoft submitted that:

(a) It is not necessarily more expensive to use Microsoft software on AWS and GCP than elsewhere; it will depend on the customer's specific workload and

[336] For Windows Server, we currently only have data available for licensing spend relating to licences deployed on Azure with the AHB applied.
[337] Microsoft submitted that its 2022 licensing changes granted customers like-for-like economies on Microsoft software whether used on Azure or another non-Listed Provider cloud. Microsoft submission to the CMA [✂].

AWS' and Google's pricing decisions.[338] Microsoft said that, as a Listed Provider, it is in the same position as AWS and Google. Its customers wanting Windows Server VMs on Azure would need to purchase those services, and Azure would charge customers a fee for the right to use those VMs. [339]

(b) AWS and Google set prices for workloads that include Microsoft software so such workloads are only more expensive on AWS/Google if those providers want them to be. Microsoft said that AWS and Google have total freedom to offer customers discounts,[340] [✂];[341]

(c) AWS and Google spend less than [0-5]% and [0-5]%, respectively, of their cloud revenues on licensing Microsoft software through the SPLA programme;[342]

(d) Considering 'all else equal' is an artificial premise because customers consider the overall economics of the cloud deployment and will not simply compare Windows Server VM prices across different clouds (or other Microsoft software products;[343] and

(e) Microsoft's licensing rights ultimately preserve innovation incentives, enable more efficient licensing and lower prices for customers.[344]

4.7 Microsoft also submitted quantitative analysis on the SPLA costs it charges AWS and Google. It calculated the markups AWS and Google charge over their SPLA costs and its own margins if it were to charge itself the same SPLA licensing cost it charges AWS and Google. We are currently considering this submission and have requested the underlying data and calculations. We are continuing to consider this analysis and the scope for the analysis to provide insight into the impact, if any, of Microsoft's licensing practices.

Customers examples (submitted by a cloud provider)

4.8 One cloud provider submitted (i) actual (but anonymised) customer examples[345] and (ii) hypothetical customer examples[346] and discussed the differences those customers would encounter from hosting their workloads on Azure compared to its own cloud. We are continuing to consider these customer examples and the scope

[338] Microsoft submission to the CMA [✂].
[339] Microsoft submission to the CMA [✂].
[340] Microsoft submission to the CMA [✂].
[341] Microsoft submission to the CMA [✂].
[342] Microsoft submission to the CMA [✂].
[343] Microsoft submission to the CMA [✂].
[344] Microsoft submission to the CMA [✂].
[345] [✂] response to the CMA's information request [✂].
[346] [✂] responses to [✂].

for this evidence to provide insight into the impact, if any, of Microsoft's licensing practices.

Evidence from customers

4.9 We asked customers about the differences, if any, between using Microsoft software products[347] on Azure compared to using those products on other public clouds in terms of price. In the same question, we asked about any non-price differences and identified functionality, access to or timing of software updates and availability. As such, we set out their answers for both price and non-price differences below:

(a) Most customers that we spoke to identified that there were price advantages from using Microsoft software products on Azure.[348]

(b) A few customers identified at least one non-price difference:

(i) One customer said that for IaaS there were 'some' Microsoft services absent on non-Azure clouds. As an example, the customer identified Office365, and said that there is therefore a need to continue to use Azure for this service. This customer also said that using Azure entitles customers to more upgrade rights for pre-October 2019 licences;[349] and

(ii) One customer said that it was previously unable to access Microsoft 365 on AWS. The customer explained that recent changes meant that it is now technically possible, but that customer still uses Azure for Microsoft 365 workloads because it is less expensive.[350]

Evidence from the Jigsaw report

4.10 The Jigsaw report generally indicated that Azure was the 'natural choice' for Microsoft customers for both technical and financial reasons.[351] In this regard, some participants indicated that there were current practical benefits of Azure, of which pricing appears to be a part of. The report provided an example of a participant that identified that its existing skill base made Azure a natural fit and considered some Microsoft services are cheaper on Azure than on rival cloud. [352] Similarly, another participant identified that Microsoft allows BYOL to Azure, and that this licensing model meant that Azure was the most competitive cloud for

[347] The question referred to SQL Server, Windows Server, Windows 10/11, Microsoft Office, Microsoft 365 and Active Directory/Azure AD specifically.
[348] Responses to the CMA's information requests [✂].
[349] [✂] response to the CMA's information request [✂].
[350] [✂] response to the CMA's information request [✂].
[351] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 7.3.2.
[352] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 7.1.6.

some types of workload.[353] However, the research also explains that some participants found it difficult to unpick the charges they incur for their Azure use as they are part of the enterprise agreement.[354]

Our initial views

4.11 Based on the evidence we have seen to date, we consider that most customers we spoke to consider that it is cheaper to use Microsoft software products on Azure than on any other cloud provider's service. A few customers we spoke to also identified some non-price differences between Azure and non-Azure clouds. We plan to further consider the effect of non-price differences.

Our analysis of differences in licensing costs on Azure compared with AWS and Google

4.12 We are undertaking an analysis that seeks to estimate the implied difference in the licensing costs for Windows Server and SQL Server on Azure compared with AWS or GCP. Windows Server and SQL Server are sold on a PAYG basis which allows us to estimate the implied difference in cost based on usage data.

4.13 This ongoing analysis seeks to use Microsoft data on the volume of usage (in vcore hours)[355] for each Azure customer of Windows Server and SQL Server that benefited from AHB in 2022, and on billing information from AWS' and Google's SPLA contracts to estimate how much it would have cost AWS or Google to host the same levels of usage on their respective platforms.

4.14 To the extent there is a significant difference between customers' licensing costs on Azure compared with the input cost charged to AWS and Google, and in particular when expressed as a proportion of customers' total Azure spend, this could be indicative of scope for Microsoft's licensing practices to soften competition by reducing the competitiveness of rival providers' cloud offerings and affecting customers' choice of cloud provider.

4.15 We are continuing to consider the scope for this analysis to provide insight into the practical impact, if any, of Microsoft's licensing practices as they relate to pricing.

[353] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 7.2.3.
[354] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 7.1.9.
[355] Virtual core hours (vcore hours) are hours of usage normalised for the number of core processing units being used to run a particular instance or operating system environment (OSE). For example, using Windows Server OS on a VM that uses 4 CPUs for one hour constitutes 4 vcore hours of usage.

5. Effect on customer choice of cloud

5.1 This section sets out the evidence we have received to date and a description of our ongoing analysis of the effect that Microsoft's licensing practices may have on customers' choice of cloud provider. To the extent that licensing terms introduce a price or non-price differential for software products procured by a customer, those terms could influence a customer's initial choice of cloud provider, its choice of provider for incremental workloads, or its decision whether to switch provider.

5.2 The scope for licensing practices to have an impact on customer choice depends on whether customers are willing and able to multi-cloud. To the extent there are substantial barriers to multi-cloud, any direct impact of licensing practices on customers' choice of cloud provider for workloads that involve Microsoft software may have an indirect impact on workloads that do not involve Microsoft software.

5.3 We set out:

(a) a description of our ongoing analysis of the proportion of the market that is likely affected by the licensing practices;

(b) cloud providers' views on whether customer choice is affected by the licensing practices;

(c) a description of our ongoing analysis of the relative usage of Microsoft software across rival clouds; and

(d) customers' views on the factors driving their choice of cloud.

Proportion of the market affected by Microsoft's licensing practices

5.4 Below we set out a number of factors that we consider would make harm to competition more likely. One such factor is that the proportion of the market potentially affected by Microsoft's licensing practices is significant.

5.5 Below we provide a description of our ongoing analysis of the proportion of customers that currently use Microsoft software on the cloud. We consider it is important to also look at the potential future usage of Microsoft software on the cloud. We therefore present evidence submitted to us on the significance of Microsoft software in on-premises solutions.

Proportion of cloud customers that use Microsoft software and related revenues

5.6 We are undertaking an analysis that seeks to estimate the proportion of cloud customers that use each of Windows Server, SQL Server, and MS365 or Office Apps.

5.7 This ongoing analysis seeks to use data from Microsoft, AWS and Google to estimate the proportion of their UK cloud customers that used each of Windows Server, SQL Server and MS365 or Office Apps in 2022 and the proportion of their total UK cloud revenues that spend from these customers accounted for.

5.8 To the extent there is a significant proportion of cloud customers that use the Microsoft software, this could be indicative of the scale of any potential impact arising from Microsoft's licensing practices.

5.9 We are continuing to consider the scope for this analysis to provide insight into the scale and impact, if any, of Microsoft's licensing practices.

Proportion of the total addressable market

5.10 The ongoing analysis discussed above will seek to estimate the proportion of current UK cloud customers (and the proportion of cloud revenues they account for) that are potentially affected by Microsoft's licensing practices.

5.11 The scope for this conduct to have a material impact on the cloud infrastructure market may be measured not only in relation to the current usage of Microsoft software on the cloud, but also by reference to the potential future usage of Microsoft software on the cloud. An important source of growth for the cloud market is migration from on-premises solutions. We therefore consider that it is potentially relevant to consider the significance of Microsoft software in on-premises solutions.

5.12 One provider submitted evidence on the size of the total addressable market for cloud services, ie the maximum potential revenue that a cloud provider could earn including from current customers of other providers and on-premises customers, and what proportion of that is likely to be affected by Microsoft's licensing practices.[356] This evidence provides information on the total addressable market for cloud services in 2022, both globally and in the UK and segmented into 'traditional' and 'digital native' customers.

5.13 One provider submitted that traditional enterprise customers (ie those with existing on premises footprints) are more likely to be affected by Microsoft's licensing practices due to their historical reliance on Microsoft's legacy on-premises software. [357]

5.14 Customers that have a history of using Microsoft software on-premises likely face higher barriers to switching to alternatives when they migrate to the cloud. For example, see 'Customers' submissions' sections in Section 3 above, where

[356] [✂] response to the CMA's information request [✂].
[357] [✂] response to the CMA's information request [✂].

customers highlight various barriers to switching away from the Microsoft software products including application compatibility and staff retraining. The Jigsaw report also found that 'that original take up of Microsoft Azure is often closely related to an organisation's pre-existing use of Microsoft products and services'.[358]

5.15 Conversely, one provider submitted that digital native customers (defined as companies founded after 2000 for which digital technology is core to their business model, product, or distribution rather than as a support or ancillary function like in traditional companies)[359] are generally less directly impacted by Microsoft's licensing practices as they do not generally have a historical reliance on Microsoft's legacy on-premises software products. [360]

5.16 The same provider calculated using the [✂] dataset that digital native customers accounted for [5-10]% and [5-10]% of the total addressable market for cloud services globally and in the UK respectively in 2022.[361] While not all traditional customers will be locked in to using Microsoft software, this evidence suggests that the majority of the total addressable UK cloud market will potentially be affected by Microsoft's licensing practices.

Submissions from cloud providers

5.17 Microsoft submitted that AWS and Google have not had difficulty attracting customers who use Microsoft products, and that the costs of Windows Server VMs are just one small component of the customers' overall decisions. It submitted that AWS has significant and growing usage of Windows Server and that GCP has lesser reliance on Windows Server VMs because of a focus on AI and other premium services.[362]

5.18 A cloud provider submitted that Microsoft's practices harm customers that are left with no economically reasonable alternative but to choose Azure, even if they prefer the prices, quality, security, innovations and features of rivals.[363] This provider also submitted that traditional enterprise customers, ie those with existing on-premises footprints, and in particular those with existing on-premises Microsoft software licences, are commercially disincentivised from choosing non-Azure cloud infrastructure when migrating to the cloud or considering switching. This provider added that, by contrast, digital natives are generally less directly impacted.[364]

[358] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 1.4.29.
[359] [✂] response to the CMA's information request [✂].
[360] [✂] response to the CMA's information request [✂].
[361] [✂] response to the CMA's information request [✂].
[362] Microsoft submission to the CMA [✂].
[363] [✂] response to [✂].
[364] [✂] response to the CMA's information request [✂].

5.19 Another provider submitted that it had lost [✂] USD due to customers that had either left the provider's VDI solutions, or expressed interest in using the services but ultimately chose not to due to licence restrictions in 2022 and part of 2023.[365] This provider's total revenue for its VDI solutions was around [✂] USD in 2022.[366]

Relative usage of Microsoft software

5.20 We are undertaking an analysis that seeks to estimate the relative usage of Windows Server and SQL Server on Azure compared with AWS and Google.

5.21 This ongoing analysis seeks to use data from Microsoft, AWS and Google on the average volume of usage (in vcore hours) of Windows Server and SQL Server by customers in different revenue brackets that licensed each product through their respective SPLAs to compare the average usage on Azure to the average usage on AWS and Google.

5.22 To the extent there is a significant difference in the usage of Windows Server and SQL Server on Azure compared with AWS and Google, this may be indicative of scope for Microsoft's licensing practices to affect customers' choice of cloud provider. However, we note that there are other possible factors that may explain any difference, including customers' familiarity with or loyalty to the Microsoft ecosystem, and the availability of alternative software products on AWS and Google and customers' ability and willingness to use them. Therefore, while this analysis seeks to understand the choices made by customers of Microsoft's software in relation to their cloud provider, it will need to be interpreted in light of the other available evidence on drivers of customer choice and the availability of alternative software.

5.23 We are continuing to consider the scope for this analysis to provide insight into the practical impact, if any, of Microsoft's licensing practices.

Evidence from customers

Choice of cloud

5.24 In this section, we set out the evidence gathered from customers on their choice of cloud provider. In line with the qualitative nature of the evidence we gathered, we have given a narrative summary of the key points that we consider emerge from the evidence.

[365] [✂] response to the CMA's information request [✂].
[366] [✂] response to the CMA's information request [✂].

Selection factors

5.25 We asked customers directly about the role that Microsoft's licensing practices had, if any, in their choice of cloud provider. We contacted Microsoft customers with questions relating to their use of Microsoft software products and their licensing arrangements. We asked large customers selected randomly using a random number generator from the customer lists of AWS, Microsoft, Google, Oracle and IBM.

5.26 In addition, where relevant, we have provided evidence from the Jigsaw report.

5.27 A cloud provider and CISPE submitted that customers are unwilling to speak openly about the issues they face in relation to Microsoft's licensing practices because they fear retaliation from Microsoft through onerous audits (used to verify compliance) or worse terms in subsequent negotiations.[367]

5.28 We prompted Azure customers to consider the relevant factors that affected their decision when they selected Azure as their public cloud. We asked them to particularly consider the relative importance of (i) familiarity with the Microsoft ecosystem; (ii) the ability and/or ease of obtaining licences for Microsoft software products in their choice of Azure; and (iii) already using Azure for back-end management of other apps. We summarise out their answers below:

(a) There was a broad consensus among the customers we spoke to that existing skills and familiarity with the Microsoft ecosystem were factors in choosing Azure as their cloud provider.[368] A few of these customers identified themselves as a 'Microsoft shop' or a 'Microsoft first' organisation.[369]

(b) Most customers were influenced by licensing as a consideration in their choice of cloud provider, although other factors also played a role:

(i) Most customers identified licensing as a factor in their choice of Azure[370] and indicated that licensing was a factor considered in the round with other selection criteria. For example, one customer said that use of existing licences on Azure was a plus factor, but not a primary factor.[371] A different customer said it operates a multi-cloud strategy and uses Azure for hosting a limited number of applications on an exception basis, which was driven by the needs of the application and commercial / licensing constraints.[372]

[367] [✂] response to the CMA's information request [✂]; CISPE submission to the CMA [✂].
[368] Responses to the CMA's information requests [✂].
[369] Responses to the CMA's information requests [✂].
[370] Responses to the CMA's information requests [✂].
[371] [✂] response to the CMA's information request [✂].
[372] [✂] response to the CMA's information request [✂].

(ii) A few customers said that they did not consider licensing in their choice of Azure.[373] One of these customers said that licensing was not a persuasive factor in its decision making.[374] Another customer submitted that acquiring Microsoft software products for use on public cloud was a brand new procurement activity and that no existing agreements existed.[375]

(c) The evidence was mixed regarding the importance of already using Azure for the back-end management of other apps.

(i) Most customers submitted that pre-existing use of Azure was a factor in their decision.[376] One of these customers said that the breadth of Azure and the reliance of Azure on EntraID was considered during the process.[377] Another customer said that managing the back-end of MS 365 constituent apps, in particular in the identity management aspects, was a consideration and an early part of their cloud adoption journey.[378]

(ii) A few customers said that pre-existing use of Azure was not a factor in their decision to use Azure.[379] One customer said that this was not a major factor[380] and another customer said that it was not a decision factor, though the latter identified that integrations between Azure and MS 365 add additional value to it.[381]

5.29 We also asked large customers to provide an indication of the importance of different factors (provided by the CMA) that they consider when choosing their main public cloud provider.[382] The responses showed that:

(a) Many customers rated the cost and ability to use software licences as important or very important. In their free-text explanations, some customers explicitly mentioned the ability to bring on-premises licences to the public cloud was important.[383] For example, one customer said that one of their biggest considerations is being able to make use of existing investment in licences[384] and another customer said that significant investment had already

[373] Responses to the CMA's information requests [✂].
[374] [✂] response to the CMA's information request [✂].
[375] [✂] response to the CMA's information request [✂].
[376] Responses to the CMA's information requests [✂].
[377] [✂] response to the CMA's information request [✂].
[378] [✂] response to the CMA's information request [✂].
[379] Responses to the CMA's information requests [✂].
[380] [✂] response to the CMA's information request [✂].
[381] [✂] response to the CMA's information request [✂].
[382] The other factors listed by the CMA were price, including discounts or cloud credits; service quality; AI capabilities; number and location of datacentres; existing relationship with the cloud provider; range of cloud infrastructure services offered by the cloud provider; range of services offered by ISVs; cloud-specific skills of your employees; ease of integration with your existing IT (such as private cloud or traditional IT); ease of integration with other public clouds; and data sovereignty requirements. Customers also had the option to identify and rate other factors.
[383] Responses to the CMA's information requests [✂].
[384] [✂] response to the CMA's information request [✂].

been made so having the ability to BYOL is a 'major advantage'.[385] Another customer submitted that Microsoft makes the cost and ability to use software licences difficult with Windows/SQL. It specified that it is uncompetitive to use a competitor cloud for Microsoft software product use cases because it is expensive, complex and difficult.[386]

(b) A few customers rated the cost and ability to use software licences as unimportant or very unimportant. Of these, two customers indicated that licences were not relevant for their applications[387, 388] (and therefore they are not customers of Microsoft licences for their cloud applications) and another said that licence costs are bundled in for their use cases.[389]

Choice of cloud

5.30 We also asked customers whether the differences, if any, between using Microsoft software products on Azure compared to non-Azure clouds affected their choice of cloud. Overall, the evidence was mixed:

(a) Half of the customers said that licensing terms did affect their choice of Microsoft workloads;[390]

(b) The other half of customers said that licensing terms did not affect their choice of workload placement,[391] with some of these specifying that other factors were more important in their choice of cloud.[392]

Evidence from the Jigsaw report

5.31 The Jigsaw report found that individual factors did not necessarily affect participants' attitudes towards multi-cloud or switching significantly on their own, but rather they add up and shape multi-cloud or switching behaviour in a cumulative way. The report notes that this makes the role of software licensing in the decision to go with Azure difficult to unpick, though adding that participants did not single out licensing as a key factor on its own influencing their decision.[393] The report did highlight that pre-existing use of Microsoft was often closely related to participants' original take up of Azure, with some participants identifying themselves as Microsoft shops.[394]

[385] [✂] response to the CMA's information request [✂].
[386] [✂] response to the CMA's information request [✂].
[387] [✂] response to the CMA's information request [✂].
[388] [✂] response to the CMA's information request [✂].
[389] [✂] response to the CMA's information request [✂].
[390] Responses to the CMA's information requests [✂].
[391] Responses to the CMA's information requests [✂].
[392] Responses to the CMA's information requests [✂].
[393] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 1.4.30-31
[394] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 7.3.1.

5.32 The report notes that participants often struggled to precisely detail why their organisation uses Azure, beyond describing it as a natural choice for both technical and financial reasons.[395] Licensing terms appear to contribute to these reasons. For example, one customer identified the ability to port licences to use on Azure compared to having to re-license on AWS, and said that this makes some workloads more competitive on Azure. Another customer said that they were able to get critical security patches for longer if they went to Azure.[396]

5.33 In addition, some participants referred to enterprise agreements which licensing terms can affect. These participants indicated that, while they see enterprise agreements as beneficial to them, the agreements mean that they rarely, if ever, review their Azure usage.[397] Indeed, the research found that for Azure users the stakes were too high for switching to be a realistic scenario, whereas AWS users were more willing to entertain the idea, even if they did not in reality want to implement a switch of supplier.[398]A

Our emerging views

5.34 Based on the evidence we have seen to date, licensing terms may have an impact on customers' choice of cloud provider. Our customer evidence indicates that the cost or ease and/or ability to use Microsoft software licences are either a key or a plus selection factor for many customers, and some particularly consider the ability to make use of their existing investment in licences in their decision. These customers are therefore more likely to choose Azure for running at least their Microsoft workloads, and possibly more widely.

5.35 The evidence also shows that pre-existing use of Microsoft software, and the associated skills developed, were very important selection factors for many Azure customers. Nevertheless, even many of these customers indicated that licensing terms were also a consideration in their decision-making process. Further, we note that even for customers that would have chosen Azure due to their pre-existing use of Microsoft regardless of licensing terms, the licensing terms may still influence future decision making and therefore potentially harm competition. In particular, for Azure customers considering switching, licensing terms may result in an additional friction to doing so.

[395] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 7.3.2.
[396] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 7.2.3.
[397] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 7.3.4.
[398] CMA commissioned primary customer research conducted by Jigsaw, dated 23 May 2024, paragraph 7.2.5.

Virtual Desktop Infrastructure

5.36 This section sets out initial evidence gathered from customers on their choice of cloud provider for their VDI workloads.

5.37 As outlined in Section 3, one of the primary use cases for Windows Desktop OS and Microsoft 365 or Office Apps on the cloud is in a virtualised desktop environment. Windows Desktop OS and Microsoft 365 are both products in relation to which our emerging view is that Microsoft likely has a significant degree of market power. Therefore, VDI services could be a particularly important subsegment to consider when assessing the impact of Microsoft's licensing practices on customer choice of cloud provider.

5.38 We have heard from a third party VDI services provider that VDIs are becoming an increasingly important workload for cloud customers due to the additional security, flexibility, and performance that they can offer over PC hardware.[399] We have also heard that customers may have reason to deploy other workloads on the same cloud as their VDI.[400]

5.39 We asked customers if they ran a network of VDIs and where they hosted VDIs. Most customers we spoke to responded that they use VDI.[401] Some of these customers host VDI on-premises.[402] Considering the customers that host VDI on public cloud, many host their VDI on Azure,[403] with one of these hosting on both Azure and AWS,[404] and a few hosting on both Azure and on-premises.[405]

5.40 We asked customers what their motivations for using VDI are. Most responded that the key benefits of VDI are flexibility, ie the ability to scale up and down their desktop footprint without needing to invest in additional hardware or ship hardware overseas, and greater security through centralised control of access. The third most cited factor was performance, eg using the additional compute power of VMs to reduce the running time of intensive workloads.

5.41 Some customers responded with the proportion of their total cloud spend that they allocate to VDI. Around half of these spend between 10-20%[406] while the other half spend less than 10%.[407]

5.42 We also asked customers whether there is any benefit to hosting other workloads on the same cloud as their VDI. In general, customers' responses to this question

[399] Note of meeting with [✂].
[400] Note of meeting with [✂].
[401] Responses to the CMA's information requests [✂].
[402] Responses to the CMA's information requests [✂].
[403] Responses to the CMA's information requests [✂].
[404] [✂] responses to the CMA's information requests [✂].
[405] Responses to the CMA's information requests [✂].
[406] Responses to the CMA's information requests [✂].
[407] Responses to the CMA's information requests [✂].

appear to depend on their use cases for VDI. Some customers said that higher latency can impact performance if certain data and the server side of applications is hosted separately from the client side.[408] Similarly, one customer that uses VDI to run intensive workloads said that the underlying storage and compute must sit as close as possible to mitigate latency and performance issues.[409] However, just under half of customers did not consider this in deciding where to deploy cloud workloads.[410]

5.43 We sent specific follow-up questions to the customers that use Azure for their VDI workloads to enquire about any role that Microsoft's licensing practices played in their choice of provider for VDI. A few customers said that they chose Azure to make effective use of their existing Microsoft software licences and Azure commitments.[411] However, one customer said that the Azure VDI offering was superior to competitors, and another said that there is no difference in the costs of licensing Microsoft software on Azure and AWS.[412]

Our emerging views

5.44 Based on the evidence we have seen so far, it appears that VDI workloads may be important for many customers and that they may become increasingly important over time as customers look for greater flexibility, security, and performance.

5.45 We consider that Microsoft's licensing practices may affect customers' decisions over where to deploy their VDI and that these decisions may have knock-on effects on decisions over where to deploy other workloads for certain customers. However, the evidence we have seen thus far is limited and inconclusive. We will continue to gather evidence.

[408] Responses to the CMA's information requests [✂].
[409] [✂], Responses to the CMA's information requests [✂].
[410] Responses to the CMA's information requests [✂].
[411] Responses to the CMA's information requests [✂].
[412] Responses to the CMA's information requests [✂].

6. Overview of our emerging views

6.1 This working paper has presented our initial analysis of and emerging views on the potential impact of Microsoft's software licensing practices and whether these practices disincentivise customers from using rival cloud providers, raise barriers to entry and consequently give rise to concerns about harm to competition.

6.2 Our approach to this assessment has two important bases:

(a) First, harm is more likely to arise if the licensing practices relate to software products where Microsoft has market power, such that customers would find it difficult to switch away from them; and

(b) Second, harm is more likely if Microsoft's software products are provided at a higher price or lower quality to customers that choose one of Microsoft's rivals in cloud services to be their provider, which may weaken competition between cloud providers.

6.3 Below we summarise the evidence we have seen to date on Microsoft's licensing practices and our emerging views on the extent to which Microsoft has market power in relation to the software products we are considering and the extent to which the licensing practices affect customer choice of cloud provider.

What are Microsoft's licensing practices?

6.4 We received a number of submissions setting out various types of issues and concerns with regard to Microsoft's software licensing practices, relating both to price and non-price factors.

6.5 The price factors relate to:

(a) price differences between using Microsoft products on Azure compared to rivals' clouds as a result of BYOL restrictions (whereby customers cannot BYOL to Listed providers' clouds);

(b) the Azure Hybrid Benefit offered by Microsoft, which allows customers with on-premises core licences with active Software Assurance or qualifying subscription licences to use their on-premises Windows Server and SQL Server licences on Azure at a reduced cost;[413] and

(c) the prices charged to other cloud providers via the Services Provider Licensing Agreement (SPLA) for licensing Microsoft software.

6.6 The non-price factors set out in the submissions are wide-ranging and include (but are not limited to) submissions that Microsoft refuses to supply certain of its products via the SPLA to other cloud providers (eg Microsoft 365, Desktop 10/11 and Visual Studio) and it limits security updates and features for Microsoft products that are being run in other clouds.

[413] See Explore Azure Hybrid Benefit for Windows VMs - Azure Virtual Machines | Microsoft Learn and Azure Hybrid Benefit - Azure SQL Database & SQL Managed Instance | Microsoft Learn, accessed on 17 May 2024.

6.7 Our evidence gathering and analysis so far has focussed on the price factors. We are currently considering the evidence we have received on non-price factors and how this impacts our analysis.

To what extent does Microsoft have market power in software?

6.8 Based on the evidence we have seen to date and our initial analysis, Microsoft appears likely to have significant market power in relation to its supply of the following products: Windows Server, Windows 10/11, SQL Server, Visual Studio and its productivity suites (MS365/Office Apps).

6.9 This is because we see at least one of the following indicators of potential market power (and in several cases multiple of these indicators) in relation to each of the software products: high market shares, customers reporting they are unwilling or unable to switch to an alternative, or distinctive product characteristics which mean Microsoft's product is highly differentiated from potential alternatives.

To what extent do Microsoft's licensing practices affect customer behaviour?

6.10 Our analysis so far has focussed on the potential impact of the price factors on consumers' choice of cloud provider. We are undertaking data analysis that seeks to estimate:

(a) the implied difference in the licensing costs for Windows Server and SQL Server on Azure compared with AWS or GCP;

(b) the proportion of cloud customers that use each of Windows Server, SQL Server, and MS365 or Office Apps; and

(c) the relative usage of Windows Server and SQL Server on Azure compared with AWS and GCP.

6.11 Evidence we have seen to date from customers on whether Microsoft's licensing practices had an impact on their choice of cloud provider shows that:

(a) most customers we spoke to understand that using Microsoft software products is cheaper on Azure;

(b) the cost or ease and/or ability to use licences are selection factors for many customers we spoke to, and some particularly consider the ability to make use of their existing investment in licences in their choice of cloud provider;

(c) a few customers we spoke to do not consider licensing to be an important factor in their choice of public cloud (for some of these customers, licensing was not relevant for their use cases); and

(d) existing skills and familiarity with the Microsoft ecosystem were also very important selection factors for many Azure customers we spoke to.

6.12 The Jigsaw report found that participants considered that Microsoft's software licensing practices were not, on their own, the influencing factor in their choice of public cloud provider. The report particularly highlights that the original take up of Azure was often closely related to customers' pre-existing use of Microsoft

products. However, some participants considered Azure as the natural choice for both technical and financial reasons and licensing terms appear to contribute to this.

Our emerging view

6.13 Based on the evidence we have seen so far, Microsoft appears likely to have a significant degree of market power in relation to its supply of the following products: Windows Server, Windows 10/11, SQL Server, Visual Studio and its productivity suites.

6.14 Evidence from customers we spoke to who use Microsoft software products suggests that the licensing of those products can be a consideration in their choice of cloud provider although other factors also play a role. As a result, Microsoft's licensing practices may affect customers' choice of cloud provider, at least for running Microsoft workloads, and possibly more widely.

6.15 We will consider our ongoing data analysis, as described above, once complete, in the round with other relevant evidence.

7. Licensing Remedies

Introduction

7.1 In the event that we find an adverse effect on competition (AEC), we are required to decide whether, and if so what, remedial action should be taken to address that AEC or any detrimental effect on customers so far as it has resulted or may be expected to result from the AEC.

7.2 We describe the CMA's approach to possible remedies in our issues statement.[414] This noted that we are considering the potential for cross-cutting remedies or a package of remedies which would combine to remedy, mitigate or prevent any AECs or their detrimental effects on customers.

7.3 We are at an early stage of considering potential remedies and as our understanding of the market(s) and the potential issues develops, we expect our consideration of potential remedies to evolve. As set out in the CMA's guidance,[415] we will consider and discuss potential remedies alongside working on understanding what features of the market may give rise to adverse effects. Consistent with this, we set out in this section our early views on potential remedies to potential AEC(s) relating to Microsoft's licensing practices, and the views that stakeholders have submitted in relation to these potential remedy options, and invite submissions from parties on these to help inform our emerging thinking.

Our analysis of potential licensing remedies

7.4 In this section we set out our rationale for potential remedies relating to Microsoft's licensing practices that we are considering in relation to the analysis set out in this paper,[416] and the views that stakeholders have submitted in relation to these options, as well as emerging thinking on some of the design and assessment issues that may arise.

7.5 We structure this as follows:

(a) we provide views from parties which are relevant to different types of licensing remedies; and

(b) we then set out our current analysis of design considerations for any interventions which relate to Microsoft's licensing practices. For illustrative

[414] Issues statement (publishing.service.gov.uk)
[415] Market Studies and Market Investigations: Supplemental guidance on the CMA's approach (publishing.service.gov.uk), paragraph 3.50.
[416] See Section 1: Introduction and framework.

purposes we have included examples of specific products or features that these remedies could apply to. However, the product scope of any remedies will depend on the finding of any AEC(s).

(c) Remedies 1-3 are targeted at commercial licensing practices, and are intended to reduce the potential significance of any differential pricing for Microsoft software products for use on Azure and third party cloud infrastructure:

(i) Remedy 1: Non-discriminatory pricing for Microsoft software products, regardless of which cloud infrastructure they are hosted on;

(ii) Remedy 2: Allowing customers to transfer previously purchased Microsoft software products to the cloud infrastructure of their choice without additional cost; and

(iii) Remedy 3: Increasing price transparency in relation to the use of Microsoft software products on Azure and third party cloud infrastructure.

(d) Remedy 4 is potentially more technical in nature, and is intended to reduce the potential significance of some of the non-price related licensing practices we are considering in our analysis in this paper on a customer's choice of cloud provider:

(i) Remedy 4: Requiring parity of Microsoft software products and product functionality for use on Azure and third party cloud infrastructure.

Overview of stakeholder views

7.6 In this section we set out some overarching stakeholder views on the potential remedies outlined above, that cloud providers and other stakeholders have submitted.

7.7 AWS, the Coalition for Fair Software Licensing (CFSL) and CISPE have made submissions advocating the introduction of principle-based remedies which could be applied industry-wide, as well as interventions which target specific Microsoft licensing practices.[417]

[417] CISPE response to the Issues Statement dated 17 October 2023; [✂]; AWS response to the Issues Statement dated 17 October 2023, paragraph 33; CFSL response to the Issues Statement dated 17 October 2023, page 2.

7.8 AWS and CISPE submitted that the design of the underlying principles could be based on the Ten Principles of Fair Software Licensing[418] published by CISPE and Cigref [419] in 2021 (see Appendix A), which include for example:

(a) equal treatment for software licensing fees in the cloud; and

(b) freedom to bring previously purchased licences to the cloud.[420]

7.9 AWS told us that the best way to eliminate unfair licensing practices for all customers is to embrace the Ten Principles of Fair Software Licensing as standard practice for the industry.[421]

7.10 CISPE suggested that one way to enforce a principle-based remedy would be for it to be monitored and enforced by an independent body including through use of audit controls.[422] It set out specific examples of targeted interventions which could be used to address specific Microsoft licensing practices, based on submissions it had previously presented to Microsoft in 2023, which had been crafted in consultation with CISPE's members.[423] It also submitted that many of its proposed remedies would require no engineering effort or changes to existing software products, such as changes to the pricing terms available to different customers, or changes to Microsoft's current BYOL policies.[424]

7.11 Google made submissions relating to interventions targeted at Microsoft's software licensing practices particularly targeted at Listed Providers.[425] Google submitted that some of these remedies could be relatively straightforward to implement through changes to contractual terms, such as removing the BYOL restrictions which currently apply to Listed Providers.[426]

7.12 Microsoft has submitted that:

(a) larger Listed Providers already have the resources and capabilities to compete in the cloud services market[427]; and

(b) any disruption that Microsoft may have caused to the business models of what Microsoft refers to as 'smaller developers' as a result of the changes it

[418] Principles for Fair Software Licensing in the Cloud | CISPE - The Voice of Cloud Infrastructure Service Providers in Europe, accessed on 5 June 2024.
[419] Cigref is a network of French companies and public administrations set up in order to develop its members' ability to acquire and master digital technology, accessed on 5 June 2024.
[420] AWS response to the Issues Statement dated 17 October 2023, paragraph 33; CISPE submission [✂]
[421] AWS response to the Issues Statement dated 17 October 2023, paragraph 33.
[422] CISPE response to the Issues Statement dated 17 October 2023 page 5 and CISPE submission [✂].
[423] CISPE response to the Issues Statement dated 17 October 2023 page 5, and CISPE submission [✂].
[424] CISPE response to the Issues Statement dated 17 October 2023, pages 4-5.
[425] Google response to the Issues Statement dated 17 October 2023, paragraph 47.
[426] Google response to the Issues Statement dated 17 October 2023, paragraph 47.
[427] Microsoft response to the Issues Statement, dated 17 October 2023, paragraph 55.

had previously implemented in 2019 have already been addressed through licensing changes introduced in 2022.[428]

Rules-based versus principles-based approach

7.13 Before discussing specific remedies, we note that there is an important distinction in how any of these remedies are designed and implemented, specifically the extent to which they are rules-based or principles-based.

7.14 A rules-based approach would typically include a relatively detailed and prescriptive set of required and prohibited conduct for Microsoft. Conversely, a principles-based approach would require Microsoft to follow a set of specified principles, but with the greater freedom to decide exactly how to comply. A principles-based approach could also include procedural steps whereby Microsoft is required to set out, to the CMA's satisfaction, how it will be applying any principles imposed on it.

7.15 We note the potential for the design of remedies relating to Microsoft licensing practices to combine broader principles-based remedies with targeted prescriptive requirements, particularly where certain approaches are more easily specified or require swifter action.

7.16 Individual principles could be designed exclusively for Microsoft's licensing practices, or as a more generic set of principles capable of being extended also to other market participants if there was reason to do so.

7.17 We will continue to consider the extent to which rules-based versus principles-based approaches might be appropriate for any potential remedies in the context of Microsoft's licensing practices.

Remedy 1: Non-discriminatory pricing of Microsoft software products, regardless of which cloud infrastructure they are hosted on

Stakeholder views

7.18 Google has called for interventions directed at specific differences in Microsoft's licensing practices as between Listed Providers and non-Listed Providers.[429]

7.19 For example, Google has submitted that Microsoft should be required to reverse the conditions of access it imposes on Listed Providers under the SPLA which, in Google's view, impose unfair terms in return for supplying Windows Server and SQL Server under Google Cloud's SPLA (eg by charging unreasonable wholesale

[428] Microsoft response to the Issues Statement, dated 17 October 2023, paragraph 54.
[429] As explained in section 2, Listed Provider was introduced by Microsoft in 2019.

prices that push up the resale prices that Google Cloud must charge to its customers).[430]

7.20 Google has also submitted that Microsoft should be required to immediately reverse a forward-looking August 2022 announcement that imposed new contractual terms on managed service providers (in particular those who do not have their own data centre capacities) with effect from October 2025 which differentiate between the pricing framework that applies to managed services providers, depending on whose cloud infrastructure their Microsoft software products are hosted on.[431]

7.21 CISPE has submitted examples of specific requirements that could be imposed on Microsoft, based on a schedule of settlement requirements it had presented to Microsoft in 2023. These include examples of specific products and programmes which CISPE's members consider lack pricing parity.[432]

7.22 CISPE, together with other stakeholders including AWS, advocate also for the use of principle-based remedies in relation to what they consider to be unfair pricing practices.[433] In particular, the Ten Principles of Software Licensing which CISPE supports include a principle advocating 'Equal Treatment for Software Licensing Fees in the Cloud', which states that software vendors should not charge different prices for the same software based solely on who owns the hardware on which it is installed.[434]

7.23 CISPE also told us that it considers price parity remedies may need to include parity on a case by-case basis because there are so many different configurations for customers using Microsoft software products, and said there should be a third party that identifies where there is discrimination.[435]

Design considerations

7.24 Remedy 1 would restrict Microsoft's ability to charge different prices for software products depending on a customer's choice of cloud provider.

7.25 This remedy could require Microsoft to offer similar prices or price parity for its software products regardless of which cloud infrastructure those products are hosted on.

[430] Google response to the Issues Statement dated 17 October 2023, paragraph 47.
[431] Google response to the Issues Statement dated 17 October 2023, paragraph 47.
[432] CISPE submission to the CMA [✂].
[433] CISPE submission to the CMA [✂]; AWS response to the Issues Statement dated 17 October 2023, paragraph 33
[434] Principles of Fair Software Licensing for Cloud Customers - Fair Software Licences, accessed on 5 June 2024.
[435] Note of Meeting [✂].

7.26 The scope of this remedy would include contractual policies and pricing structures which are capable of directly or indirectly raising the relative cost to customers of using Microsoft software products on third party cloud infrastructure relative to Microsoft's own cloud infrastructure, including for example through discounting structures such as AHB.

7.27 We will also consider the level of product specificity for this remedy, which could be imposed in relation to individual products or suites of products (eg Microsoft 365), or across a more broadly defined portfolio of software products depending on the scope of any AEC(s) found.

7.28 Given that Microsoft's direct customers on third party cloud infrastructure are, in some cases, the cloud service provider rather than the end customer, the design of non-discriminatory pricing remedies may potentially involve comparison between prices at different levels in the supply chain for Microsoft software products.

7.29 For example, Microsoft sells subscription services for Windows Server to cloud service providers and other intermediaries under SPLAs for use on non-Azure cloud (which allow them to license Microsoft software products as part of their own solutions that they sell to customers), as well as directly to end customers. The SPLA sets out the prices charged to a non-Azure cloud service provider and therefore forms part of that cloud service provider's 'input' cost of servicing its end-customers on its own cloud infrastructure.

7.30 For products like Windows Server subscriptions, which are sold under SPLAs on non-Azure cloud infrastructure, this remedy could therefore impose obligations on Microsoft to ensure non-discriminatory pricing between the prices it charges at different levels in the supply chain, as discussed in more detail below.

7.31 Any remedy design would need to give careful consideration to the basis by which prices are to be compared, taking into consideration that Microsoft's direct customer in these circumstances is the cloud service provider, not the end customer.

7.32 One approach could be to restrict Microsoft from charging materially different prices on a per-product basis, regardless of whether they are Azure end customer prices or 'input prices' for non-Azure cloud infrastructure providers. However, we acknowledge that this may not fully reflect the different monetisation models for selling software products to end customers for use on Azure and third party cloud infrastructure (ie that the third party cloud provider may charge a price above that implied by the SPLA input prices).

7.33 An alternative approach could be to require Microsoft to provide access to its software products on fair, reasonable and non-discriminatory ('FRAND') pricing terms, where different fees are charged to different customers only where

objectively justified. Specific consideration would need to be given to the basis on which the level of FRAND prices would be set, and the appropriate oversight mechanism.

7.34 We are interested in stakeholder views on the possible approaches for imposing non-discriminatory pricing obligations on Microsoft between end customer prices for Azure customers and SPLA prices.

Potential impact

7.35 The aim of this remedy would be to prevent Microsoft from using differential pricing which make its software products more expensive when used with rival cloud infrastructure compared to Microsoft's Azure services.

Potential for unintended consequences

7.36 We consider that where a remedy reduces the differential in prices charged to different customers, there is a risk that some customers may face higher prices. For example, if Microsoft were to implement this remedy by increasing non-Listed SPLA prices in line with Listed Provider SPLA prices, some non-Listed Providers and end customers could face higher prices for certain Microsoft software products.

7.37 Where remedies impose changes to 'wholesale' pricing structures (eg SPLA pricing for Listed Providers or non-Listed Providers), there is a risk that those changes might not impact end customer prices. For example, the extent to which a reduction in AWS and Google SPLA prices for Windows Server impacts end customers, depends on the extent to which AWS and Google pass through those cost savings to their end customers.

7.38 We also consider there may be a risk that a remedy which, in part, requires Microsoft to remove differential pricing between Listed Providers and non-Listed Providers, (eg SPLA pricing differentiating between non-Listed Providers and Listed Providers), could reduce the ability of non-Listed Providers to compete.

7.39 We consider that where a remedy is intended to weaken a supplier's ability to use commercial practices which directly or indirectly raise rivals' supply costs, that supplier may be incentivised to try to lessen the impact of that remedy. There may be an incentive to try to circumvent this remedy, for example through changes to contractual terms and pricing structures for Microsoft software products, or through directly discounting the price of cloud infrastructure services for Azure customers who purchase a package of cloud infrastructure services and Microsoft software products. We consider circumvention risk could potentially be mitigated through remedy design which includes the use of principle-based remedies relating to the objectives of the remedy, alongside more targeted interventions.

Remedy 2: Allowing customers to transfer previously purchased Microsoft software products to the cloud infrastructure of their choice without additional cost

Stakeholder views

7.40 AWS and Google have called for remedies which require Microsoft to allow customers to use previously purchased software products on the cloud infrastructure of their choice, without incurring additional charges or fees.[436]

7.41 AWS submitted that remedy design could include adoption of principle-based remedies.[437] For example, the Ten Principles of Fair Software Licensing advocated by CISPE and AWS include a principle supporting 'Freedom to Bring Previously Purchased Software to the Cloud', which states that customers:

(a) 'that seek to migrate their software from on-premises to the cloud should not be required to purchase separate, duplicative licences for the same software'; and

(b) 'should be free from licensing restrictions and increased costs that discriminate against their ability to run their licensed software in the cloud, and on the cloud providers of their choosing'.[438]

7.42 Google has submitted that licensing remedies could be implemented in part by requiring Microsoft to terminate the commercial policies which currently restrict the customers of Listed Providers (including Google) from transferring licences to third parties. Google has also provided examples of software products which should be in scope of this remedy (eg the use of servers purchased for use on-premises; the transfer of Microsoft 365 products purchased for desktop to the customers VDI provider of choice).[439]

7.43 Google told us that customers would have greater choice of cloud provider if they were able to freely transfer existing licences to the cloud provider of their choice than if Microsoft is able to impose surcharges for licence transfers.[440]

7.44 CISPE has suggested that the design of remedies relating to transfer of previously purchased licences could include provisions relating to audit processes that Microsoft might employ when managing the risks of unlicensed software product use associated with allowing customers to freely transfer its software products to

[436] AWS response to the Issues Statement dated 17 October 2023, paragraph 33; Google response to the Issues Statement dated 17 October 2023, paragraph 47.
[437] CFSL response to the Issues Statement dated 17 October 2023, page 2; AWS response to the Issues Statement dated 17 October 2023, paragraph 33.
[438] Principles of Fair Software Licensing for Cloud Customers - Fair Software Licences, accessed on 5 June 2024.
[439] Google response to the Issues Statement dated 17 October 2023, paragraph 47.
[440] Google response to the Issues Statement dated 17 October 2023, paragraph 46.

third party cloud infrastructure, including to address concerns raised by individual CISPE members in relation to access to commercially sensitive information.[441]

7.45 Microsoft has submitted that:

(a) Microsoft considers that restrictions on BYOL for Listed Providers are necessary to ensure it is 'compensated fairly for its [Intellectual Property]';[442] and

(b) Microsoft is concerned that allowing customers to transfer previously purchased Microsoft software products to AWS and Google's cloud infrastructure in particular would significantly increase end customers' unlicensed use of Microsoft software products and that it is difficult to find and address small scale unlicensed use.[443]

Design considerations

7.46 This remedy would require Microsoft to allow customers who have previously purchased software products for use on premise or on Azure cloud infrastructure to deploy that same software on the cloud infrastructure of their choice, without incurring additional charges or fees.

7.47 We consider this form of remedy could be implemented primarily through changes to Microsoft's commercial policies and pricing structures governing a customer's use of its software products on cloud. For example, it could involve:

(a) the removal of contractual terms which restrict customers from migrating perpetual licences from on-premises to the cloud, or otherwise using previously purchased software on their cloud of choice; and/or

(b) the removal of Software Assurance charges (see section 2) relating to the deployment of previously purchased Microsoft software products and subscription services on a customer's choice of cloud infrastructure.

7.48 We recognise that the Software Assurance subscriptions include additional customer benefits other than licence transfer.[444] Therefore implementing this remedy may not be as straightforward as simply removing Software Assurance charges.

[441] CISPE submission to the CMA [✂].
[442] Microsoft submission to the CMA [✂].
[443] Microsoft submission to the CMA [✂].
[444] Software Assurance by Benefit | Microsoft Volume Licensing, accessed on 5 June 2024.

Potential impact

7.49 The aim of this remedy would be to prevent Microsoft from using commercial policies and pricing structures relating to the transfer of previously purchased licences in order to make its software products more expensive when used with non-Azure cloud services compared to Microsoft's Azure services.

7.50 The overall potential impact of this remedy is different from Remedy 1. By prohibiting Microsoft from charging customers to transfer previously purchased licences to the cloud, this remedy would effectively prevent Microsoft from monetising the transfer of its software products from on-premises to the cloud. In contrast, Remedy 1 would allow Microsoft to use a model such as Software Assurance to monetise the transfer of on-premises software product licences to the cloud, provided that the effective cost to the customer is the same, regardless of which cloud infrastructure the software product is deployed on.

Potential for unintended consequences

7.51 We consider a remedy requiring Microsoft to allow all customers to transfer previously purchased licences to the cloud infrastructure of their choice could potentially increase the risk of unlicensed use of Microsoft software products by end users, and the audit costs associated with managing this risk. Microsoft uses audit processes to manage under-licensed use of its products, and it is potentially more straightforward for Microsoft to audit AWS and Google for the software licences they are themselves required to pay for in advance for the services they provide to their customers, than to audit individual end customers for the on-premises licences they claim to have brought to the cloud.[445]

7.52 We consider a remedy which restricts the routes by which Microsoft is able to monetise its software products, for example when migrating them from on-premises to cloud, could adversely impact its incentives to invest in developing its software products although the extent of that impact would depend also on the availability of alternative monetisation routes.

7.53 As already discussed in relation to Remedy 1, it may also be necessary to manage circumvention risks, for example through the inclusion of principles-based remedies alongside more targeted interventions.

[445] Microsoft submission to the CMA [✂].

Remedy 3: Increasing price transparency in relation to the use of Microsoft software products on Azure and third party cloud infrastructure

7.54 The third potential remedy that we set out in our issues statement was to increase pricing transparency where cloud services are sold to customers as part of a larger bundle that includes cloud services and software products.

7.55 This remedy would require Microsoft to make it easier for customers to determine the relative cost of using Microsoft software products on third party cloud services and Azure cloud services. We would expect there to be benefits from customers having access to clear and comparable information relating to the costs of hosting Microsoft software products on Azure and non-Azure cloud services, which would enable them to assess whether they are getting a good deal from their current provider or whether another provider would give them a better deal.

7.56 We consider that a remedy targeted at information transparency may play an important role in addressing any potential AECs relating to Microsoft's software licensing, and could be applied in combination with the price-related remedies discussed above.

Invitation to comment on Remedies 1-3

7.57 We would particularly welcome views on the following questions:

(a) How should any non-discriminatory pricing obligations in Remedy 1 be applied if an AEC is found?

(b) Could these remedies be effective and/or proportionate in increasing competitive constraints in the market for cloud infrastructure services if an AEC is found, either individually or in combination?

(c) What would be the estimated costs to Microsoft and/or other impacted parties of implementing these remedies?

(d) What are the main circumvention risks, and how could they be mitigated?

(e) Are there any alternative remedies that could be as effective as those set out above in reducing the potential significance of Microsoft software product costs on a customer's choice of cloud provider, and that might be considered less costly and/or intrusive?

(f) Are there any relevant customer benefits in relation to licensing practices that we should consider as part of our assessment of remedies?

(g) What form of comparative pricing information could be introduced under Remedy 3 to aid price transparency?

(h) How could principle-based remedies play a role in addressing commercial licensing practices, and how might they be enforced?

Remedy 4: Parity of Microsoft software products and product functionality for use on Azure and third party cloud infrastructure

Stakeholder feedback

7.58 Several stakeholders[446] submitted that the CMA should consider interventions requiring parity of products, including in relation to functional parity between how Microsoft software products operate on Azure and third party cloud infrastructure.

7.59 Google[447] and CISPE[448] submitted that this form of remedy could, for example, require Microsoft to:

(a) ensure the same duration of extended security updates for Windows subscription services are available for third party cloud infrastructure as well as for Azure; or

(b) facilitate interoperability with third party cloud infrastructure of what Google referred to as 'must have' tools, which, in Google's view, includes Active Directory.

7.60 CISPE also submitted other specific examples of product and functional changes Microsoft could be required to introduce to comply with this form of remedy.[449]

7.61 Submissions from AWS, CISPE and CFSL advocated the use of principle-based remedies to address licensing practices relating to product and product features availability.[450]

7.62 For example, CISPE's Principles of Fair Software Use[451] include the following:

(a) Permitting Fair Software Transfers: This principle includes a requirement for software vendors to continue to offer what CISPE refers to as 'support and patches' under fair terms, where customers have the right to transfer software licences.[452]

[446] Google response to the Issues Statement dated 17 October 2023, paragraph 47; CISPE response to the Issues Statement dated 17 October 2023, page 2 and [✂] submission to the CMA [✂]; CFSL response to the Issues Statement dated 17 October 2023, page 2.
[447] Google response to the Issues Statement dated 17 October 2023, paragraph 47.
[448] CISPE submission to the CMA [✂].
[449] CISPE submission to the CMA [✂].
[450] [✂] submission to the CMA [✂].
[451] CISPE Principles of Fair Software Licensing for Cloud Customers - Fair Software Licences, accessed on 5 June 2024.
[452] We note that CFSL's own Fair Software Licensing Principles (The Coalition for Fair Software Licensing Principles, accessed 5 June 2024), which are based on the 10 Fair Software Licensing Principles exclude this particular principle.

(b) Avoiding Customer Lock-In Through Interoperable Directory Software: This principle is intended to require Microsoft and other software vendors who provide directory software to actively avoid the risk of customer lock-in in relation to IAM tools.

7.63 CISPE suggested that an independent body should monitor this form of remedy, for example by monitoring progress against a non-exhaustive list of specific changes that Microsoft would need to make to ensure compliance with this remedy.[453]

7.64 Microsoft is opposed to offering Listed Providers unrestricted access to its software products.[454]

Design considerations

7.65 This form of remedy would require Microsoft to:

(a) ensure equal access to Microsoft software products and product versions regardless of which cloud infrastructure they are hosted on; and

(b) provide functional parity with respect to how Microsoft software products operate on or with Azure and third party cloud infrastructure, unless objectively justified.

7.66 In some circumstances, functional parity might potentially include interoperability.[455]

7.67 This remedy could be implemented through a combination of commercial and technical changes, for example through:

(a) removing commercial restrictions on the use of Microsoft 365 on certain Listed Providers;[456] and/or

(b) making technical changes to Active Directory, or ensuring access to relevant documentation or source code, in order to ensure customers could migrate Microsoft-related workloads to their choice of cloud.

Potential impact

7.68 By requiring Microsoft to ensure parity of its software products and product functionality for use on Azure and non-Azure cloud infrastructure, this remedy

[453] CISPE submission to the CMA [✂].
[454] Microsoft response to the Issues Statement, dated 17 October 2023, paragraphs 54-55.
[455] See technical barriers working paper Cloud services market investigation.
[456] We note that Microsoft eased its restrictions on use of Microsoft 365 on AWS cloud infrastructure in August 2023. Microsoft Product Terms, accessed 5 June 2024.

would weaken Microsoft's ability to reduce the contestable market by restricting the availability on non-Azure cloud infrastructure of software products and software product functionality which is important to a customer's overall business IT requirements. This remedy is likely to involve technical as well as contractual changes.

Potential for unintended consequences

7.69 Remedies requiring Microsoft to provide full product equivalence for its software products, regardless of which public cloud they are hosted on, could potentially deter Microsoft from developing new features and harm innovation, or delay the roll-out of new products until such time as they are capable of being rolled out also on third party cloud infrastructure.

7.70 Remedies which require Microsoft to provide the same level of support for end of life products hosted on third party public clouds as on its own cloud infrastructure could require significant ongoing technical investment.

Invitation to comment

7.71 We would particularly welcome views on the following questions:

(a) Would a remedy requiring product and/or product feature parity be effective and/or proportionate in remedying a possible AEC?

(b) What would be the estimated costs to cloud providers and/or other impacted parties of implementing these remedies?

(c) What are the main circumvention risks, and how could they be mitigated?

(d) Are there any relevant customer benefits in relation to licensing practices that we should considerer as part of our assessment of a remedy package?

(e) How do you see the role of principle-based requirements in relation to Remedy 4, and how might they be enforced?

Conclusion

7.72 As set out above, we have further developed our thinking on the approach and design of the potential remedies set out in our Issues Statement. We have identified remedial approaches which would seek to address the potentially concerning characteristics of Microsoft's licensing practices. Our Remedies

working paper sets out our consideration of cross-cutting remedy design elements.[457] Our consideration of potential remedies is ongoing.

[457] See Cloud services market investigation

Appendix A: CISPE Licensing Principles

A.1 Cloud Infrastructure Service Providers in Europe ('CISPE') is a European trade association which has 29 member companies.[458] We understand that AWS was one of six original founding members,[459] and is represented on CISPE's Board of Directors.[460]

A.2 In April 2021, CISPE, together with French organisation, CIGREF[461] published Ten Principles of Fair Software Licensing, with the intention of setting out best practices of software licensing for cloud customers.[462]

A.3 The Ten Principles of Fair Software Licensing are:

1. Licensing Terms Should Be Clear and Intelligible
2. Freedom to Bring Previously Purchased Software to the Cloud
3. Customers Should Be Free to Run their On-Premises Software on the Cloud of their Choice
4. Reducing Costs through Efficient Use of Hardware
5. Freedom from Retaliation for Cloud Choices
6. Avoiding Customer Lock-In Through Interoperable Directory Software
7. Equal Treatment for Software Licensing Fees in the Cloud
8. Permitted Uses of Software Should Be Reliable and Predictable
9. Licences Should Cover Reasonably Expected Software Uses
10. Permitting Fair Software Transfers

A.4 In November 2022, CISPE filed a complaint against Microsoft with the European Commission relating to Microsoft's licensing practices, in particular that Microsoft uses its dominance in productivity software to direct European customers to its own Azure cloud infrastructure including through both pricing and non-pricing practices.[463]

[458] Note of Meeting with [✂].
[459] Note of Meeting with [✂].
[460] Board of Directors | CISPE - The Voice of Cloud Infrastructure Service Providers in Europe, accessed on 5 June 2024.
[461] Cigref
[462] CIGREF and CISPE Launch Ten Principles to End Unfair Practices of Software Gatekeepers, accessed on 5 June 2024.
[463] CISPE Files Complaint Against Microsoft with European Commission, accessed on 5 June 2024.

A.5 CISPE announced in February 2024 that it had opened discussions with Microsoft, including in relation to potential remedies.