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CMA: Public Cloud Infrastructure Services Market Investigation

IBM OBSERVATIONS ON ISSUES STATEMENT

IBM welcomes the opportunity to participate in the CMA's market investigation into Public Cloud Infrastructure Services. IBM reiterates its support for Ofcom's overall conclusion that a cloud services infrastructure market that is working well needs to ensure that customers can adopt a multi-cloud model. In line with the Issues Statement, IBM considers that the ability of customers to switch cloud provider and to deploy a multi-cloud environment should be central themes in the CMA's investigation. In this regard, IBM strongly believes that the guiding principles for competitive cloud markets should include true and transparent interoperable models, portable tools and services, industry-supported standards, and symmetry of access to data and functionalities.

These principles are reflected in IBM's business model. IBM offers a range of open hybrid multi-cloud solutions that facilitate interoperability and portability of software and data, and its cloud solutions are largely based on open-source products. IBM's 2019 acquisition of Red Hat was essential in developing IBM's flexible offering, with Red Hat's open-source solutions further complementing IBM's products to provide clients with an open hybrid multi-cloud environment. IBM's hybrid cloud offering, in particular Red Hat's OpenShift, is available on almost any infrastructure, whether it is IBM's public cloud, other public clouds, a customer's private cloud, or data centres of other providers. This flexibility allows companies to limit costs when migrating, and to optimise their use of the cloud according to their needs. IBM also increasingly provides customers with tools and services to facilitate multi-clouding such as Turbonomic or its range of Apptio solutions. This model fosters interoperability and portability which Ofcom recognised as critical for a competitive cloud environment.

A competitive cloud environment where multi-cloud models unlock their full potential is also fostered through cloud solutions that offer high levels of security and enable the level of cloud resilience increasingly sought by the market and regulators (e.g. the Financial Conduct Authority's guidelines on outsourcing IT).

In the following sections IBM provides its observations on selected points in the Issues Statement where IBM believes it is most useful to comment or restate its position. In addition, IBM's submissions made in the course of the Ofcom market study still stand.

IBM believes that the complexity of the evolving cloud industry calls for a nuanced approach when identifying the range and variety of issues (technical, commercial and/or contractual) that may hinder open and competitive markets.

Finally, the cloud industry does not operate in a vacuum and cannot be assessed independently of related services, such as data analytics or AI. It is IBM's understanding that the CMA is embracing these key principles in its work, and we encourage it to continue to do so as the investigation unfolds.

1. THEORIES OF HARM

- 1.1. IBM's position with respect to each of the theories of harm is briefly outlined below as well as its broader view on interoperability and portability, which are key to facilitating multi-clouding and switching.
- 1.2. **Interoperability and portability.** IBM offers a range of hybrid multi-cloud solutions that facilitate the interoperability and portability of software by combining the use of private and public cloud functions. It allows companies to adopt cloud solutions faster and improves their business agility and competitiveness. A hybrid multi-cloud solution leverages portability and makes it possible to optimise workloads by using the best suited environment for these workloads. It also allows customers the choice of where their data resides: in the public cloud, the private cloud, or on-premises. IBM's overarching business strategy is focused on

helping customers leverage the power of hybrid multi-cloud. As stated, the acquisition of Red Hat in 2019 was essential in further developing IBM's flexible offering.

- 1.3. IBM's cloud solutions are largely based on open-source products. The purpose of open standards is to facilitate interoperability and therefore an open cloud approach. IBM is active in standards committees, for example the Hyperledger Foundation (managed by the Linux Foundation). It is IBM's strategy to follow open standards if they are in place and to develop them if they are not. ¹
- 1.4. There are differences in IBM's cloud offering from that of other market players in terms of interoperability and portability [X] namely:
 - IBM's hybrid cloud offering is available on almost any infrastructure, whether it is IBM's public cloud, public cloud of other providers, a customer's private cloud, or data centres of other public cloud providers. This flexibility allows companies to limit costs when migrating and to optimise their use of the cloud according to their needs, without being tied to a particular provider.
 - The neutrality of Red Hat's OpenShift platform, which is available on almost any infrastructure, enables IBM to offer a differentiated and attractive hybrid cloud alternative.
 - IBM Cloud Satellite further reflects IBM's openness since the distributed cloud architecture² can be run in any environment.
- 1.5. IBM however notes that the concepts of portability and interoperability can arise in a variety of scenarios and thus can be context-specific. Consequently, they need to be clearly defined, and such definitions need to be comprehensive. Absent commonly agreed and detailed definitions, each provider would be able to implement these concepts in the way that better suits its commercial goals. It follows that assessment of portability and interoperability requires a nuanced and technical approach, to differentiate genuine portability and interoperability that facilitates flexibility, multi-clouding and switching, from less effective versions of portability and interoperability.
- 1.6. **Technical barriers.** IBM believes that the cloud industry faces several technical barriers that limit interoperability and portability, thus inducing customer lock-in. These include:
 - Lack of open standards. The lack of open and widely used standards limits the interoperability and portability of applications. Although the adoption of open-source software has accelerated in recent times across companies of all sizes and industries, [※] cloud providers have not necessarily adopted these standards. The absence of widely implemented open standards by [※] public cloud providers poses a challenge to the ability of third-party service providers, especially in software, to develop solutions that can work effectively in all environments. The lack of appropriate governance for certain so called open-source standards can also lead to the creation of proprietary forked versions of the standard, reducing openness and interoperability. Similarly, some PaaS services can be provided with compatibility modes but may not fully support the capabilities of the open-source version.

[×]

The development of the open-source-based hybrid cloud requires and also enables providers to offer a higher level of security, which is key to IBM's value proposition.

IBM defined the concept of a 'distributed cloud' to enable clients to consume IaaS/PaaS services on cloud and non-cloud locations. The strategy is to build a hybrid cloud platform that can be run in any cloud and on-premises servers including PaaS services based on open-source and middleware using Cloud Paks. This provides interoperability of PaaS services and middleware software between cloud service provider locations. IBM Cloud can be deployed on other third-party clouds, on-premises, at the edge or in locations as small as the home through the use of IBM Cloud Satellite, with servers running open-source Red Hat Enterprise Linux. This enables IBM Cloud PaaS services to be run in any location wherever servers, storage and network are available.

- Asymmetry in access to functionalities. A player with market power could reduce the functionalities of its products when used on third-party cloud services, as opposed to when used on its own first-party cloud services. IBM's cloud offering is based on a hybrid multi-cloud approach, meaning that IBM provides cloud-related services largely irrespective of the customers' choice of cloud service provider. However, when a provider exclusively provides (or significantly favours) cloud-related services within its own cloud infrastructure, this may affect competition [≫]. Such conduct also reduces the customer's ability to choose between competing services and discourages the development of alternative solutions.
- Lack of portability. Concerns may arise where there is a lack of portability of Day2 operations tools which are used once an application is running to e.g., monitor performance, ensure security, compliance, logging and metering. This means that an application or Day2 operation tool has to be recreated when using another cloud provider, which will involve additional technical work (mainly recoding) and may require different skillsets. Similarly, cloud service providers sometimes take a closed source approach to PaaS services (such as AI cloud services see below) with clients locked in to their proprietary services.
- Update and certification-related barriers. Over-frequent and unstable updates can be detrimental to other cloud providers: if patches are released frequently and need material work to achieve interoperability, rivals' services will need to incur high costs to debug and provide a stable service. Refusals to allow other cloud infrastructure providers to obtain a certification that the software is secure, stable and supported when run on other cloud infrastructure providers (integrated or bare metal) introduce additional friction. Some software providers may also only provide support for their proprietary software on their own cloud, making integration challenging and expensive.
- 1.7. These technical barriers are especially problematic for companies that have gradually migrated to the cloud, as they have often ended up with a patchwork of multi-cloud infrastructure. Unlike companies that are actually building their applications directly in the cloud (known as "cloud-native"), the majority of companies pre-exist the development of cloud and have progressively migrated some or all of their workloads to the cloud on an as-needed basis. For these customers the migration may have occurred in a fragmented way, by activity or by process, resulting *de facto* in a multi-cloud solution, but one which was not open and interoperable by design. Achieving interoperability and portability between different cloud solutions is crucial if these customers are to optimise and streamline their systems.
- 1.8. **Egress fees.** At the outset, it is worth recapping that as acknowledged by Ofcom there are different scenarios of data transfer which may incur "egress fees". These scenarios can be summarised as follows:
 - clients who use cloud services across multiple providers (multi-cloud);
 - support applications which require a large amount of data transfer from the cloud environment to
 on-premises sites, or to share and collaborate across multiple end-users, or for back-up/copy
 purposes; and
 - clients who switch to another cloud provider.

It is important to note that it is only the third of these scenarios which could be for consideration as a possible barrier to switching suppliers. The first and second relate instead to ongoing operations in which data may need to move between clouds and/or on-premises. The level of egress fees in those two categories may be relevant to customers' incentives to adopt multi-cloud and hybrid deployment models.

- 1.9. Egressing data through the internet generates costs for cloud service providers. If the costs incurred by a cloud provider are not recovered in one form, they will likely be recovered elsewhere, in order to allow the provider to achieve an economic return.
- 1.10. IBM promotes transparency in egress fees with its customers, encouraging customers to have an appropriate structure where the workload and application is assessed, as well as the use cases, so addressing intelligently

the volume of data that will need to move. In the process that will tend to ensure that egress fees are economic for the operational use intended.

- 1.11. IBM also has a one-rate-plan, without separate charges for data retrieval or data transfer. This is helpful for customers with a fixed need that want to be able to access their data at will. In this case, the customer is technically paying for the storage and not the egress. IBM also provides tools to allow customers to better understand and manage their spend, including on egress fees.³ Providing customers with the means to effectively monitor their consumption/usage helps to limit inefficient practices which would result in the accumulation of egress fees.
- 1.12. Given the importance of the potential technical switching barriers outlined above, IBM's experience is that customers are more focused on those barriers than on the cost of egress fees. [X]
- 1.13. **Committed spend discounts.** Committed spend discounts reinforce the technical barriers to multi-cloud and present a challenge from customers' standpoint, as they can limit their ability to switch providers [%].
- 1.14. Cloud migrations can take longer than expected, leading in the short term to lower cloud consumption than forecast. Customers may underestimate the time it takes to move workloads to the cloud, which in turns leads to inflated cloud consumption targets; such aggressive cloud migration plans often leave customers facing an uphill battle to meet their spend commitments. IBM considers that cloud service providers have an important role to play in educating customers about devising appropriate and realistic cloud consumption models. In this regard, IBM transparently engages customers to manage this risk, assessing workload capacity requirements and the feasibility of deploying those workloads as planned to ensure the end user is able to meet their volume commitments and within planned time periods before forming commercial agreements. Our experience post-contract demonstrates this to be an effective principle which services both the customer and IBM well, in what are typically long-term business relationships.
- 1.15. [%]
- 1.16. IBM favours an interoperable hybrid cloud model $[\times]$.
- 1.17. [%]
- 1.18. [%]

2. INTERACTION BETWEEN CLOUD SERVICES AND AI

- 2.1. IBM's portfolio is positioned to foster hybrid multi-cloud opportunities, enabling IBM's clients to access and deploy IBM's AI capabilities on IBM's cloud or those of other major providers. One of the five core capabilities of IBM's overarching value proposition is the automation of end-to-end enterprise software processes, for effectiveness and efficiency with AI-driven decision-making.
- 2.2. IBM welcomes the CMA's decision to consider the impact of AI on the functioning of competition in the cloud services market, and conversely. In this regard, the publication of the CMA's initial report following its initial review of AI Foundation Models is a positive development and an important first step in understanding the interconnections between nascent AI market(s) and cloud services.
- 2.3. In line with the findings of the AI Foundation Models Review, IBM considers that data is a critical input in the development of foundation models since they are trained on vast amounts of data. In particular, the development of AI and machine learning solutions depends primarily on the quantity and quality of the data available to train the underlying algorithms. Issues related to data and data access are of crucial importance

³ IBM has recently acquired Apptio, a provider financial and operational IT management and optimization (FinOps) software that allows customers to benefit from an integrated and simplified visibility into technology spend across hybrid and multi-cloud environments, labour and associated resources.

in the provision of cloud services, which Ofcom recognised as the cornerstone for the development of AI tools. Data can be used to improve commercial targeting and knowledge of user needs but can also allow cloud providers to improve the functionalities of their services and develop new tools, including capabilities applicable in a B2B environment. Moreover, many cloud solutions use AI and machine learning to mine data and provide more sophisticated analytical services to their customers.

- 2.4. In view of the above considerations, IBM submits that the explicit or implicit possibility for cloud providers to use customers' data stored on the provider's platform to better the provider's own products needs to be factored into the CMA's assessment of competition in the provision of cloud services.⁴
- 2.5. [×] the CMA [×] observed that there is significant vertical integration, with multiple firms integrating foundation model technology into consumer-facing products and services, e.g., online shopping and search. Several [✗] developers of foundation models enjoy privileged access to a large amount of proprietary data, including consumer data, which they can, for the most part, use for other purposes (subject to consent when personal data within the meaning of the UK GDPR - or equivalent rules elsewhere - are concerned).⁵ Although it is possible to purchase data from third party providers, the CMA [X] observed that the use of proprietary data is increasing in importance. [X]
- 2.6. In terms of market outcome, IBM considers that it is critical that the AI ecosystem remains open. [X]
- 2.7. The asymmetry of data access limits the possibility for other players to develop innovative and competitive solutions which in turn limits competition and customer choice. Re-establishing a certain symmetry in access to data would make it possible to strengthen innovation and diversify the available offers. Whilst the grant of access to data should be subject to applicable data protection rules, IBM deplores existing practices which seek to weaponise privacy – as well as other regulations and principles such as cybersecurity – for potentially anti-competitive purposes.
- 2.8. IBM notes that in many environments, cloud users can typically only make use of their data if they agree to use the tools and services offered by their cloud services provider. De facto this restrains competition between providers of data analysis tools, and strongly limits customers' choice. IBM is the only provider that enables its AI environment onto other public clouds, so that customers can process all of their data irrespective of where it is actually stored. $[\times]$
- 2.9. [><]

3. REMEDIES

- 3.1. As outlined above, the guiding principles for competitive cloud markets should include true and transparent interoperable models, portability, industry-supported standards, and ongoing and timely symmetry of access to data and functionalities. At this stage, IBM has not had the opportunity to meaningfully consider all of the remedies outlined in the Issues Statement. However, IBM considers that targeted remedies which are focused on achieving the outcomes set out below would facilitate multi-clouding and switching.
- 3.2. Symmetry of access to data and functionalities. Re-establishing a certain symmetry in access to data, obviously subject to consent for personal data, would make it possible to strengthen innovation and diversify the available offers. Similarly, while innovation increases the quality of service for customers, it may also increase technical switching barriers if improvements are only available to first-party services of a cloud

As a general matter, IBM wishes to underline its key leading principle which is that clients own their data, and IBM does not and should not have access to it. For example, IBM pioneered the idea of 'Keep Your Own Key' within its Hyper Protect Crypto Services, which substantiated how important it is for IBM to ensure that access to data should be truly limited to the end client.

IBM primarily offers B2B services, but consumer data is relevant for IBM's enterprise offerings. For example, MaximoWorker's insight helps businesses improve their workers' safety by analysing data which is collected from different sources. Those sensors could involve a smartwatch or other types of trackers that are connected to a worker's body or clothes. IBM must be able to work together seamlessly with third parties who provide such sensors and/or establish the connections through smartphones with such sensors.

provider [\times] but not to competing third-party services. There needs therefore to be ongoing and timely symmetry of the functionalities available to first and third-party cloud services, in order to ensure competition and true customer choice in a multi-cloud environment.

- 3.3. **Open industry-supported standards.** The lack of open and widely used standards limits interoperability and portability. Truly effective interoperable models are best based on industry-supported standards with appropriate governance (*e.g.*, by the Linux Foundation) [≯].
- 3.4. **Transparency.** Overall, IBM believes that greater transparency would improve competitive conditions in the cloud market, in particular with regard to:
 - Data ethics. Information and transparency in this area could improve competition, including on non-price parameters like privacy or security. Indeed, more clarity on (i) the level of access to data enjoyed by the cloud provider, (ii) the possible use of that data by the provider for its own processes, and (iii) what the UK GDPR does and does not allow in this area would limit the weaponisation of these rules. Similarly, clearer information on technical justification for security requirements would limit weaponisation of cybersecurity considerations.
 - Costs. Increased transparency would limit the potential foreclosure effects of egress fees, at least for B2B customers. Giving enterprises, during contract negotiations, clear information about egress fees would give these sophisticated customers a better understanding of the total cost of ownership of the contract, so that they can select their provider based on all relevant criteria. It may also better equip customers to consider optimising their IT infrastructures to reduce the amount of data that needs to egress the cloud.
- 3.5. **Interoperability with multi-cloud tools and software**. ISVs and cloud providers are increasingly offering tools and software to provide customers with better visibility and control over their IT infrastructure when operating in a multi-cloud setting. To be truly effective, these tools however need to interoperate with various functionalities of the cloud services providers, including APIs. Ensuring that workable tools and services are available to customers would facilitate multi-cloud and increase competition.
- 3.6. **Portability of proprietary cloud services.** As explained, proprietary cloud services are often not portable, which means that an application has to be recreated when switching to another cloud. Mandating portability for proprietary cloud services PaaS/SaaS offering in most cases would increase competition for these services, as well as on the underlying IaaS layer, and increase customer choices.
- 3.7. IBM stands ready to assist the CMA with industry insights into the subtleties of the dynamics in Cloud Infrastructure Services, so that remedies can be effectively nuanced and targeted.