Appendix R: Market power – supplementary framework and evidence

R.1 This appendix presents supplementary framework considerations for each of the five Microsoft products we have considered in our market power assessments in Chapter 6. These are:

(a) evidence on market shares, including descriptions of the relevant data, methodology and caveats for each; and

(b) relevant customer and provider evidence.

Additional framework considerations

R.2 One additional consideration that is relevant to our assessment of market definition in software markets when using the hypothetical monopolist test is the concept known as the 'cellophane fallacy'.[1] This refers to an error that can be made when trying to define a market where an existing supplier is a monopolist or has market power. In such cases, the supplier's ability to set higher prices may lead customers to treat products as valid substitutes even though they would be poor substitutes if the supplier's product were available at competitive prices. Because of the cellophane fallacy, applying the HMT by considering a SSNIP relative to prevailing prices can risk incorrectly defining a wider market that includes poor substitutes. We have considered the extent to which this may limit the usefulness of the HMT in this case.

Microsoft Windows Server

Market shares

R.3 We have multiple measures to understand Microsoft's share in server OS, each with some limitations as detailed below. Overall, the measures suggest that Windows Server has a significant share of the server OSs used on-premises and a moderate share of the server OSs used on the cloud.

Shares across the public cloud and on-premises combined

R.4 We have three data sets that show market shares of Windows Server across public cloud and on-premises combined: revenue data; installed base data; and shipments data.

[1] This problem is known as the 'Cellophane Fallacy' because it arose in a US Supreme Court case involving cellophane, in which the issue was whether the relevant market was cellophane or all flexible packaging materials. CC3 (Revised), Guidelines for market investigations: Their role, procedures, assessment and remedies, paragraph 139.

R.5 We are most interested in shares on the cloud, but shares on-premises are also relevant (as explained in Chapter 6).

R.6 IDC provided global server OS market shares based on revenue. Shares of supply by revenue are typically the most direct distribution of customer demand as they take into account the differences in prices and quality of firm's offerings.

(a) These shares include the sale of server OS licences which can be used on premises or on the cloud. Therefore, there may be some use on the private cloud included. In the case of server OSs, revenue shares do not include free unsupported versions of Linux. This means shares by revenue may understate Microsoft's market power if use of free versions of Linux is high.[2]

(b) The table below summarises this data.

Table R.1: Market shares for server operating system, global basis, 2019 – 2023

					%
	2019	*2020*	*2021*	*2022*	*2023*
Microsoft	[70-80]	[70-80]	[70-80]	[70-80]	[70-80]
IBM	[10-20]	[20-30]	[20-30]	[20-30]	[20-30]
Other	[5-10]	[5-10]	[5-10]	[5-10]	[5-10]

Source: CMA analysis of IDC data, [✂]. *Shares do not sum to 100 due to rounding.*

(c) The data shows that Microsoft has had a high and stable share of server OS at [70-80%] in 2023. After Microsoft, IBM (which sells the RedHat distribution of Linux) has the next largest share at [20-30%] in 2023.[3]

R.7 Microsoft provided us with two data sets that describe the shares of supply of Windows Server and other server OSs.[4] In particular, the data sets show:

(a) server OS installed base forecast (published 2022) – this is a metric of operating system units on server hosts; and

(b) server OS shipments forecast (published 2022) – this is a flow measure of shares. These shares illustrate the direction of travel of shares of supply. It counts physical and virtualised shipments, the latter of which include guest OS instances associated with an OS licence as well as OS instances deployed in the public cloud.

[2] We asked customers which distributions of Linux they used. Some customers which responded used paid for distributions of Linux [✂]. Some customers also used free versions of Linux in addition to paid versions [✂]. A few customers used only a free distribution of Linux [✂].
[3] CMA analysis of IDC data [✂].
[4] Microsoft's response to the CMA's information request [✂].

R.8 Limitations of the installed base data set include, among others: it does not take into account relative usage of each type of server OS; it considers 'cloud' and 'non-cloud' not 'public cloud' and 'on-premises'; and there was some uncertainty about its precise definition.

R.9 Limitations of the shipments data set include, among others: it considers the share of supply by new purchases. Therefore, it does not capture the stock of existing server Oss. It considers 'virtualised' shipments which may include private cloud shares (and there was some uncertainty about its precise definition).

R.10 We also note that 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 that those firms all share a common base OS, we might expect for those firms to be closer substitutes for each other than for Windows Server.

R.11 The table below shows global market shares for server OSs for all deployments (cloud and non-cloud).

Table R.2: Market shares for server operating system, global basis, 2020 – 2022

	%					
	Installed base			Shipments		
	2020	2021	2022	2020	2021	2022
Microsoft	[50-60]	[50-60]	[40-50]	[20-30]	[20-30]	[10-20]
Linux	[40-50]	[40-50]	[50-60]	[70-80]	[70-80]	[70-80]
Other	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]

Source: CMA analysis of [✂] data. Shares do not sum to 100 due to rounding.

R.12 The data shows that in 2022, Windows had a high share of the 'installed base' data set at [40-50]%, which was similar to Linux's share. Linux had the highest share of the 'shipments' data set [70-80]%, followed by Microsoft. Linux's share of both data sets grew slightly over the period 2020-2022. Microsoft submitted that this was evidence of Linux OS being the market leader.[5]

R.13 Because the shipments data set is a measure of new demand for server OSs, this could suggest that Microsoft's overall market share could diminish in future, as people increasingly move towards Linux distributions for new workloads. Whether this also means that 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.

[5] Microsoft's submission to the CMA [✂].

Shares on the public cloud

R.14 We have five metrics that can show market shares of Windows Server deployed on the public cloud: installed base; shipments data; revenue data; Azure's share of Windows Server compute (count of virtual machines (VMs) running Windows Server on Azure); and Windows Server VMs on Azure by vcore hours of usage.

R.15 The server OS installed base forecast data described above can be further segmented by deployment type (cloud and non-cloud).[6,7] When segmenting for cloud deployments only, the installed base data shows that in 2022, Linux distributions had [70-80]% share of global server OSs and Windows had [20-30]%. This showed that the Linux family's share was also high using a share of deployments rather than share of applications measure.

R.16 The server OS shipments data described above can be segmented by deployment type (virtualised and physical).[8,9] The shares for server OS shipments, segmented for virtualised instances, shows that Linux has the largest market share. In 2022 Linux's share was [80-90%] and Windows' share was [10-20%]. This aligns with the installed base data.

R.17 We also calculated market shares based on data from IDC which related to server OS revenue data from Windows, Linux and Unix software variants when used on the public cloud (OSs running on virtual machines).[10] We consider limited weight should be placed on this metric because this data overstates Microsoft's share since it also includes bare metal services in public cloud and excludes non-paid Linux variants. This data shows that Microsoft's share was high at [60-70%]in 2023. It has been stable at this level for the period we have data for (2019 to 2023). Linux's share in 2023 was [30-40%].

R.18 Microsoft submitted evidence to support its statement that the relevance of Windows Server was declining in the cloud.

(a) Microsoft submitted data on Azure's share of Windows Server compute.[11] This is a measure of the use of Windows Server on the cloud by count of VMs running Windows Server (see Figure R.1). This measure does not take into account the relative usage of VMs. It considers only a share on Azure,

[6] 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. Because IDC may have used a slightly different definition, this means we should place limited weight on this distinction.
[7] [✂] response to the CMA's information requests [✂].
[8] In this context we have interpreted 'virtualised' to mean operating systems installed on virtual machines hosted in a public cloud, and 'physical' to refer to other types of installation including on-premises. Because IDC may have used a slightly different definition, this means we should place limited weight on this distinction.
[9] [✂] response to the CMA's information requests [✂].
[10] CMA analysis of IDC data [✂].
[11] Microsoft's submission to the CMA [✂].

therefore shares on Azure are likely an overestimate of aggregate Windows Server OS shares in the cloud.

Figure R.1: Azure's share of Windows Server compute

[✂]

Table R.3: Azure's share of Windows Server compute

Q3 2019	*Q4 2019*	*Q1 2020*	*Q2 2020*	*Q3 2020*	*Q4 2020*	*Q1 2021*	*Q2 2021*	*Q3 2021*	*Q4 2021*	*Q1 2022*	*Q2 2022*	*Q3 2022*	*Q4 2022*	*Q1 2023*	*Q2 2023*	*Q3 2023*	*% Q4 2023*
[40-50]	[40-50]	[40-50]	[40-50]	[40-50]	[30-40]	[30-40]	[30-40]	[30-40]	[20-30]	[20-30]	[30-40]	[30-40]	[20-30]	[30-40]	[20-30]	[20-30]	[20-30]

Source: Microsoft's submission to the CMA [✂].

(b) This data shows that the proportion of Azure VMs running Windows Server OS declined from almost half of all Azure compute in Q3 2019 to less than a third of all Azure compute by the end of 2023. The trend has stabilised from Q1 2022 to Q4 2023.

(c) We compared this to shares of Azure VM usage by operating system from 2020 to 2023. We used Microsoft data on the total annual vcore hours of usage of Azure virtual machines by UK customers, segmented by OS (Windows Server, Windows Desktop and Linux). We used this data to calculate shares of usage by each OS.[12] This showed Windows Server's share of Azure VM usage was stable at [40-50%] from 2021 to 2023. Linux's share declined slightly from [40-50%] in 2021 to [40-50%] in 2023.

(d) Microsoft submitted that out of [✂] new customers joining Azure between May and December 2022, [50-60]% purchased Windows Server VMs during their first twelve months with Azure, which was less than the share for all customers on Azure [60-70]%.[13]

(e) Microsoft submitted there has been a steady decline in the share of customers who used Windows Server on Azure, from [60-70]% in 2020 to [60-70]% in 2023. Considering only new customers, [50-60]% used Windows Server on Azure in 2022, which Microsoft said indicates the declining relevance of Windows Server to cloud workloads and customer choice of cloud provider.[14]

(f) A limitation of the analyses presented in (d) and (e) was that they consider customers who purchased Windows Server VM, rather than considering overall customer relative usage between Windows Server and Linux. We

[12] See Figure 6.6 in Chapter 6. Source: CMA analysis of Microsoft's response to the CMA's information request [✂].
[13] Microsoft's submission to the CMA [✂].
[14] Microsoft's submission to the CMA [✂].

note in response to both these pieces of analysis in (d) and (e) that the reported shares all represent a significant share of customers.

Shares on-premises

R.19 We have two metrics that can show market shares of Windows Server deployed on-premises: installed base; and shipments data.

R.20 The shares for server OS installed base forecast, segmented for non-cloud deployments, shows that Windows' share was very high on-premises.[15] When segmenting for on-premises deployments, it shows that in 2022, Windows had [70-80]% share of global server OSs and Linux distributions had [20-30]%.

R.21 The shares for server OS shipments, segmented for physical deployments, shows that Linux has the highest share.[16] It shows that in 2022, Windows had [30-40]% share of global server OSs physical shipments, and Linux distributions had [60-70]%. This contrasts with the installed base on-premises data, but aligns with the shipments virtualised data, which also showed that Linux has the majority share.

R.22 One cloud provider provided an analysis which outlines that Windows Server workloads make up [60-70%] 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) was made up of workloads in which Windows Server plays a part.[17]

Customers' submissions

R.23 We asked customers if they host Windows Server on public cloud and/or non-public cloud IT environments (public, non-public or both), and (if the former), whether they previously also used it on non-public cloud.

(a) Most customers use Windows Server on both public and non-public cloud,[18] and some use it only on the public.[19]

(b) Of these customers, most previously used Windows Server on non-public cloud.[20] This suggests there was some stickiness of demand as customers migrate from on-premises to the public cloud.

R.24 We have indicated in the following assessment where customer evidence relates to customers who only use Windows Server on non-public cloud. We have given

[15] [✂] response to the CMA's information requests [✂].
[16] [✂] response to the CMA's information requests [✂].
[17] [✂] response to the CMA's information requests [✂]; [✂] submission to the CMA [✂].
[18] Responses to the CMA's information requests [✂].
[19] Responses to the CMA's information requests [✂].
[20] Responses to the CMA's information requests [✂].

this less weight than evidence from customers who use the product on the public cloud, but still included it for the following reasons:

(a) Customer evidence on use of the product on non-public cloud and public cloud suggests customers may find it hard to switch away from the Microsoft product.

(b) Some customer reasons for choosing Windows Server relate to their historical use of the product (for example, staff have developed skills in it or other applications rely on it).

(c) Customer evidence on alternatives did not highlight that there was a different range of alternatives on the public cloud versus non-public cloud.

R.25 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 contacted listed server OSs from the Linux family, for example Ubuntu, SUSE, RedHat, Amazon Linux, CentOS and Debian.[21]

(b) One said server OSs from the UNIX family, for example IBM AIX and Oracle Solaris,[22] and a few said VM ware.[23]

(c) Some customers said there were no alternatives.[24] These customers all have some use of Linux, so we infer they mean no alternatives for certain use cases (rather than all).

R.26 This shows the most popular alternative family of server OSs is the Linux family.

R.27 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%.

R.28 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

[21] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[22] [✂] response to the CMA's information request [✂].
[23] Responses to the CMA's information requests [✂].
[24] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].

software the customer currently uses or retrain its staff on Linux seem to be significant barriers to switching.[25]

R.29 Most customers said they would be unlikely to move away from Windows Server in response to a 5% price rise.[26] Reasons included it was required for some software, cost to re-build custom applications, requirement to re-train staff, loss of functionality, and integrations with other Microsoft products.

R.30 Some customers indicated their preference was to move away from Windows Server regardless of a 5% price rise.[27] Reasons included wanting to move individual workloads to Linux to improve portability, or that Linux was their preferred type of server OS.

(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.[28] It may be the case that some customers have to use Windows Server for some workloads – this is explored further below.

R.31 We asked customers that also use a server OS other than Windows Server to explain which one(s) they use.

(a) All the customers we contacted that were customers of Windows Server also used one or more Linux distributions alongside Windows Server.[29]

(b) The reasons for choosing Linux included cost, efficiency, reliability, availability, and compatibility with certain workloads/applications.[30]

R.32 The customers' responses show that the use of Linux distributions was widespread among the customers that responded to our request for information. To understand the extent of the competitive constraint posed by Linux distributions

[25] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[26] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[27] Responses to the CMA's information requests [✂].
[28] [✂] response to the CMA's information request [✂].
[29] This included some customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[30] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].

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 contacted described Windows Server as very important, using words like key, critical, fundamental or foundational.[31]

(b) Most customers also said Linux distributions were important,[32] though some of these said Linux was less important than Windows Server.[33]

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

R.33 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.[34] This shows there are a wide variety of reasons for using Windows Server.

R.34 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 Server 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.[35] For example, one customer described itself as being a 'Windows shop'.[36]

(b) Only one customer mentioned reasons related to functionality (other than software compatibility).[37]

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[31] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[32] This included some customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[33] This included one customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[34] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[35] This included one customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[36] [✂] response to the CMA's information request [✂].
[37] This customer only uses the product on non-public cloud. [✂] response to the CMA's information request [✂].

(c) Reasons customers gave for choosing Linux distributions included cost effectiveness, corporate preference, required for software, flexible, open-source/ support from open-source community.[38]

R.35 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.[39] 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 was well supported and understood by staff, Ubuntu for AWS, and Red Hat Enterprise Linux if required by a workload.[40]

(b) A few customers said they prefer Linux,[41] while some prefer Windows Server.[42] A few customers said they choose the server according to the use case or workload.[43]

R.36 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.[44] We categorised responses into four quartiles.[45]

(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).

R.37 In the round, this customer evidence suggests that Windows and Linux distributions are the leading options for server OSs and there was 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

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[38] This included some customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[39] This included one customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[40] This customer only uses the product on non-public cloud. [✂] response to the CMA's information request [✂].
[41] This included one customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[42] Responses to the CMA's information requests [✂].
[43] This included one customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[44] This included some customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[45] 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.

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 was very important to their overall business IT requirements.

Providers' submissions

R.38 We asked Microsoft to identify its main competitors in supplying Windows Server. Microsoft listed other types of server OS.[46]

R.39 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 [✂]. Different customers will have different preferences for server OS products. There are a vast number of OSs available to customers for on-premises deployment as well as in the cloud. 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 – this is less relevant in the cloud. Microsoft said various forms of Linux are the most popular OSs in the cloud and it considers Linux is also likely [✂].[47]

R.40 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 was generally no 'typical customer' for these products and said that customers' switching considerations would vary depending on the customers' particular characteristics and preferences.[48]

R.41 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.[49]

R.42 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 into the decision making of server OS purchasers. Survey responses about an organisation's future plans regarding deployment of existing Windows Server workloads showed that [60-70%] of all customers (those who plan to stay on-premises and those who would move to the public cloud) would stay on Windows

[46] Microsoft's response to the CMA's information request [✂].
[47] Microsoft's response to the CMA's information request [✂].
[48] Microsoft's response to the CMA's information request [✂].
[49] Microsoft's response to the CMA's information request [✂].

Server rather than switch to Linux.[50] 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.

R.43 Considering only customers who plan to move to the public cloud, [40-50%] would stay on Windows Server rather than switch to Linux [40-50%]. This suggests that for existing Windows Server workloads moving to the cloud, customers are split regarding whether they will keep using Windows Server or switch to an alternative server OS.[51]

R.44 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.[52]

(b) AWS said its offering, Amazon Linux, was not proprietary, it wants its customers to use the OS of their choice and did not list any competitors.[53]

R.45 We asked AWS which of its products compete with Windows Server and to describe the main customer use cases. AWS said Linux was 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.[54]

R.46 AWS said Linux cannot be used as an alternative to Windows Server in all cases eg Linux was unable to run any Microsoft software and therefore was not able to fulfil any use cases where a customer is seeking to run Microsoft's productivity software.[55] This is an example of a use case where a customer may not have an alternative to Windows Server.

(a) AWS said: 'While customers may want to choose Linux as the OS for their Amazon WorkSpaces and Amazon AppStream instances, they are practically limited by which software applications are compatible with Linux OS. Microsoft's productivity software is incompatible with Linux, meaning that Linux cannot realistically be used as an alternative to Windows Server given the popularity and demand for Microsoft products from customers. For instance, there is no Linux version available for Microsoft 365 or Visual

[50] Microsoft's response to the CMA's information requests [✂] and CMA analysis. We note there may be limitations with this survey.
[51] We note that the sample included more customers who planned to remain on-premises rather than move to the public cloud.
[52] IBM's response to the CMA's information request [✂].
[53] AWS' response to the CMA's information request [✂].
[54] AWS' response to the CMA's information request [✂].
[55] AWS' response to the CMA's information request [✂].

Studio. [✂] approximately [✂] of [✂]. Additionally, approximately [✂] of [✂] run Microsoft Office. Therefore, contrary to Microsoft's claim, a majority of cloud-computing applications are based on Microsoft products like Windows Server rather than open-source solutions like Linux, and are therefore relevant to those customer opportunities'.[56]

R.47 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 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.[57]

R.48 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.[58]

R.49 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.[59]

(b) AWS 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.[60]

(c) Another server OS provider said barriers exist to an extent in terms of regulatory requirements, cost, economies of scale and distribution.[61]

R.50 This suggests there are some barriers to entry and expansion, and they differ depending on the provider.

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[56] AWS' submission to the CMA [✂].
[57] IBM's response to the CMA's information request [✂].
[58] IBM's response to the CMA's information request [✂].
[59] Microsoft's response to the CMA's information request [✂].
[60] AWS' response to the CMA's information request [✂].
[61] [✂] response to the CMA's information request [✂].

R.51 Microsoft submitted that 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.[62]

R.52 Microsoft submitted that though its share was 'less than a quarter of a large market', this was 'far from de minimis' and therefore agreed that Windows Server 'should be an area of focus'.[63]

R.53 Google submitted that Windows Server had a persistently dominant share of supply, including in particular for on-premises workloads which would drive competition in cloud.[64] It said that Windows Server sits at the foundation of the Microsoft ecosystem and that it 'has enjoyed a dominant market position that has persisted over many decades'.[65]

R.54 Google also submitted that customers do not typically refactor or modernise their workloads at the time of moving to cloud and instead prefer to 'lift and shift', and that customers are more likely to 'lift and shift' workloads for Windows Server compared to other workloads.[66]

Microsoft SQL Server

Market shares

R.55 We have the following measures of information about Microsoft's share of supply in RDBMS: CMA analysis of data from IDC by revenue; and Microsoft's share of supply analysis by revenue.

R.56 In response to the CMA's request for internal documents, a database provider has provided us with an industry report which describes shares of supply of SQL Server and other competing DBMS solutions. Of the DBMS market, the RDBMS segment made up 66.2% of the market in 2022.[67] The data shows that 52.3% of revenue received by providers in 2022 was associated with the public cloud.[68]

R.57 We have purchased data on the RDBMS market from IDC and conducted analysis to estimate Microsoft's share of supply in RDBMS. Support and maintenance

[62] Microsoft's submission to the CMA [✂].
[63] Microsoft's response to the CMA's Licensing working paper, 10 July 2024, paragraph 12.4b.
[64] Google's response to the CMA's information request [✂].
[65] Google's response to the CMA's Licensing working paper, 24 July 2024, page 1-2.
[66] Google's response to the CMA's information request [✂].
[67] [✂] response to the CMA's information request [✂].
[68] [✂] response to the CMA's information request [✂].

revenue[69] for the provision of PaaS services is included in this dataset, but IaaS revenue from the provision of the PaaS service and Service management revenue[70] is excluded. This analysis has the following caveats:

(a) Microsoft has other cloud services which are based on open-source RDBMS solutions, for which support and maintenance revenue is included in this dataset. Other cloud providers provide cloud services which use SQL Server software as an input (for which support and maintenance revenue is recorded in this data set). Therefore, the distribution of some revenues across providers does not accurately reflect the revenue associated with Microsoft SQL Server, and may overstate, or understate Microsoft's market power.

(b) We understand that revenue for AWS RDS third party offerings[71] (for example SQL Server and Oracle) was not included in this data set.

R.58 We also have analysis submitted by Microsoft that calculates shares of supply using revenue data.[72] The CMA notes that this analysis has the following caveats:

(a) We are unable to understand the classification of revenues as we do not have access to revenues by product.

(b) We suspect that, as with shares by vendor calculated from the IDC data, this analysis may not consider allocation of revenues across cloud services which use SQL Server as an input.

R.59 We also have a revenue split by deployment type based on IDC data. However, due to caveats surrounding the classification of revenues into cloud and non-cloud deployments above, we do not consider that this is informative to consider Microsoft's market share in RBDMS across deployment types. As such, we present only aggregated figures in this section.

R.60 All three measures detailed above reflect on-premises and cloud combined. As there are additional RDBMS products available in the cloud that are not available on-premises, we expect that aggregated shares could overstate Microsoft's market power in RDBMS in the cloud.

R.61 The table below shows the shares of supply for RDBMS based on the CMA analysis of IDC data (outlined above) on a global basis across all deployment types from 2019-2023.

[69] This includes the cost of providing technical support, updates, and maintenance.
[70] This covers the management and operational services provided by the cloud provider, including monitoring, security, and maintenance.
[71] We understand that AWS third party offerings refers to when a proprietary database software is used with AWS RDS, which is not owned/developed by AWS.
[72] Microsoft's submission to the CMA in response to the CMA's Licensing working paper, 15 August 2024, page 9.

Table R.4: Market shares for RDBMS, all deployment types, 2019-2023

					%
	2019	*2020*	*2021*	*2022*	*2023*
Microsoft	[20-30]	[30-40]	[30-40]	[30-40]	[30-40]
Oracle	[30-40]	[30-40]	[30-40]	[30-40]	[20-30]
AWS	[0-5]	[5-10]	[5-10]	[5-10]	[5-10]
IBM	[5-10]	[5-10]	[5-10]	[5-10]	[5-10]
SAP	[5-10]	[5-10]	[5-10]	[5-10]	[5-10]
Other	[10-20]	[10-20]	[10-20]	[10-20]	[10-20]

Source: CMA analysis of IDC data, [✂]. Shares do not sum to 100 due to rounding.

R.62 The table below shows the shares of supply for RDBMS based on revenue data on a global basis across all deployment types from 2021-2023, submitted by Microsoft.

Table R.5: Market shares for RDBMS, all deployment types, 2021-2023

			%
	2021	*2022*	*2023*
Microsoft	[20-30]	[20-30]	[20-30]
Oracle	[20-30]	[20-30]	[20-30]
AWS	[10-20]	[20-30]	[20-30]
IBM	[5-10]	[5-10]	[5-10]
SAP	[5-10]	[5-10]	[5-10]
Other	[10-20]	[10-20]	[10-20]

Source: Microsoft's submission to the CMA [✂]. Shares do not sum to 100 due to rounding.

R.63 The analysis provides the following results.

(a) The CMA analysis based on IDC data illustrates that Microsoft has had a stable [20-30]% and [30-40]% share of supply in RDBMS from 2019-2023 with [0-5]% increase from 2021-2023.

(b) The Microsoft analysis illustrates that Microsoft has had a [✂] [20-30]% (with [✂] increase) share in RDBMS from 2021-2023.

R.64 In order to aim to correct for caveat (a) outlined above which affects the interpretation of the CMA analysis of IDC data we have sought to attribute shares of supply in 2023 to the relevant underlying RDBMS vendor. This analysis has the following caveats:

(a) We do not know how much revenue should be attributed to SQL Server for Google's cloud service 'Cloud SQL', or any other service which uses SQL Server as an input (however estimate this to be negligible).

(b) We understand that revenue for AWS RDS third party offerings (for example SQL Server and Oracle) was not included in this data set, however, based on

AWS data on the use of Microsoft software with RDS, we are able to estimate that in 2023, [✂].[73] Therefore, had this revenue been included, we anticipate that this would increase Microsoft's share, and that the shares based on the CMA analysis above may understate Microsoft's market power associated with SQL Server.

(c) We only have this data point for 2023, therefore cannot present historical shares of supply based on this analysis.

R.65 This analysis illustrates that in 2023, Microsoft had a [20-30]% share on a global basis considering SQL Server related revenues in RDBMS.

Customers' submissions

R.66 We asked customers if they host SQL Server on public cloud and/or non-public cloud IT environments (public, non-public or both), and (if the former), whether they previously also used it on non-public cloud.

(a) Most customers use SQL Server both on the public cloud and on non-public cloud,[74] and some use it only on the public cloud.[75]

(b) Of these customers, all apart from one previously used SQL Server on non-public cloud.[76] This suggests there was some stickiness of demand as customers migrate from on-premises to the public cloud.

R.67 We have indicated in the following assessment where customer evidence relates to customers who only use SQL Server on non-public cloud. We have given this less weight than evidence from customers who use the product on the public cloud, but still included it for the following reasons:

(a) customer evidence on use of the product on non-public cloud and public cloud suggests customers may find it hard to switch away from the Microsoft product.

(b) some customer reasons for choosing SQL Server relate to their historical use of the product (for example staff have developed skills in it or other applications rely on it).

[73] AWS' response to the CMA's information request [✂]. We note that this data presents revenue for RDS use associated with SQL Server considering UK customers, and that here we consider shares of supply on a global basis. However, we have no reason to consider that the proportion of use of SQL Server with RDS would differ according to geographic region, as reflected in our global market definition, therefore consider we can apply the UK revenue data proportions in this instance.
[74] Responses to the CMA's information requests [✂].
[75] Responses to the CMA's information requests [✂].
[76] Responses to the CMA's information requests [✂].

R.68 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.[77] 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.[78] One customer said that there were no alternatives for its use of SQL Server.[79]

R.69 We asked customers to explain the reasons for choosing SQL Server over the alternatives they had listed.

(a) Many customers we asked mentioned their internal application landscape or requirements (including the availability and computability of commercial off the shelf applications, and in house products).[80] Some customers explained that a lot of their applications don't support alternatives to SQL Server.[81] One customer mentioned compatibility with existing infrastructure/architecture.[82]

(b) Others mentioned integration with the Microsoft ecosystem or Microsoft application/server stack.[83] One customer explained that this includes seamless integration with Azure and other Microsoft services like Azure AD, Microsoft Identity manager, SharePoint etc,[84] and another similarly detailed integration with eg Power BI, SharePoint, Microsoft Excel, Active Directory as well as other Microsoft security and monitoring products such as Sentinel, and Azure database services.[85]

(c) Many customers mentioned existing skills, or availability of skills in the labour force.[86] One further mentioned software engineering preference.[87]

(d) Some customers mentioned the quality of the product as a factor, the functionality[88] or lack of functionality of alternatives. For example: one customer noted the availability of features;[89] another mentioned

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[77] In summarising the customer responses, we include customers who have reported use of SQL Server on the public cloud, on across both the public cloud and other IT/cloud deployments. We also include responses from customers which we cannot confirm their volume of usage across deployment types, however responded to the CMA's RFI asking for responses with respect to products which they use on the public cloud. Where we have included evidence from customer who only use the product on non-public cloud we have indicated so.
[78] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[79] [✂] response to the CMA's information request [✂].
[80] This included one customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[81] Responses to the CMA's information requests [✂].
[82] [✂] response to the CMA's information request [✂].
[83] This included one customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[84] [✂] response to the CMA's information request [✂].
[85] [✂] response to the CMA's information request [✂].
[86] Responses to the CMA's information requests [✂].
[87] [✂] response to the CMA's information request [✂].
[88] [✂] response to the CMA's information request [✂].
[89] Responses to the CMA's information requests [✂].

performance;[90] a few customers noted the availability of support;[91] and some mentioned that alternative open-source solutions offer reduced support, scalability or power compared with proprietary products.[92]

(e) Others noted cost as a reason for choosing Microsoft SQL Server,[93] with some noting that it was a cheaper option than Oracle database.[94]

R.70 Some customers explained, in response to this question, their reasons for remaining with SQL Server.

(a) One customer highlighted its ongoing use of SQL Server for historical reasons and explained there would be cost and effort to move away from SQL Server.[95]

(b) Another mentioned that existing on-prem systems had SQL Server licences, therefore when migrating to cloud it was easier to transition with minimum change (therefore sticking with Microsoft SQL Server).[96]

R.71 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.[97]

R.72 Most customers we asked mentioned being unlikely to or having a very small chance of switching away from SQL Server.[98] Customers which we contacted reported a variety of reasons for not being likely to switch away from SQL Server.

(a) Some customers reported monetary considerations such as increased costs,[99] or high cost of porting applications/database migration,[100] or the high cost of changing architecture.[101]

(b) Some customers mentioned that software within their businesses only runs with SQL Server.[102]

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[90] [✂] response to the CMA's information request [✂].
[91] Responses to the CMA's information requests [✂].
[92] Responses to the CMA's information requests [✂].
[93] Responses to the CMA's information requests [✂].
[94] Responses to the CMA's information requests [✂].
[95] [✂] response to the CMA's information request [✂].
[96] [✂] response to the CMA's information request [✂].
[97] Responses to the CMA's information requests [✂].
[98] This included one customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[99] Responses to the CMA's information requests [✂].
[100] Responses to the CMA's information requests [✂].
[101] [✂] response to the CMA's information request [✂].
[102] [✂] response to the CMA's information request [✂].

(c) Some customers outlined the effort to re-architecture,[103] business disruption,[104] or the need to acquire new skills.[105]

(d) One customer outlined compatibility/integration as a reason that they were unlikely to switch away from SQL Server, and that partners are less likely to have the depth of experience with alternative products.[106]

(e) One customer mentioned moving away from Oracle to Microsoft SQL Server as it has all the required capabilities at a better price.[107]

(f) Some customers explained that they would not switch due to the functionality of SQL Server. For example, some customers outlined that SQL Server provides all the capabilities which they require.[108]

R.73 Some customers mentioned that there would be a low likelihood of switching away for existing workloads or switching away in the short term, but a higher likelihood of switching away for new workloads or products or in the long run.[109]

(a) One customer explained that if a team needs a database for their application they will try and select the best option to meet their requirements, and that in modern app development it rarely chooses SQL Server.[110]

(b) Another explained that the adoption of alternatives may be a client requested need, or exploitation of a new capability in the marketplace.[111]

R.74 A minority of customers outlined that switching away from SQL server would be likely.[112]

(a) One customer (for which SQL Server was not its primary database solution) explained that choice of database product was dictated by the architectural needs of its products, but that its current direction was to move away from SQL Server.[113]

(b) Another outlined that it would consider a switch if the business case supports the change, but that this was dependent on whether there are restrictions from commercial software vendors. It outlined that for in-house development

[103] [✂] response to the CMA's information request [✂].
[104] [✂] response to the CMA's information request [✂].
[105] [✂] response to the CMA's information request [✂].
[106] [✂] response to the CMA's information request [✂].
[107] [✂] response to the CMA's information request [✂].
[108] Responses to the CMA's information requests [✂].
[109] Responses to the CMA's information requests [✂].
[110] [✂] response to the CMA's information request [✂].
[111] [✂] response to the CMA's information request [✂].
[112] Responses to the CMA's information requests [✂].
[113] [✂] response to the CMA's information request [✂].

of software it tends to use software from open-source databases as the first choice.[114]

R.75 A few customers did not outline their likelihood of switching away from Microsoft SQL Server in response to this question but explained that the choice of database solution depends on vendors, functional reasons or features/support required.[115]

R.76 The evidence from customers outlines that there were few customers who were able/willing to switch away from SQL Server and that even though there are alternatives available, most customers who use SQL Server on the public cloud would not switch to these.

Providers' submissions

R.77 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.[116]

(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.[117] 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, but that for simpler workloads, MySQL database would be a closer competitor.[118]

(c) A DBMS provider submitted that the competitor set was 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 was usually based around price or features, or

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

customers that were already using a database service, where additional considerations would be taken into account.[119]

(d) Another DBMS provider submitted that Microsoft SQL Server competes with all other relational and non-relational database software, including its range of relational and non-relational database services.[120] 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.[121]

R.78 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.[122]

(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).[123] Oracle explained that it has successfully aided many customers moving from Microsoft SQL to Oracle.[124]

R.79 We asked IBM to broadly describe the steps a customer would have to take to switch away from its database products. IBM said that to migrate away from an IBM-provided DBaaS based on open-source software, a customer would need to migrate the application data and then adjust the applications to establish connections to the new database. A customer migrating from an IBM proprietary RDBMS would also need to migrate the application data and to potentially further

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

adjust the applications to work with the target database SQL dialect if its applications used specific SQL dialect or extensions.[125]

R.80 One cloud provider has submitted customer examples which outline the difficulty its customers have modernising workloads to switch away from SQL Server, including that with significant effort since 2022, one customer has only managed to switch 20% of its SQL Server workloads.[126]

R.81 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 was 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.[127]

(b) Oracle submitted that the general concept was 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 was 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.[128]

R.82 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.

[125] IBM's response to the CMA's information request [✂].
[126] [✂] response to the CMA's information request [✂].
[127] Microsoft's response to the CMA's information request [✂].
[128] Oracle's 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.[129]

(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 was 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).[130]

R.83 We have received some responses to the Licensing practices working paper which are relevant to consider with respect to SQL Server.

R.84 Microsoft submitted that SQL Server was second ranked to Oracle in relational databases[131] and that 'Oracle is a close competitor and close substitute. It submitted that Microsoft's share of supply RDBMS does not in any year reach 30%, the traditional threshold at which ability to foreclose concerns could arise.[132]

R.85 Even with a moderate share of supply, Microsoft may have market power where customers face differentiation or switching costs. As discussed above, we have seen some evidence of differentiation that could make other products poor substitutes for SQL Server, and there is evidence which suggests customers may face switching costs.

R.86 Microsoft has also addressed the theory that SQL Server customers may notionally be stickier (in that some may be unwilling to switch away from SQL Server when they move from on-premises to the cloud).[133] However, Microsoft submitted that there was no price based foreclosure because SQL Server has always had "Licence Mobility" and customers can BYOL at no extra charge to any cloud provider beyond Microsoft Azure itself – including all small cloud rivals and AWS and Google.

R.87 AWS recognises the importance of SQL Server to customers, saying: SQL Server is one of the most popular database offerings that many customers use in their existing on-premises deployments, and therefore customers expect to be able to use it on RDS if they choose to migrate to AWS (or if they have migrated to AWS in the past).[134]

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[129] Microsoft's response to the CMA's information request [✂].
[130] Oracle's response to the CMA's information request [✂].
[131] Microsoft's submission to the CMA [✂].
[132] Microsoft's submission to the CMA [✂].
[133] Microsoft's submission to the CMA [✂].
[134] AWS' submission to the CMA [✂].

Microsoft Windows 10/11

Market shares

R.88 IDC provided global market shares for desktop operating systems based on revenue for 2019 to 2023.[135] These shares include both consumer and enterprise segments; we understand the split to be roughly 70% enterprise, 30% consumer. As we are focussed on the enterprise segment, we consider that including the consumer segment would understate Microsoft's market power as we understand that consumer use of Google Chrome OS is higher than for enterprise.

R.89 The table below shows global market shares for desktop OSs.

Table R.6: Market shares for desktop operating system, global basis, 2019 – 2023

					%
	2019	2020	2021	2022	2023
Microsoft	[90-100]	[80-90]	[80-90]	[80-90]	[80-90]
Google	[5-10]	[10-20]	[10-20]	[5-10]	[5-10]
Other	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]

Source: CMA analysis of IDC data, [✂]. Shares do not sum to 100 due to rounding.

R.90 This data shows that Microsoft has had a high and stable share of desktop OS. For the period 2019 to 2023, Microsoft's share of the global market for desktop operating systems ranged between [80-90]% and [90-100]%. In 2023 it was [80-90]%. Its share was much higher than the next-closest competitor, Google, which had [5-10]% in 2023.

R.91 In response to the licensing working paper, SMF highlighted Microsoft's strong position in the desktop OS market, saying: 'Estimates suggest Microsoft has a share of 70% to 80% in desktop operating systems, granting it significant potential leverage in cloud and other adjacent sectors'.[136]

Customers' submissions

R.92 We asked customers if they host Windows 10/11 on public cloud and/or non-public cloud IT environments (public, non-public or both), and (if the former), whether they previously also used it on non-public cloud.

[135] CMA analysis of IDC data [✂].
[136] Social Market Foundation's response to the CMA's Licensing working paper, page 24.

(a) Some customers use Windows 10/11 only on the public cloud,[137] and some use it both on public and non-public cloud.[138]

(b) Of these customers, all previously used the product in non-public cloud environments.[139] This suggests there was some stickiness of demand as customers migrate from on-premises to the public cloud.

R.93 We have indicated in the following assessment where customer evidence relates to customers who only use Windows 10/11 on non-public cloud. We have given this less weight than evidence from customers who use the product on the public cloud, but still included it for the following reasons:

(a) customer evidence on use of the product on non-public cloud and public cloud suggests customers may find it hard to switch away from the Microsoft product.

(b) some customer reasons for choosing Windows 10/11 relate to their historical use of the product (for example staff have developed skills in it or other applications rely on it).

(c) customer evidence on alternatives did not highlight that there was a different range of alternatives on the public cloud versus non-public cloud.

R.94 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 said they could use Linux and/or MacOS for the same purpose as Windows 10/11.[140] Some said there were no alternatives.[141]

(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.

[137] We consider that it is likely that these customers use Windows 10/11 also as installed in the 'physical desktop' as well as through a virtual desktop in the public cloud. For customers who have reported use of Windows 10/11 on the public cloud but did not report that they operated a network of virtual desktops on the public cloud, we have considered that these customers do not host Windows 10/11 in the public cloud (or 'on VDI'). Responses to the CMA's information requests [✂].
[138] Responses to the CMA's information requests [✂].
[139] Responses to the CMA's information requests [✂].
[140] Responses to the CMA's information requests [✂].
[141] Responses to the CMA's information requests [✂].

R.95 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 responded that they 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.[142]

(b) Some customers already use, or are considering moving to, alternatives, regardless of a price rise.[143] For example, some use MacOS for some staff or use cases, or were considering allowing users to bring their own device in future.

R.96 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.[144]

(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 those that are software as a service (SaaS), browser-based or if they are sold by a major vendor.[145] Applications that tend to be harder to move include those developed in house or by a smaller third party, if they are Internet Explorer based and those requiring client installation.[146]

(c) No customers said they would be able to deploy all 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 was a lack of available alternatives for these customers.

R.97 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[147] and some use MacOS.[148] Common reasons

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[142] Responses to the CMA's information requests [✂].
[143] Responses to the CMA's information requests [✂].
[144] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[145] Responses to the CMA's information requests [✂].
[146] This included a customer who only use the product on non-public cloud. Responses to the CMA's information requests [✂].
[147] [✂] response to the CMA's information request [✂].
[148] Responses to the CMA's information requests [✂].

for choosing the alternative desktop OSs were: staff preference, needing to develop applications to run on Apple devices, and needing to run Adobe Creative suite of applications.[149] Some customers said MacOS was a small share of their overall desktop OS usage.[150]

Providers' submissions

R.98 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.[151]

R.99 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: [✂].[152]

(b) The same document showed there are costs of moving away from Windows 11: [✂].[153]

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

R.100 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.[154]

(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.

[149] Responses to the CMA's information requests [✂].
[150] Responses to the CMA's information requests [✂].
[151] Microsoft's response to the CMA's information request [✂].
[152] Microsoft's response to the CMA's information request [✂].
[153] Microsoft's response to the CMA's information request [✂].
[154] Microsoft's 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 was 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 was much less relevant.

R.101 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.[155] However, customer evidence highlighted various barriers to switching including cost and staff retraining.

R.102 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.[156]

Microsoft's productivity suites

Market shares

R.103 We note that there is some evidence that the Microsoft products are meaningfully differentiated from their next-closest competitors, therefore any market shares likely understate Microsoft's degree of market power.

R.104 We have four measures of share of supply for productivity suites on a global basis:

(a) shares by revenue calculated from an industry report submitted by Microsoft based on a market for enterprise productivity suites. There are some limitations associated with the data used to calculate these shares as:

(i) these revenue figures are estimates;

(ii) we have not been able to have access to the methodology by which the revenue figures are compiled to confirm the allocation of revenues; and

[155] Microsoft's response to the CMA's information request [✂].
[156] Microsoft's response to the CMA's information request [✂].

(iii) these revenue figures have only been provided from 2020 to 2022.

(b) shares by revenue calculated from data submitted by Microsoft and Google. A limitation associated with this metric is that this excludes other productivity suite providers, however we consider these immaterial.

(c) shares by count of users based on data submitted by Microsoft and Google.

(d) shares by revenue submitted by Google based on [✂] which calculate Googles market share across SMB (small and medium businesses), Corporate and Enterprise and Select segments. This has only been submitted for 2022, and we do not have access to the underlying data for this analysis. This data is not presented in the table below.

R.105 The table below presents three of the four metrics outlined above. Below, the results from the Google analysis are presented.

Table R.7 Summary of market shares for Microsoft's productivity suites based on three different metrics

%

		2018	2019	2020	2021	2022	2023
Shares by revenue (data submitted by Microsoft)	Microsoft			[80-90]	[80-90]	[80-90]	
	Google			[10-20]	[10-20]	[10-20]	
	Other			[✂]	[✂]	[✂]	
Shares by revenue (submitted by Microsoft and Google)	Microsoft	[80-90]	[80-90]	[80-90]	[80-90]	[80-90]	[80-90]
	Google	[10-20]	[10-20]	[10-20]	[10-20]	[10-20]	[10-20]
Shares by count of users (submitted by Microsoft and Google)	Microsoft	[80-90]	[80-90]	[80-90]	[80-90]	[80-90]	[80-90]
	Google	[10-20]	[10-20]	[10-20]	[10-20]	[10-20]	[10-20]

Source: CMA analysis of Google's response to the CMA's information request [✂] and Microsoft's responses to the CMA's information requests [✂]. Shares do not sum to 100 due to rounding.

R.106 Google has submitted an analysis which calculates its global market share for its Google Workspace product across three customer segments based on 2022 revenues. Based on this analysis it estimates Google Workspace to hold a share of:

(a) [10-20]% for the [✂] based on a total addressable market of USD [✂];

(b) [0-5]% for the [✂] based on a total addressable market of USD [✂]; and

(c) [0-5]% for the [✂] based on a total addressable market of USD [✂].[157]

R.107 Google has submitted that it did not consider the market shares of its competitors in this analysis. However, it has submitted that it would expect Microsoft's

[157] Google's response to the CMA's information request [✂].

productivity software to account for almost all of the remaining market shares across any enterprise customer segments.[158]

R.108 As shown in the results above, Microsoft's market share was very high and significantly higher than its next-closest competitor. All measures illustrate that for the time periods available, Microsoft has held more than an [80-90]% share of supply considering a global market for productivity suites.

Customers' submissions

R.109 We asked customers if they host Microsoft 365 on public cloud and/or non-public cloud IT environments (public, non-public or both), and (if the former), whether they previously also used it on non-public cloud.[159]

(a) Some customers use Microsoft 365 only on the public cloud,[160] and some use it on both public and non-public cloud.[161] Other customers used Microsoft 365 on the non-public cloud

(b) Of these customers, most previously used Microsoft 365 on non-public cloud.[162] This suggests there is some stickiness of demand as customers migrate from on-premises to the public cloud.

R.110 We have indicated in the following assessment where customer evidence relates to customers who only use Microsoft 365 on non-public cloud. We have given this less weight than evidence from customers who use the product on the public cloud, but still included it for the following reasons:

(a) customer evidence on use of the product on non-public cloud and public cloud suggests customers may find it hard to switch away from the Microsoft product.

(b) some customer reasons for choosing Microsoft 365 relate to their historical use of the product (for example staff have developed skills in it or other applications rely on it).

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[158] Google's response to the CMA's information request [✂].
[159] We note that Microsoft 365 includes some cloud backed services include SharePoint online, and SaaS delivery of the Microsoft 365 Apps. We consider the use of Microsoft 365 in the public cloud to be the installation of the Microsoft 365 Apps as part of a VDI. Therefore, for customers who have reported use of Microsoft 365 on the public cloud but did not report that they operated a network of virtual desktops, we have considered that these customers do not host Microsoft 365 on the public cloud (or 'on VDI'). We consider it likely that for customers which may have reported that they use Microsoft 365 only on the public cloud, that these customers will also have the Microsoft Apps installed on the desktop, and therefore on both public cloud and traditional IT environments.
[160] This included a few customers who only use the product on non-public cloud. Responses to the CMA's information requests [✂].
[161] Responses to the CMA's information requests [✂].
[162] This included a few customers who only use the product on non-public cloud. Responses to the CMA's information requests [✂].

R.111 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%.[163]

R.112 Almost all customers we contacted who use Microsoft 365 on the public cloud said they were unlikely or had a very small chance of switching away.[164] The customer who was theoretically open to switching mentioned being open to alternatives but unable to switch within the next five years.[165]

R.113 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.[166]

R.114 Customers directly highlighted a number of switching costs.[167]

(a) Many customers reported a high cost of change and/or re-architecture.[168]

(b) Many customers highlighted re-training staff as a cost of switching away from Microsoft 365.[169]

(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.[170]

(d) One customer raised portability issues between Microsoft 365 and alternatives.[171]

R.115 Some customers reported not wanting to switch away because they wanted to use the same solution as other companies.[172] One mentioned having to use Office because of its clients.[173] Another highlighted it would not switch away as Microsoft 365 was the corporate standard.[174]

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[163] 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.
[164] This included a few customers who only use the product on non-public cloud. Responses to the CMA's information requests [✂].
[165] [✂] response to the CMA's information request [✂].
[166] This included a customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[167] Responses to the CMA's information requests [✂].
[168] This included a customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[169] This included a customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[170] This included a customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[171] [✂] response to the CMA's information request [✂].
[172] This included a customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[173] [✂] response to the CMA's information request [✂].
[174] This customer only uses the product on non-public cloud. [✂] response to the CMA's information request [✂].

R.116 Concerning Office, customers raised additional reasons highlighting that they were unlikely to completely switch away.[175]

(a) One Google Workspace customer mentioned where there are external factors or functional limitations in alternatives it was likely that there will always be some Microsoft Office usage.[176]

(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.[177]

R.117 In response to the working paper, SMF highlighted several further customers which consider Microsoft's productivity suites as important to their businesses with a lack of alternatives and described Microsoft as the 'default' suppliers of productivity software.[178] SMF provided an example of a customer who felt 'overly entrenched or "tied" to Microsoft's suite' and that 'pursuing alternative solutions… would result in additional expenses'.

Providers' submissions

R.118 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 it does not track a list of the products that provide the most important competitive restraint on the Microsoft 365 Apps. Microsoft outlined that Google Workspace was likely its most significant competitor.[179]

R.119 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) [✂].[180] 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. [✂].[181][✂].[182]

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[175] Responses to the CMA's information requests [✂].
[176] This customer only uses the product on non-public cloud. [✂] response to the CMA's information request [✂].
[177] This customer only uses the product on non-public cloud. [✂] response to the CMA's information request [✂].
[178] Social Market Foundation response to licensing working paper, pages 27 and 29.
[179] Microsoft's response to the CMA's information request [✂].
[180] Microsoft's response to the CMA's information request [✂].
[181] Microsoft's response to the CMA's information request [✂].
[182] Microsoft's response to the CMA's information request [✂].

R.120 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.

R.121 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.[183]

R.122 [✂].[184]

R.123 We also note that Microsoft's response contrasts with customer evidence which highlights various barriers to switching including cost and staff retraining.

R.124 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.

R.125 Microsoft said that it does not believe there are any material barriers to entry or expansion for the creation of productivity software.[185]

R.126 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.[186]

R.127 In response to the licensing working paper, AWS submitted: 'Microsoft, despite its assertions to the contrary, is dominant in the supply of productivity software as pointed out frequently by the CMA and other parties. This means that customers have no choice but to accept Microsoft's licensing restrictions given the "must-have" nature of their products'.[187]

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[183] Microsoft's response to the CMA's information request [✂].
[184] [✂] response to the CMA's information requests [✂].
[185] Microsoft's response to the CMA's information request [✂].
[186] [✂] response to the CMA's information request [✂].
[187] AWS response to licensing working paper, paragraph 5.3.1.

Microsoft Visual Studio

Market shares

R.128 The market for IDEs seems to be an under-researched area, and we have not been able to gather data for Microsoft Visual Studio's market share in the market for IDEs precisely. However, we have two sources of related evidence, and we explain the caveats associated will each of these below.

R.129 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.[188]

Visual Studio's market share in a market for Development Languages, Environments, and Tools

R.130 Visual Studio is an integrated development environment (IDE). While we have defined a market for IDEs, the data we have been able to procure from IDC is revenue for Development Languages, Environments, and Tools (DLET) which includes IDEs but is broader, also including other products that are not part of the market.[189] We have been able to calculate Microsoft's share in DLET, and Microsoft's share derived from the Visual Studio product in this wider category of products. This figure is likely a very considerable underestimate of Microsoft's market share and the scope for market power on Microsoft's part in relation to the supply of IDEs.

R.131 The table below shows Microsoft's share (for Visual Studio; other Microsoft DLET products; and the combined share of Visual Studio and other Microsoft DLET products) and other DLET providers' shares, of a global market for development languages, environments and tools.

[188] Microsoft's response to the CMA's information request [✂].
[189] CMA analysis of IDC data [✂].

Table R.8: Market shares for development languages, environments and tools, global basis, 2019 – 2023

					%
	2019	*2020*	*2021*	*2022*	*2023*
Microsoft – Visual Studio and other DLET products combined	[20-30]	[20-30]	[20-30]	[20-30]	[20-30]
Microsoft – Visual Studio	[✂]	[✂]	[✂]	[✂]	[✂]
Microsoft – other DLET products	[✂]	[✂]	✂]	[✂]	[✂]
IBM	[10-20]	[5-10]	[5-10]	[5-10]	[5-10]
Broadcom	[5-10]	[5-10]	[5-10]	[5-10]	[5-10]
JetBrains	[0-5]	[0-5]	[5-10]	[5-10]	[5-10]
NVIDIA	[0-5]	[0-5]	[0-5]	[0-5]	[5-10]
Others	[40-50]	[40-50]	[40-50]	[40-50]	[40-50]

Source: CMA analysis of IDC data [✂]. Shares do not sum to 100 due to rounding.

R.132 The data shows that Microsoft (Visual Studio and other DLET products combined) had the largest share of the revenue for DLET at between [20-30]% and [30-40]% from 2019-2023. Microsoft Visual Studio makes up [30-40]% of the revenue for Microsoft in DLET.

R.133 We have been able to use additional data from IDC to separate out revenue from Visual Studio and revenue from other Microsoft DLET products.[190] This data shows that from 2019-2023, Microsoft Visual Studio had the largest global share by revenue of all Development Languages, Environments and Tools, at [10-20]%. The second largest was IBM, which had a share of [5-10]% in 2023.[191]

Visual Studio's market share in a market for IDEs

R.134 To address the underestimate described above, we requested from IDC the list of products contained within the DLET data and identified whether they were IDEs or not.[192] In doing so, we tended to understate Microsoft's position in IDEs in a number of respects.

(a) We included compilers and other development tools, which share functionality with IDEs, but would not be a substitute in all use cases (eg they often do not have a graphical user interface).

(b) The IDC data includes some products that appear no longer to be available, and which therefore do not act as competitive constraints on Visual Studio.

[190] The IDC DLET data set included data on Visual Studio as well as other Microsoft products. In this analysis we have separated Microsoft's share of the DLET market between its share attributable to Visual Studio, and its share attributable to the other products.
[191] CMA analysis of IDC data [✂].
[192] We note that this is not in line with IDC classification of revenues into functional markets.

(c) We note, however, that free IDEs are not included in this data (as it is based on revenue) and this could understate Microsoft's position.

R.135 This data shows that in 2023, Visual Studio's global share by revenue of IDEs was the largest at [30-40%].[193] The second largest was NVIDIA with [10-20%].

Customers' submissions

R.136 We asked customers if they host Visual Studio on public cloud and/or non-public cloud IT environments (public, non-public or both), and (if the former), whether they previously also used it on non-public cloud.[194]

(a) Some customers use Visual Studio only on the public cloud,[195] and some use it on both public and non-public cloud.[196] Some customers use it only on non-public cloud.[197]

(b) Of the customers who use Visual Studio on public cloud, all previously used Visual Studio on non-public cloud.[198] This suggests there is some stickiness of demand as customers migrate from on-premises to the public cloud.

R.137 We have indicated in the following assessment where customer evidence relates to customers who only use Visual Studio on non-public cloud. We have given this less weight than evidence from customers who use the product on the public cloud, but still included it for the following reasons:

(a) customer evidence on use of the product on non-public cloud and public cloud suggests customers may find it hard to switch away from the Microsoft product.

(b) some customer reasons for choosing Visual Studio relate to their historical use of the product (for example staff have developed skills in it or other applications rely on it).

(c) customer evidence on alternatives did not highlight that there was a different range of alternatives on the public cloud versus non-public cloud (see above).

[193] CMA analysis of IDC data [✂].
[194] For customers who have reported use of Visual Studio on the public cloud but did not report that they operated a network of virtual desktops on the public cloud, we have considered that these customers do not host Visual Studio in the public cloud (or 'on VDI').
[195] Responses to the CMA's information requests [✂].
[196] Responses to the CMA's information requests [✂].
[197] Responses to the CMA's information requests [✂].
[198] Responses to the CMA's information requests [✂].

R.138 The product market definition section discussed customer evidence we received regarding the alternative products to Visual Studio customers could use for the same purpose.

R.139 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 Azure and other Microsoft products, staff skills, functionality (eg extensive set of tools and plug ins), legacy use, it gets updates and optimisations for .NET development faster than other IDEs, it is bundled with other Microsoft licences, and it is an embedded product.[199]

R.140 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 contacted said they would be unlikely to move away from Visual Studio (or Visual Studio Code).[200] Reasons given included: cost of change, integrations with other software and Microsoft ecosystem, more or desired functionality, cost of re-training staff, little perceived benefit, existing investment, additional licensing cost, codes would need to be re-written, and Visual Studio was best for Windows development. One party said it deploys Visual Studio for limited use cases for example support of legacy applications.[201]

(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 was suitable.[202] Another said its decision to stay with Visual Studio was becoming marginal in terms of cost saving, explaining using it in the public cloud was 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.[203] Another said developers can choose their preferred product, but switching was complex involving staff re-training and code base changes.[204]

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[199] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[200] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[201] [✂] response to the CMA's information request [✂].
[202] We consider that customers that already have a preference to move away from Visual Studio regardless of a price rise are not really 'Visual Studio customers' in the counterfactual (ie they would not be consuming Visual Studio in the absence of the price rise). Their responses are still relevant, but we should put more weight on customers that do use Visual Studio in the counterfactual. This included one customer who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[203] [✂] response to the CMA's information request [✂].
[204] [✂] response to the CMA's information request [✂].

R.141 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. 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, losing integrations with Microsoft infrastructure, licensing costs.[205]

R.142 Some customers said there would be no or low switching costs.[206] 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.[207]

Providers' submissions

R.143 Microsoft submitted that Visual Studio is not relevant to the cloud and the CMA should not focus on it. It said Visual Studio is only a marginally more popular IDE than competitors IntelliJ IDEA, Notepad++ and Vim, with less than 1 in 3 developers stating that they regularly use/will use the IDE according to a 2023 Stack Overflow survey.[208] We note there are possible limitations with this survey for example customers self-selected rather than being selected using random methods, so we cannot be confident the survey was based on a representative sample of users.

R.144 We asked Microsoft to identify its main competitors in supplying Visual Studio. Microsoft listed other IDEs – Eclipse, Xcode IDE, NetBeans, OutSystems, Oracle JDeveloper, Android Studio and others. [209]

R.145 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.[210]

R.146 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

[205] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[206] This included a few customers who only uses the product on non-public cloud. Responses to the CMA's information requests [✂].
[207] [✂] response to the CMA's information request [✂].
[208] Microsoft's submission to the CMA [✂].
[209] Microsoft's response to the CMA's information request [✂].
[210] Microsoft's response to the CMA's information request [✂].

use the new tools to which they are switching and it does not believe that there are any major barriers.[211]

R.147 We asked Oracle to list any Oracle products that compete with Microsoft Visual Studio and describe the main customer use cases they fulfil. Oracle submitted that its offerings do not compete directly with Visual Studio but Visual Studio is a tool of 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.[212]

R.148 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. [213]

(b) Oracle said for Oracle Java, none of these factors are significant barriers to expansion. [214]

[211] Microsoft's response to the CMA's information request [✂].
[212] Oracle's response to the CMA's information request [✂].
[213] Microsoft's response to the CMA's information request [✂].
[214] Oracle's response to the CMA's information request [✂].