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Competition in the Provision of Cloud Computing Services – Note by France

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Antonio CAPOBIANCO
Antonio.Capobianco@oecd.org, +(33-1) 45 24 98 08

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France

1. On 29 June 2023, the *Autorité de la concurrence* ("the *Autorité*") published Opinion 23-A-08 on the competitive operation of cloud computing¹. The opinion provides an overall analysis of the functioning of competition in this complex, fast-growing technical sector, which represents a major source of value creation for the European economy.
2. The cloud is defined by the U.S. National Institute of Standards and Technology² as "a model for enabling ubiquitous, convenient, and on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." They offer the possibility to outsource "the management of all or part of the existing software, applications and IT Units".
3. The *Autorité's* opinion focuses mainly on the public cloud, which enables IT resources to be shared elastically, and optimises the cost of these resources for companies by pooling them across different usage profiles. The public cloud is seen as the model destined to become dominant in the future. According to consulting firm Gartner³, entities' spending on public cloud services is set to increase worldwide by 21.5% in 2025 to \$723.4 billion, up from \$595.7 billion in 2024.
4. Three main categories of cloud service offerings can be distinguished, depending on their degree of outsourcing. "Infrastructure as a Service" (IaaS), the least outsourced model, refers to the provision of computing resources in which users can deploy and run the software of their choice. "PaaS" (Platform as a Service) is an intermediate model that enables customers to use software and tools to develop their applications without having to create or maintain the infrastructure. Lastly, "Software as a Service" (SaaS), which gives users direct access to applications managed entirely by the supplier, from any connected device, is very different from the previous two services, in terms of customers, uses and business models. The *Autorité's* analysis mainly concerned IaaS and PaaS services.
5. For the investigation of its opinion, the *Autorité* exchanged views with both French and international private-sector stakeholders (providers, customers, associations and others) as well as with institutional stakeholders (sector regulators, foreign competition authorities, ministerial departments). In addition to interviews, questionnaires were sent out to cloud service providers and customers, as well as to other stakeholders, such as software integrators and publishers, and professional associations. The Investigation Services collected responses from over 50 interlocutors. A public consultation was also launched in summer 2022 to present the initial lessons and trends drawn from the first six months of the investigation.

¹ [Opinion 23-A-08 on the competitive operation of cloud computing](#).

² Peter Mell and Timothy Grance, *The NIST definition of cloud computing*, National Institute of Standards and Technology, Special Publication 800-145, September 2011

³ <https://www.gartner.com/en/newsroom/press-releases/2024-11-19-gartner-forecasts-worldwide-public-cloud-end-user-spending-to-total-723-billion-dollars-in-2025>

1. The different players in the cloud value chain

1.1. Sector player categories

6. Three main categories of player are involved upstream, in the middle and downstream of the cloud value chain, with some players tending to position themselves across the entire value chain and others in a limited segment.
7. Upstream, the data centre operators build and operate the infrastructures required to provide cloud services.
8. As far as suppliers are concerned, some were already major players in the digital economy before entering the cloud sector, such as Amazon, Alphabet (Google) and Microsoft, which have massive storage and computing capacities. The term "hyperscaler" is commonly used to describe these players. Other providers in different digital markets who have expanded into cloud services include companies from the software and corporate information systems sector, and electronic communications operators.
9. Other providers can be described as "pure players", in that their activities mainly concern the cloud, and they have little or no presence in other markets. Examples include OVHcloud, Scaleway and 3DS Outscale.
10. Still others specialise in certain services or categories of cloud services, such as providers of "trusted cloud" offerings.
11. Downstream are the integrators, who support cloud service customers in managing their migration to the cloud and in upgrading and maintaining their applications in the cloud in working order.
12. Lastly, it should be noted that many cloud service providers offer cloud marketplaces that are open to third parties, who can generally offer similar services themselves.

1.2. Relationships between players

13. As far as the relationship between these players is concerned, cloud service providers most often conclude standard contracts with their customers, as they appear on their websites, for an indefinite period and cancellable at any time. Only a few key accounts have contracts with negotiated, fixed-term clauses, which may include a commercial discount in return for the purchase of a high volume of services.
14. While pricing is based on demand and usage ("pay as you go"), the sector is also characterised by specific pricing practices.
15. On the one hand, "cloud credits" entitle customers to a discount on certain cloud services, usually offered in the form of cloud service trials, of varying amounts, and generally of short duration - except for certain users with high innovation potential, who can enjoy cloud credits in the form of support programmes, which are more substantial both in duration and in amount.
16. On the other hand, some cloud service providers, particularly hyperscalers, charge for data transfers, both to another provider and between the infrastructures of the same provider; this pricing is usually referred to as "egress fees".

2. How the cloud sector works

17. In its opinion, the *Autorité* highlighted the main characteristics of the cloud sector, which can be summarised as follows.

1. The provision of cloud services requires resources, which can represent very significant costs and investments. These inputs consist mainly of data centres and the infrastructures they house, as well as the technologies and skills required to develop these services. Given the high fixed costs and significant economies of scale that characterise this business, the players involved need to acquire a sufficient critical size to propose a viable offer, and an established player with significant production capacity will have an advantage over new entrants or smaller players. Added to this are economies of scope, which can significantly influence the competitive functioning of the market and encourage the merger of the players involved.
2. With regard to differentiation capabilities, the opinion notes that these appear limited for IaaS services, but that additional managed services such as PaaS or SaaS would, on the other hand, facilitate the development of diversified offerings. Different certifications relating to cloud technologies and services, including "trusted cloud" offers, can also contribute to this.
3. An analysis of the way the sector operates tends to show that some providers are building cloud ecosystems, i.e. a set of integrated services that customers can access, including their proprietary services, but also, generally through marketplaces, services from third-party developers. The main cloud service providers are present at all levels of the value chain, especially the hyperscalers, offering solutions that can cover all customer needs; this is at a time when the quantity of accessible services is an important factor in customers' choice of supplier. Added to this are network effects, amplified by the learning costs associated with the specific nature of cloud products and services, which reinforce the creation of cloud ecosystems and the position of the main players, to the detriment of other suppliers. As a result, the *Autorité* has identified both potentially limited competition *in* the market, where there is already a relationship between a customer and a primary provider, and competition *for* the existing market between providers, where large hyperscalers forming ecosystems enjoy an advantageous position.
4. In its opinion, the *Autorité* emphasised that players with a strong presence in other sectors of the digital economy, such as Amazon, Google and Microsoft, enjoyed significant competitive advantages of a conglomerate nature. These hyperscalers enjoy considerable financial muscle, enabling them to agree to the substantial investments that are nonetheless needed to launch activities in the cloud industry, such as data centres or IT and network infrastructures. They can benefit from economies of scale and product ranges linked to the different services in their ecosystems. Finally, they have access to a pre-existing customer base that enables them to take advantage of significant network effects, and which can be used as leverage to expand rapidly in the cloud industry. The relative difficulty of migrating from one provider to another and the lack of interoperability between their services tend to reinforce the capture of customers by hyperscalers. All in all, these sector characteristics are all factors that favour and strengthen the position of existing providers. These findings call for particular vigilance with regard to changes in the market's competitive structure and to the practices likely to be implemented by hyperscalers.

3. Competitive risks in the cloud industry

18. Some risks raise cross-cutting issues, insofar as they affect competition in the sector as a whole, while others are more relevant to specific scenarios, with risks identified during the initial migration to the cloud, and in the event of migration from one cloud service provider to another; the latter case involves risks linked to impediments to the expansion of hyperscalers' competitors.

3.1. Cross-cutting competitive risks

19. The risks highlighted by the investigation of the opinion relate to the imbalance in relations between hyperscalers and their customers (1), and to hyperscalers' cloud credit and egress fee practices (2).

20. Firstly, customers have a limited ability to negotiate contracts, which are generally concluded online - even key accounts find themselves constrained in this respect, due to the asymmetry between the parties, given the economic power and, in particular, the technological expertise of cloud service providers. Furthermore, it is difficult for customers to anticipate future costs, given the complexity of the offerings and the lack of pricing transparency.

21. In addition, pricing practices specific to cloud services, such as cloud credits and egress fees, require particular vigilance.

22. Cloud credits are trial offers whereby a provider offers a customer free access to services for a given period. In practice, unlike a free trial, it is a sum to be spent in the form of an invoice credit granted before use. Cloud credits can be used for product testing and discovery, or for targeted business support.

23. Cloud credits are of real benefit to many companies, making it easier for them to switch to the cloud and, especially for start-ups, providing low-cost access to the cloud without the need for heavy investment. Cloud service providers can thus spread the word and encourage the adoption of their technology.

24. While cloud credits offered in the form of tests do not appear a priori to raise competitive risks, the *Autorité* considers that targeted support offers must be the subject of particular attention. The high amounts sometimes proposed, the vast ecosystem of companies they cover, their validity periods and the customer lock-in risks - caused by technical and pricing barriers to migration - set them apart significantly from the free trials commonly seen in other sectors, and raise doubts about the ability of all cloud service providers to respond.

25. With regard to egress fees, a number of hyperscalers have set up a cloud service provision model based on charging customers for the volume of data leaving their environment ("egress-only pricing model"). These fees apply when a customer seeks to migrate to a competing provider's cloud services, use different solutions in a multi-cloud architecture that requires data transfers, or when it transfers data to its own site or to its end users as part of its everyday operations.

26. However, charging these fees on outgoing traffic, which is increasing significantly in view of the ever-greater volumes of data, entails a risk of customer lock-in, and could therefore have a direct negative impact on the long-term growth potential of customer companies. Egress fees are a major concern for the industry, as their pricing structure is proportional to the volume of data transferred, and customers are unable to anticipate future needs in terms of data traffic and bandwidth usage.

27. Furthermore, the explanations put forward by the major cloud service providers to justify this pricing method on technical or economic grounds were not corroborated by the evidence gathered during the *Autorité's* investigation, as the pricing structure adopted does not reflect the costs incurred for data transfer outside networks. Invoicing outgoing traffic at a different price from incoming traffic would seem to be more the result of a commercial strategy to retain customers.

28. All in all, cloud credits and egress fees would be likely to limit the competitive pressure to which hyperscalers are exposed, both from other providers, unable to match their massive cloud credit offers, and between hyperscalers, since transfer fees, in their current structure, would entail a risk of lock-in by making it more difficult for customers to leave their primary provider or use multi-cloud.

3.2. Specific competitive risks

29. The *Autorité* has identified specific competitive risks in three different scenarios, depending on whether it is looking at the situation of customers when they first migrate, i.e. migrating on-premise information systems to the cloud, or when migrating from one cloud service provider to another, or when looking at barriers to expansion for competitors of hyperscalers.

3.2.1. *The risks of first-time migration to the cloud*

30. The opinion highlighted the technical and organisational obstacles to the initial migration of data and applications to the cloud.

31. Given the difficulty of a successful migration, the incumbent software solution providers could leverage their established relationships with corporate customers to encourage them to choose their own cloud solutions, to the detriment of those of an alternative cloud service provider.

32. These practices, which are liable to limit customers' freedom of choice, can include contractual clauses that restrict the free use in the cloud of software previously acquired on site from competing cloud service providers - in a context of imbalanced trade relations between cloud service providers and customers, as mentioned above -, tied selling and price advantages which, for example, force a company migrating to the cloud to accept new proprietary products and services associated with cloud services, as well as technical restrictions that, for a supplier, tend to deteriorate the quality of the solutions offered by its competitors and favour its own. If implemented by an operator in a dominant position, these practices could constitute abusive practices. Several complaints have been submitted to the European Commission on the basis of similar practices.

3.2.2. *Risks associated with a migration from one cloud service provider to another*

33. Barriers to migration from one cloud service provider to another carry the risk of locking in corporate customers. In addition to the complexity generally inherent in migrating to a new provider (particularly given the lack of portability of data or applications), these obstacles may be related to the technical characteristics of the services. While some services are becoming standardised, others are still partly differentiated - as is the case with IaaS services - or even include proprietary, provider-specific technologies, as can be seen in PaaS services.

34. Furthermore, providers may deliberately put in place additional barriers that increase the customer lock-in phenomenon within their ecosystem; these barriers are either

technical - this could be the case of a company in a dominant position deliberately using a specific data format to hinder data portability - or relating to commercial conditions.

3.2.3. *The risks of hyperscalers' competitors holding back their expansion.*

35. In its opinion, the *Autorité* noted the existence of technical obstacles to multi-cloud that were likely to have an impact on the competitive operation of the sector. In this way, the integration of a hyperscaler's services can make it more difficult to use a third-party provider's solution - the opinion presents concrete examples of this, such as the limited interoperability of IaaS and PaaS services, which could particularly affect smaller, competing providers.

36. Furthermore, all these behaviours, which enable providers to use their market power in a related market, contribute to a conglomerate dynamic, with knock-on effects that enable them to strengthen their position in all these markets, to the detriment of more specialised players. This may be the case, for example, if a major cloud provider engages in practices that restrict competitors' access to the software needed to provide cloud services, such as tied selling, price advantages, or commercial or technical restrictions designed to favour its own products or services and limit the expansion of third-party providers, or that involve privileged or exclusive access to data that is difficult to reproduce. This dynamic can reduce the choice for users and weaken the development of alternative solutions.

37. Other risks have been highlighted, linked in particular to the conditions for accessing and using cloud marketplaces, which would be set by the providers of these platforms. While the role of these marketplaces remains modest to date, the *Autorité* nonetheless considers that competitive risks could emerge, leading these integrated ecosystems to favour their solutions to the detriment of the services offered by third parties. Vigilance is also required with regard to the implementation of any price parity clauses or commission increases.

4. Possible answers

38. The examination of competitive risks identified, on the one hand, the technical impediments to competition inherent to the cloud sector, and on the other, the risks linked to practices that the operators themselves might implement.

39. When it can be implemented quickly enough, competition law is an effective tool for maintaining the competitive dynamics of the digital economy. Its flexibility allows it to embrace new practices and adapt well-established solutions to new services.

4.1. Curbing abuses of a dominant position

40. Competition authorities, and in particular the *Autorité* and the Commission, have already acquired considerable experience of cases involving abuse of a dominant position in digital markets. This rich decision-making practice can serve as a reference in the event of an action based on the abuse of a dominant position in the cloud sector. One example is the Decision of 10 September 2024⁴ of the Court of Justice of the European Union, sitting as a Grand Chamber, in the Google Shopping case, which upheld the decision dated 27 June 2017 by which the Commission had fined Google 2.4 billion euros for abusively

⁴ [Judgment of the Court \(Grand Chamber\) in Case C-48/22 P, Google v European Commission, 10 September 2024](#)

leveraging its dominant position in the upstream market for general search engines to gain a competitive advantage for its own product comparator over competing services in the downstream market for specialised search services.

41. The *Autorité* also has a number of procedural tools that are particularly well suited to dealing with competition concerns in digital markets, such as interim measures and commitments, which enable it to put an end to contentious behaviour in good time and impose the implementation of measures to restore competition in the market concerned. Thus, in its Decision of 16 June 2022⁵, the *Autorité* accepted and made binding the commitments proposed by Meta, for the first time in an antitrust procedure, to remedy the concerns raised by certain practices liable to affect competition conditions, on the one hand between the different providers of advertising intermediation services, and on the other, between Meta and the complainant, Criteo, a French online advertising player. In its Decision of 4 May 2023⁶, the *Autorité* imposed interim measures on Meta, to put an end to potentially discriminatory and unfair behaviour likely to constitute an abuse of dominance against a Meta customer company whose development depended on access to its ecosystem.

4.2. Combating illegal cartels

42. In its opinion, the *Autorité* raised a number of points of note with regard to agreements between cloud players.

43. Stronger partnerships have been formed between cloud service providers, or between these providers and integrators, and interoperability agreements have also been signed between certain cloud and SaaS players, in a variety of forms - joint structures to present a "trusted cloud" offering, technological partnerships between software and cloud service providers, alliances between hyperscalers and integrators to offer cloud solutions to joint customers, partnerships specific to an industry sector, such as the automotive sector.

44. The investigation of the opinion highlighted possible concerns that these agreements could raise in terms of the commercial or technical lock-in of customer companies.

45. Furthermore, standardisation agreements, in principle conducive to greater interoperability, could present a competitive problem if, under certain conditions, they led to technical lock-in and ultimately paralysed innovation.

4.3. Merger operations

46. A policy of aggressive acquisitions by companies already present in the cloud sector and aiming to strengthen their position in one of their markets, or in a related market, could likewise require particular vigilance by the competition authorities.

47. In its opinion, the *Autorité* noted a strategy of numerous acquisitions in the cloud sector by hyperscalers, many of which were not subject to merger control due to the low value of the target. However, during the public consultation that preceded and fed into the *Autorité's* opinion, players shared concerns that a merger dynamic was taking place in the cloud sector, particularly in the French market.

⁵ [Decision 22-D-12 of 16 June 2022 regarding practices implemented in the online advertising sector](#)

⁶ [Decision 23-MC-01 regarding the request by the company Adloox for interim measures](#)

48. Since then, developments in Court of Justice case law and doctrine to date⁷ have led European competition authorities to abandon the approach of controlling transactions below the mandatory notification thresholds through Article 22 of the European Merger Regulation.

49. Consequently, like many of its counterparts, the *Autorité* has undertaken to draw up and propose, in conjunction with the contributions received from stakeholders as part of a public consultation, a balanced reform that ensures effective control of such transactions and sufficient legal certainty for the companies concerned⁸.

50. Finally, since the cloud raises a wide range of legal risks (impact on customers and competitors, structural failings in the sector, potentially abusive contractual conditions), it may be appropriate to consider these issues from a broader angle. Thus, any practices identified could also be addressed by the *Autorité* and, where appropriate, sanctioned on the basis of abuse of economic dependence, while the Ministry of the Economy's Directorate General for Competition Policy, Consumer Affairs and Fraud Control could use the provisions relating to restrictive competition practices.

4.4. Sanctioning abuses of economic dependence

51. Article L.420-2 paragraph 2 of the French Commercial Code prohibits the abusive exploitation of a state of economic dependence. This offence, which straddles the line between the law on anti-competitive practices and the law on unfair business-to-business commercial practices, is designed to deal with anti-competitive behaviour in vertical relationships. The characterisation of this offence requires proof of economic dependence as well as of abusive exploitation of this state of dependence. The text covers refusals to sell, tied sales, certain restrictive practices and range agreements.

52. This provision would make it possible to sanction practices by players in the cloud sector consisting of locking access to infrastructures and imposing unfair conditions on their co-contractors. Although the *Autorité* imposed a major penalty against an undertaking in the digital sector in 2020 for an abuse of economic dependence, the standard of proof remains difficult to meet.

4.5. Other responses in the event of market failure

53. However, a regulatory approach would appear to be more appropriate for dealing with already identified and known market failures; the European and national regulatory authorities have already begun to implement this approach, in particular with the European Digital Markets Act (DMA), the European Data Act and the French law to secure and regulate the digital space ("SREN Law"). The *Autorité*, which received a referral regarding this draft law, issued an opinion on 20 April 2023⁹ in which, while it shared most of the concerns to which this text was intended to respond, it made a number of recommendations designed in particular to ensure that its provisions would be aligned with those of the Data Act.

54. In addition, the effectiveness of European regulation is a major factor in guaranteeing contestability and fair competition in the markets. In this respect, cloud

⁷ [Judgment of the Court, C-611/22 P. Case. Illumina v Commission and C-625/22 P |Grail v Commission and Illumina, 3 September 2024](#)

⁸ [Press release from the Autorité, 10 April 2025](#)

⁹ [Opinion 23-A-05 of 20 April 2023 on the draft law to secure and regulate the digital space](#)

services that would constitute a ‘core platform service’ within the meaning of Article 3 of the DMA should be the subject of a designation decision by the Commission, to guarantee the applicability of said European regulation to the cloud sector. The DGCCRF [Directorate for Competition policy, Consumer affairs and Fraud control, Economy ministry], as part of its exchanges with the Commission under Article 38 of the DMA, has begun to raise awareness of this matter at European level.

5. The cloud and generative artificial intelligence (AI)

55. The *Autorité’s* Opinion of 28 June 2024 on the competitive functioning of generative AI highlighted the importance of cloud services for the sector¹⁰.

56. The cloud appears to be the only way to access the computing power needed to train models. It is also a vector for disseminating models downstream to marketplaces. Such marketplaces enable developers to make their models easily accessible to cloud-using companies, encouraging developers to make their models available on every cloud provider. However, certain operators already have the financial and technical capacity and expertise required to create and manage such an infrastructure, unlike new entrants. Consequently, the position these companies occupy as suppliers of an essential input for AI technologies creates the risk that they will abuse it to extend their market power and reduce competition.

57. The *Autorité* found that several financial and technical lock-in practices, already identified in its opinion on competition in the cloud sector, appear to remain and even to be intensifying to attract the largest possible number of start-ups active in the generative AI sector.

58. Firstly, particularly high-quality cloud credit offers are available, especially for innovative companies in the sector. These offers are particularly attractive for these companies, as they give them free access to the cloud services they need to train, specialise and deploy their solutions. Nevertheless, given the scale of the costs involved in training or fine-tuning AI models, this practice has the effect of encouraging users to choose the services of these hyperscalers due to the amount of cloud credits they are offered, and not just because they would best meet their long-term needs. These credits could have the effect of locking these companies into hyperscaler ecosystems, against a backdrop of technical and price barriers to migration.

59. In order to limit these practices by hyperscalers, which are likely to hinder competition, a framework for cloud credit offers could be introduced at European level, potentially as part of the review of the DMA scheduled for 2026.

60. Other practices have been identified in addition to cloud credits as technical lock-in practices. Hyperscalers are said to offer proprietary solutions (e.g. automated machine learning services) for companies wanting to create or tune their models more easily. However, users would not have access to the model itself when the final model is created, only to the possibility of using or deploying it from the cloud service provider's infrastructure. This practice would lock in users who, if they wanted to change cloud service provider, would have to recreate their AI model from scratch, as it could not be transferred to another provider.

¹⁰ [Opinion 24-A-05 of 28 June 2024 on the competitive functioning of the generative artificial intelligence sector](#)

61. The *Autorité's* opinion on generative AI makes a number of recommendations designed to foster the competitive dynamics of the sector, in particular by paying special attention to marketplaces that provide access to generative AI models via the cloud (MaaS). Given the very general definition of cloud services, it seems that MaaS, which are essential for reaching a substantial part of the business market, might be included in the scope of core platform services under the DMA. Therefore, designating some of them as important gateways operated by gatekeepers would benefit AI model providers, as it would make it possible to put an end to any potential practices of self-preferencing of AI models developed by certain major digital players or their partners on their own MaaS platforms. Besides, in terms of access to computing power, the *Autorité*, like many public authorities, supports the development of public supercomputers, which are an alternative to cloud providers and give academics, in particular, access to computing power, which is beneficial for innovation.