



**ONLY THE FRENCH VERSION IS AUTHENTIC AND IT PREVAILS  
IN THE EVENT OF ITS DIFFERING FROM THE TRANSLATED VERSION**

**Public consultation paper on the operation of competition in the cloud computing  
sector**

## SUMMARY

Following the launch of the opinion procedure on the competitive functioning of the cloud sector on 27 January, and after six months of investigation, the *Autorité* is today publishing an interim document for public consultation. Stakeholders (industry players or those involved in a third-party activity) are invited to comment on the delineation of the relevant markets and the practices implemented or likely to be implemented in the sector. The Investigation Services suggest focusing on the public or hybrid cloud in particular, and more specifically on the IaaS and PaaS models. Responses are due by Monday 19 September 2022 at [avis.cloud@autoritedelaconcurrence.fr](mailto:avis.cloud@autoritedelaconcurrence.fr).

The cloud industry is part of an ever-changing economic and regulatory environment. In France, this sector is expected to grow by 17% per year by 2025, with the volume of business increasing from 16 billion euros in 2021 to 27 billion euros in 2025. Several studies<sup>1</sup> confirm this trend, since although the adoption of the cloud by French companies is still limited compared to the rest of Europe, it is growing rapidly. In addition, while no licence is required to operate cloud services, some players are subject to several regulatory obligations that impact the sector. The competitive landscape is structured around several categories of stakeholders from different businesses (for example from the IT or electronic communications sectors).

The process of delineating the relevant markets is based on the principle of demand-side and supply-side substitutability. Following this methodology, the Investigation Services consider several possible relevant markets, ranging from the narrowest to the broadest, from the type of cloud service to the entire IT services market. The public consultation seeks to determine whether competition constraints are expressed by cloud service, group of services (cloud

---

<sup>1</sup> Examples include Markess by Exaegis - Digital and Cloud Infrastructure - Market Data 2022, 30 March 2022; Gartner, "Gartner Forecasts Worldwide Public Cloud End-User Spending to Grow 23% in 2021", 21 April 2022 and Eurostat, "Cloud computing - statistics on the use by enterprises", December 2021.

service category), customer needs (called workloads) or even broader categories, such as IaaS and PaaS models or even IT services in general.

There are also specific features that could justify a delineation of the relevant markets according to the modes of deployment of cloud services (public, private or hybrid cloud), specific offers linked to the trusted cloud, sectors (in particular the financial sector and the healthcare sector), calls for tender launched by the parties, or the completeness of the offer. Lastly, the Investigation Services question the existence of related markets, such as the intermediation and data centre operation markets. The stakeholders are then consulted on the geographical dimension of the envisaged markets.

Next, the Investigation Services are seeking to assess whether certain players are likely to hold particular positions and competitive advantages, particularly with regard to their investment capacity, access to certain infrastructures, their ability to set themselves apart or offer a wide range of services. Several major players could accumulate several advantages and also take advantage of their well established position in digital markets, or even their ecosystem, to promote their expansion.

Lastly, the Investigation Services are seeking to analyse certain practices implemented or likely to be implemented in the cloud sector, to assess whether any of them could restrict the development of competition on the merits. First, several technical practices are discussed to assess, in particular, the barriers to migration and the use of multiple cloud service providers. Second, a series of trade practices, in particular contractual or pricing practices, are discussed, some of which may contribute to increasing barriers to entry or expansion in certain markets or to extending the market power of a player. Third, the vertical integration of certain players in the cloud markets or the existence of potential conglomerate effects could also raise competition concerns. Lastly, the Investigation Services address the risks associated with cartels and merger practices that may exist in the sector.

## SUMMARY

Public consultation paper on the operation of competition in the cloud computing sector ...	1
I. General framework.....	5
A. Economic context .....	6
B. Regulatory context.....	6
C. Presentation of the stakeholders .....	8
1. The French competitive landscape is structured around several categories of stakeholder .....	8
2. Customers of cloud services and/or products .....	10
II. Assessment.....	11
A. The relevant markets.....	11
1. Product and service markets .....	11
Principles .....	11
Several possibilities for segmenting the cloud market.....	13
2. Geographic markets .....	16
III. Positions and competitive advantages of the various players involved .....	19
IV. Practices likely to be put in place by the various stakeholders.....	20
1. Technical practices.....	21
2. Trade practices .....	25
3. Risks related to the leverage capabilities and ecosystem benefits of certain players.....	30
4. Cartel risks.....	32
5. Concentration practices .....	33
V. Perspectives.....	34
Glossary .....	35

## INTRODUCTION

1. On 27 January 2022, the *Autorité de la concurrence* (the *Autorité*) announced<sup>2</sup> that it had started proceedings ex officio on the conditions of the competitive operation of the cloud computing sector, in accordance with the provisions of Article L. 462-4 of the French Commercial Code (*Code de commerce*). As part of this sector-specific inquiry, the *Autorité* is today launching a public consultation to gather comments from stakeholders on several points.
2. Since January 2022, the Investigation Services have been questioning numerous industry players on the basis of Article L. 450-3 of the French Commercial Code (*Code de commerce*).
3. Through this document, the Investigation Services are requesting contributions from stakeholders who did not have the opportunity to respond to the preliminary questionnaires or from those wanting to add to their responses. These contributions will be taken into account in the drafting of the opinion, while respecting the elements covered by the business secrecy identified by the contributors. The *Autorité de la concurrence* specifies in this respect that contributions to the public consultation may therefore be made "confidential".
4. It should be recalled that the purpose of a sector-specific inquiry is neither to qualify market behaviour under Articles 101 and 102 TFEU and Articles L. 420-1 and L. 420-2 of the French Commercial Code (*Code de commerce*), nor to authorise or prohibit notified mergers, but rather to study the functioning of a sector from the perspective of competition law, with a particular focus on the impact that recent or ongoing developments may have on the overall competitive balance of the sector and other economic sectors that depend on it.
5. In the context of this document, the Investigation Services have formulated several hypotheses on the context and regulations applicable to the cloud sector, the relevant markets, the positions and competitive advantages of the various players concerned and the practices that could be implemented.
6. Interested stakeholders are invited to respond to this public consultation document by answering some or all of the questions no later than 5pm on Monday 19 September 2022 at [avis.cloud@autoritedelaconcurrence.fr](mailto:avis.cloud@autoritedelaconcurrence.fr).

---

<sup>2</sup> <https://www.autoritedelaconcurrence.fr/en/press-release/autorite-de-la-concurrence-starts-proceedings-ex-officio-analyse-competition>

## I. General framework

7. The cloud provides companies with capabilities that might be difficult and costly to develop in-house. These benefits include access to scalable and elastic computing resources and the ability for customers to easily increase or decrease access to IT power.
8. The public<sup>3</sup> cloud has grown significantly in recent years and is expected to accelerate further. Indeed, demand for public cloud services should continue to grow between now and the end of 2025 (17% average annual growth expected), driven by the switchover of sectors of activity (such as banking, insurance and government) that have previously lagged behind<sup>4</sup>. In addition, technologies such as containerisation<sup>5</sup> and edge computing<sup>6</sup> are becoming more common and lead to additional expenses<sup>7</sup>. Industry observers expect the combination of the cloud with technologies such as artificial intelligence, the Internet of Things and 5G to impact most sectors of the economy<sup>8</sup>.
9. In contrast, some of the players interviewed by the Investigation Services consider that the private<sup>9</sup> cloud is not likely to become the dominant model in the future, unlike the public cloud. There would be more of a gradual transition to the public cloud for businesses.
10. In addition, cloud services cover many different services. It therefore appears that the "Infrastructure as a Service" (IaaS)<sup>10</sup> and "Platform as a Service" (PaaS)<sup>11</sup> models are quite distinct from the "Software as a Service" (SaaS)<sup>12</sup> model, from the point of view of both providers and users. SaaS model stakeholders are more numerous and mostly from the software world. The users are also very different, with a target of IT professionals (especially DevOps<sup>13</sup>) for the IaaS and PaaS models and software end users for the SaaS model.

---

<sup>3</sup> For a better understanding of the public consultation, this term is defined in the glossary available at the end of this document.

<sup>4</sup> Markess by Exaegis - Digital Infrastructures and Cloud - Market Data 2022, 30 March 2022.

<sup>5</sup> According to the ANSSI, a container is a standard unit of software, which embeds the code and all its dependencies, so that the "containerised" application functions normally and reliably, regardless of the host machine. The image of a container, which is present on the system, becomes a container at runtime ([link](#)).

<sup>6</sup> This architecture allows data to be processed close to its collection point, which improves latency, network utilisation, security and network resiliency ([link](#)).

<sup>7</sup> Gartner, "*Gartner Forecasts Worldwide Public Cloud End-User Spending to Grow 23% in 2021*", 21 April 2022 ([link](#)).

<sup>8</sup> Gartner, "*Gartner Forecasts Worldwide Public Cloud End-User Spending to Grow 23% in 2021*", 21 April 2022 ([link](#)).

<sup>9</sup> See glossary.

<sup>10</sup> See glossary.

<sup>11</sup> See glossary.

<sup>12</sup> See glossary.

<sup>13</sup> DevOps combines the words "development" (developers) and "operations" (operational IT teams). The DevOps movement began around 2007, when IT operations and development teams expressed concern about the traditional development model, in which programmers worked in isolation from the operations teams responsible for deploying and supporting the code.

11. The Investigation Services therefore proposed focusing on the competitive operation of the cloud (essentially the public or hybrid cloud<sup>14</sup>), particularly the categories relating to the IaaS and PaaS models, even if developments in the future opinion may concern the entire cloud value chain (see heading I.C below on the description of the stakeholders).

***Issue***

- 1) Do you have any comments on the general framework of the future notice?

**A. Economic context**

12. The cloud sector is currently booming, with major challenges in terms of creating value for the economy and accompanied by a strong innovation dynamic. According to the latest forecast from research firm Gartner, global end-user spending on public cloud services is expected to grow 20.4% in 2022 to \$494.7 billion<sup>15</sup>.
13. The main reasons for this growth are the flexibility and immediate scalability offered by this business model, which allows user companies to offload the constraints of investing in IT resources and the costs associated with the renewal and maintenance of this equipment. Outsourcing these services also reduces the need for IT staff. New ways of working put in place in the wake of the Covid-19 emergency have accelerated the adoption of the cloud globally.
14. In France, the cloud market (all clouds combined) should, according to some sources, increase from 16 billion euros in 2021 to 27 billion euros in 2025, driven by an average annual growth of 14%<sup>16</sup>. The adoption of the cloud by companies remains lower than elsewhere, overall. According to Eurostat, in 2021, only 29% of French companies were using cloud services, compared to an average of 41% in the European Union<sup>17</sup>.

**B. Regulatory context**

15. While no prior approval is required to operate in cloud services, the cloud industry is nevertheless governed by several regulatory frameworks.
16. For several years, the cloud sector has been subject to significant changes in data regulations to meet the challenges of security, personal data protection and sovereignty.
17. Regulations such as the Directive on measures for a high common level of cybersecurity across the Union (NIS Directive, currently under revision<sup>18</sup>), set a cybersecurity framework that includes specific obligations for cloud service providers in the EU.

---

<sup>14</sup> See glossary.

<sup>15</sup> Gartner, "*Gartner Forecasts Worldwide Public Cloud End-User Spending to Reach Nearly \$500 Billion in 2022*", 21 April 2022 ([link](#)).

<sup>16</sup> Markess by Exaegis press release, "Markess by Exaegis forecasts a global cloud market of €27 billion in 2025 in France", 11 April 2022 ([link](#)).

<sup>17</sup> Eurostat, "*Cloud computing - statistics on the use by enterprises*", December 2021 ([link](#)).

<sup>18</sup> European Commission press release, "Commission welcomes political agreement on new rules on cybersecurity of network and information systems", 13 May 2022 ([link](#)).

18. Cloud providers are also covered by the personal data protection required by the General Data Protection Regulation<sup>19</sup> (GDPR). In a context of increasing exchanges of personal data between countries, limits to this protection have appeared. The "Schrems II" judgment, issued by the Court of Justice of the European Union on 16 July 2020, thus invalidated the system of data transfers between the European Union and the United States ("Privacy Shield")<sup>20</sup>. This ruling raises questions about the extent of the legal risks associated with the application of non-European laws to French and European customers and cloud service providers. Pending a new political agreement, announced by the European Commission and the United States on 25 March<sup>21</sup>, this situation pushed the authorities and some stakeholders to develop solutions that guaranteed the protection of sensitive data at a European level.
19. In France, the National Cloud Strategy, launched on 17 May 2021, aims to guarantee digital sovereignty and equip France with the cloud capabilities it needs to ensure it plays a part in the next technological developments, while respecting commitments to the environment.<sup>22</sup> There are three pillars to this strategy: the implementation of a "trusted cloud" label to ensure a dual level of technical and legal certainty for French companies, the "cloud at the centre" policy for the State's digital transformation, and the industrial policy<sup>23</sup>, with direct support for high value-added projects.
20. For example, as part of the "cloud at the centre" policy, if a public sector IT system or application handles particularly sensitive data, the chosen cloud offering must comply with the "SecNumCloud" qualification awarded by the *Agence Nationale de la Sécurité des Systèmes d'Information* (ANSSI) and be protected against all non-EU regulations.
21. It should be noted that some sectors are also subject to specific regulations that may have an impact on cloud providers:
  - In the health sector, personal health data must be hosted under appropriate security conditions. The French Public Health Code (*Code de la santé publique*) (in particular Article L. 1111-8) stipulates that all public or private organisations that host or operate the health information system or make backups on behalf of a health care institution or a third party must be certified as a health data host (HDS), with the exception of computer archiving services, which are not affected by these obligations.
  - In the financial sector, the national and European banking and financial market regulators have defined several guidelines to manage the risks associated with the use of the cloud. The draft European DORA regulation ("Digital Operational

---

<sup>19</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

<sup>20</sup> According to the Court, the restrictions on the protection of personal data which derive from the United States' domestic regulations on access to and use by the United States' public authorities of such data transferred from the European Union to that third country are not regulated in a way that meets requirements which are substantially equivalent to those required under European Union law by the principle of proportionality, inasmuch as the surveillance programmes based on those regulations are not limited to what is strictly necessary.

<sup>21</sup> European Commission press release, "European Commission and United States Joint Statement on Trans-Atlantic Data Privacy Framework", 25 March 2022 ([link](#)).

<sup>22</sup> See the press kit on the National Cloud Strategy ([link](#)).

<sup>23</sup> See Circular 6282-SG of 5 July 2021 on the doctrine for the use of cloud computing by the State ([link](#)).

resilience of the financial sector") currently under discussion aims to strengthen the resilience of the financial sector with regard to cybersecurity risks in particular, and ensure better control of cloud providers in the sector<sup>24</sup>.

- Finally, there are regulatory constraints designed to defend the vital and strategic interests of certain customers. Article 22 of the Military Programming Law (Law 2013-1168 of 18 December 2013) requires operators of vital importance (OVI)<sup>25</sup> to increase the security of the critical information systems they operate - the Systems of Information of Vital Importance (SIVI)<sup>26</sup>. In addition, the monitoring of foreign investments in France involves "*data hosting activities*"<sup>27</sup>.

22. In addition, the cloud sector is affected by several legislative developments, particularly at the European level, aimed at improving the functioning of digital and data markets. The proposed *Digital Markets Act*, which was agreed politically on 24 March 2022, includes "*cloud services*"<sup>28</sup> as one of the core businesses covered by the regulation. Providers of such services, designated as gatekeepers, could therefore be subject to certain obligations, such as those related to interoperability and self-referencing practices. On 23 February 2022, the European Commission also adopted a proposal for a Data Act, now under negotiation, aimed in particular at unlocking the cloud market in the European Union. Several obligations could therefore be imposed on cloud providers to effectively allow their customers to migrate between providers.

#### *Issue*

- 2) Can you see any other regulations that may impact the competitive operation of the cloud industry?

### C. Presentation of the stakeholders

#### 1. THE FRENCH COMPETITIVE LANDSCAPE IS STRUCTURED AROUND SEVERAL CATEGORIES OF STAKEHOLDER<sup>29</sup>

23. First, from an infrastructure management perspective, **data centre operators** provide a service leasing the physical infrastructure underlying cloud services. These are secure physical spaces, powered by electricity and interconnected with telecoms networks. This service is generally priced according to the area rented and the electricity used. This activity requires significant initial investments. The power supply, the energy efficiency, the level of

---

<sup>24</sup> Proposal for a Regulation of the European Parliament and of the Council on digital operational resilience for the financial sector and amending Regulations (EC) No 1060/2009, (EU) No 648/2012, (EU) No 600/2014 and (EU) No 909/2014 ([link](#)).

<sup>25</sup> OVIs are designated by the State as having activities essential to the survival of the nation or dangerous for the population. The sectors of vital importance include the civil and military activities of the State.

<sup>26</sup> See the ANSSI website for the definitions of OIV and SIIV ([link](#)).

<sup>27</sup> The decree of 29 November 2018, expanded the scope of sectors that fall under the procedure to new sectors, including "*data hosting activities*".

<sup>28</sup> "Cloud computing service" is defined in Article 4(19) of Parliament Directive (EU) 2016/1148 as "*a digital service that enables access to a scalable and elastic pool of shareable computing resources*".

<sup>29</sup> Ernst & Young study, "A French Cloud market still being structured", November 2020, page 14 ([link](#)).



distribution optimisation and the quality of the interconnection with the networks are the main differentiation criteria between stakeholders. There are also other options such as private data centres or colocation data centres. It also appears that some cloud providers are building and then offering services on their own data centres.

24. Secondly, cloud **providers** offer virtualised IT services that are adaptable to the user's needs.
25. They can choose to offer a wide range of cloud products or services that give them full control over the value chain, from the design of their servers to the design of the cloud platform solutions they provide to their customers, as well as the construction and management of their data centres and the orchestration of their fibre network. They can also choose to focus on one or more IaaS, PaaS or SaaS models.
26. Cloud providers come from different businesses:
  - Very large-scale hosting providers (*hyperscalers*)<sup>30</sup>, such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud, are generally players already well established in other digital markets that have expanded into the cloud in recent years. These companies have considerable financial power and benefit from strong economies of scale and scope. Their customers are already large companies, but their spontaneous assimilation into the world of "tech" also positions them favourably with respect to smaller companies and start-ups. Their value proposition is based on the continuous enrichment of their broad portfolio of products and services.
  - Web hosting players (such as OVHcloud and Scaleway) were initially companies specialising in the supply of physical servers and have gradually moved on to the supply of virtual servers, i.e. servers that appear to be functional only, independently of the underlying physical and logical structure. They most often own and operate their own data centres. They are therefore players who have specialised in IT since the beginning and who have highly technical skills. Their offerings are based on IaaS and/or PaaS models and they have a diverse customer base (large enterprises, public sector entities, technology companies offering services designed from the ground up for the SME cloud environment ("cloud native")).
  - Electronic communications operators such as Orange and Bouygues Telecom also enjoy a good reputation among users and a historical position on the Internet network. Their cloud offering now complements their service portfolio. These operators are also facing significant investments, mainly oriented towards the network, with the rise of new technologies such as fibre and 5G.
  - Integrators are mostly Digital Services Companies (DSC), such as Capgemini and Atos. These stakeholders enjoy a daily presence at end-user sites, particularly through consulting services and assistance with the deployment of IT solutions. Thanks to their partnerships with numerous cloud providers (with *hyperscalers* at the forefront), they offer their customers customised packages, combining the provision of several cloud services with additional building blocks to ensure the smooth running of the entire architecture. These companies have human resources characterised by cross-disciplinary skills and have long-standing relationships with all major French companies.

---

<sup>30</sup> See glossary.

- Other players have entered the market for different reasons. For example, 3DS Outscale, a subsidiary of Dassault Systèmes, wanted to provide trusted cloud services.
27. It also appears from the investigation that PaaS players are generally IaaS solution providers seeking to upsell their basic offering. *On the other hand*, SaaS stakeholders are generally software publishers who have moved from an "on premise" solution installation model (i.e. the software is installed locally on the workstations or the structure that has acquired it with a physical licence system) to a SaaS model where the software is externalised, rented by users and accessible via an Internet connection.
28. However, the boundary between these different businesses is not watertight, given the contractual relationships that may exist within the value chain. For example, electronic communications operators are partnering with large cloud providers, as are integrators with cloud providers.<sup>3132</sup> In addition, a large number of alliances and partnerships have been concluded by hyperscalers with European stakeholders, notably with the aim of setting up a trusted cloud<sup>33</sup>.

## 2. CUSTOMERS OF CLOUD SERVICES AND/OR PRODUCTS

29. Cloud customers range in size from large enterprises to start-ups and operate in a variety of industries. The future opinion will focus on professional customer relations.
30. Several segments can be distinguished among the professional customers. First, there are the "digital native" or "cloud native" customers, who have been using cloud services since their creation. These are mainly technology companies and players using the SaaS model. Second, large enterprises, SMEs, VSEs and government entities are largely migrating to the cloud on a massive scale. Lastly, cloud providers can provide services to "white label" resellers and partners, who market their solutions to their own customers under their own brand.

### ***Issues***

- 3) Do you agree with the above presentation of cloud industry stakeholders?
- 4) Do you think other stakeholders should be included? If so, which?

---

<sup>31</sup> Le Monde, "Comment les GAFAM s'invitent sur le terrain des télécoms," 28 September 2021 ([link](#)).

<sup>32</sup> See, for example, the partnerships forged between Capgemini and several cloud providers ([link](#)).

<sup>33</sup> OVHcloud press release of 10 November 2020, "OVHcloud and Google Cloud announce a strategic partnership to co-build a trusted cloud solution in Europe" ([link](#)); Press release of 6 October 2021, "Thales and Google Cloud announce a strategic partnership to jointly develop a Trusted Cloud offering in France" ([link](#)); Capgemini and Orange press releases of 22 June 2022, "Capgemini and Orange announce that Bleu will start engaging with future customers by the end of 2022", ([link](#) and [link](#)).

## II. Assessment

### A. The relevant markets

32. As the cloud industry is a relatively new and still evolving sector, decision-making practice in this sector is still limited. Indeed, at the European Commission and the *Autorité de la concurrence*, decisions that include elements of the cloud sector are mainly clearance decisions without merger control conditions and not litigation decisions<sup>34</sup>. These decisions have a forward-looking dimension and do not require the market to be precisely defined.
33. In addition, the cloud is characterised by a considerable heterogeneity of services, ranging from basic storage services to a specific service for a customer wanting to comply with regulatory obligations, which can make the delineation of the relevant market difficult.
34. The objective of the public consultation is to collect available information on the markets with a view to identifying those factors that are important from the point of view of demand, in order to identify the products or services as being part of the same market, to determine whether there are any impediments to the substitutability of the supply of these products or services, and identify whether any other competitive constraints could be used to analyse the relevant markets.
35. The analysis in the future opinion will therefore not be intended to provide a detailed outline of the markets in the cloud sector or to establish any links that may exist between these markets. In effect, the relevant markets are defined only for the purposes of the competitive analysis of each case (examination of anticompetitive practices or merger control).

### 1. PRODUCT AND SERVICE MARKETS

#### Principles

36. Defining the relevant markets is the first step in the competitive analysis of trade practices or proposed mergers. The relevant market includes a "product" or "service" dimension, on the one hand, and a geographic scope, on the other. In both cases, it is necessary to "*identify and define the perimeter within which competition between companies takes place*"<sup>35</sup>. The definition of a market, in terms of both products and geographical dimension, must therefore make it possible to determine whether there are real competitors capable of influencing the behaviour of the companies present.
37. The definition of the market allows, among other things, a calculation of the positions of the various players in the markets. The fundamental objective of the delineation of the relevant market therefore remains the evaluation of the market power of the various players in place.

---

<sup>34</sup> See, for example, *Autorité de la concurrence* Decision 19-DCC-259 of 18 December 2019 regarding the acquisition of sole control of Softeam by La Poste Group; European Commission Decision in Case M. 9205, IBM/Red Hat, 27 June 2019; European Commission Decision in Case M. 8994, Microsoft/Github, 19 October 2018; European Commission Decision in Case M. 6921, IBM ITALIA/UBIS.

<sup>35</sup> Commission Notice on the definition of the relevant market for the purposes of Community competition law of 9 December 1997 (97/C 372/03), point 2. It should be noted that the Commission Communication is currently being revised ([link](#)).

38. Lastly, the assessment of markets and market power makes it possible to evaluate both the existence of dominant positions and possible undesirable practices and effects on competition.
39. To define relevant markets, the *Autorité de la concurrence* first identified which products or services are interchangeable from the demand side, before analysing substitutability on the supply side. This two-tiered analysis, described below, aims to outline the relevant markets in the cloud sector.

#### *Analysis of demand-side substitutability*

40. Generally speaking, the product market in question comprises all the products and/or services that the consumer considers interchangeable or substitutable, due to their characteristics, their prices and their intended use. A company's market power depends directly on this degree of substitutability.
41. In practice, the analysis of relevant markets is based on a conceptual and iterative analytical framework.
42. In this case, it consists of identifying, in the first instance, the smallest group of candidate cloud products/services in the relevant market, in other words, identifying the first group of substitutes that are closest in terms of demand.
43. Secondly, it is important to ask ourselves whether the companies present in this first "candidate market" could increase their prices or more generally downgrade their offers<sup>36</sup> in a sustainable, significant (a downgrade of around 5 to 10% is generally considered) and profitable manner. This test<sup>37</sup> is beneficial for companies in the "candidate market" if the margin loss from shifting customers to other cloud services not in the "candidate market" is not sufficient to make the price increase (or, more generally, the downgrading of the offer) in the "candidate market" unprofitable. In this case, the relevant market is identified. On the other hand, if the downgrading of the offer is not profitable, given the loss of margins with customers who have now been transferred outside the "candidate market", the cloud services considered do not constitute the relevant market and the test should be extended by including the closest substitutes to the original group of services.
44. Lastly, the test is repeated until it is profitable to the "candidate market", defining in fact a relevant market.
45. This "hypothetical monopolist test" now provides the conceptual framework for analysing the qualitative and quantitative indices used by competition authorities to delineate relevant markets. The *Autorité* will therefore be able to use quantitative tools but also focus on a quantitative and/or qualitative body of evidence to analyse the possible definitions of the relevant cloud markets. It can therefore take into account the characteristics of the cloud services concerned, their uses and conditions of use, their marketing methods, the reputation of the cloud providers or brands, the preferences of cloud service customers, the legal and regulatory environment, and the characteristics of customers, etc.

---

<sup>36</sup> For example, price increase, deterioration of trading conditions, decrease in the quality of services, etc.

<sup>37</sup> This is known as the "hypothetical monopolist test" or Small but Significant and Non-Transitory Increase in Price test (or "SSNIP" test). The "hypothetical monopolist" represents the offers of the different companies present in the candidate market for which a price increase of 5 to 10% is simulated.

### *Analysis of supply-side substitutability*

46. Alternatively, to define a relevant product or service market, supply-side substitutability may be taken into account in certain cases, in addition to demand-side substitutability.
47. In practice, the competition authorities then examine whether the other suppliers absent from the "candidate market" are able to "*redirect their production to the relevant products and market them in the short term without incurring any substantial cost or risk in response to small but permanent changes in relative prices*"<sup>38</sup> (or more generally to a downgrading of offers on the candidate market). If this is the case, then the first "candidate market" must include those suppliers who could be the first to redirect their production to it. If not, the test should be repeated until it is no longer profitable for any other supplier to shift production to the candidate market in the short term. The relevant market is then identified.

### **Several possibilities for segmenting the cloud market**

48. Following the methodology described above, this section explores the different possibilities.

#### **i. Possible relevant markets**

49. The Investigation Services consider several possible relevant markets, ranging from the narrowest to the broadest, from the **type of cloud service to the entire IT services market**.<sup>39</sup>
50. The characteristics of these different markets are discussed below. There follows a list of questions to which the parties are invited to respond.

#### *A market definition by type of cloud services?*

51. One way to define relevant markets in the cloud sector would be to delineate them according to the types of services (see Appendix 1, which presents a list of service categories and the types of services they include). For the Investigation Services, one type of service would be document data storage or a relational database management system (RDBMS).

#### *A market definition by category of cloud services?*

52. While the respondents ruled out the definition of markets by types of cloud services, the Investigation Services consider delineating markets by categories of services. A category of cloud services can include several types of cloud services.
53. The most important categories include data analytics, computing, containers, databases, developer tools, Internet of Things, artificial intelligence and machine learning, migration, networking, media, application modernisation, operations, management tools, security and identity, serverless, government services, and storage (see Appendix 1).

---

<sup>38</sup> Commission Notice on the definition of the relevant market for the purposes of Community competition law of 9 December 1997 (97/C 372/03), point 20.

<sup>39</sup> The Investigation Services have produced a table, attached to this document, that outlines the types of cloud services and the categories of cloud services involved.

*A market definition by workload?*

54. While respondents felt that delineation by types or categories of cloud services was not relevant, the Investigation Services propose an alternative, broader approach, by workload<sup>40</sup>.
55. The investigation shows that, from the customers' perspective, they typically start by defining their goals and needs and then consider a wide range of options that could help them achieve them. Companies can also use different vendors for separate workloads.
56. Examples of workloads (for which several cloud services from different categories can be mobilised, such as "computing" and "database") could be (i) a financial management workload based on several cloud services (a relational database, a web application hosting platform (PaaS) and a decision-making IT service)<sup>41</sup> or (ii) an e-commerce site workload based on several cloud services (a content delivery network (CDN) service combined with an object storage service for the static content layer, an API management service<sup>42</sup> for API design and management, a customer identity and access management (CIAM) service for the authentication layer, and a serverless event computing (FaaS) service combined with an indexed NoSQL database service for the dynamic content layer).

*Market segmentation based on IaaS/PaaS models?*

57. At first analysis, the Investigation Services consider that these models do not constitute criteria for delineating the relevant markets within the cloud.
58. In fact, several stakeholders indicated that they do not use these terms when analysing client needs. Moreover, there would be no fixed definition of these models. Lastly, these models bring together very different products and services that can also be combined. A product considered as belonging to the IaaS model, for example, could also, with additional options, belong to another model (PaaS, for example).

*Is the cloud a sub-segment of the IT services market?*

59. The decision-making practice of the *Autorité de la concurrence* and the Commission identifies the IT services market as being composed of seven functional categories of services<sup>43</sup>, including the segment of global management services also referred to as "outsourcing" or "systems management services".
60. The Commission considered several sub-segments within the global managed services segment, based on the type of services offered: public cloud computing services; IaaS services; IT infrastructure outsourcing services; and application outsourcing services.
61. In the context of this consultation, the Investigation Services want to verify whether cloud products and/or services constitute a relevant market within the IT services market.

---

<sup>40</sup> A cloud workload is a capacity or amount of work executed on a virtual instance deployed on the cloud.

<sup>41</sup> See the Microsoft website on this workload ([link](#)).

<sup>42</sup> See glossary.

<sup>43</sup> The other categories identified are business management services, also known as "business process outsourcing" (BPO); software development and integration; consulting services, which include technical services on network architecture, planning or project management assistance; software maintenance and logistics support; hardware maintenance and logistics support; and education and training; see, for example, Decision 19-DCC-259 of 18 December 2019 regarding the acquisition of sole control of Softeam by La Poste Group.

## ii. Additional segmentations are possible

62. Additional segmentations are possible depending on the deployment mode, specific offers linked to the trusted cloud, sectors, calls for tender launched by the parties or the completeness of the offer.

### *A market by deployment mode (public, private, hybrid cloud)?*

63. The Investigation Services question the possibility of delineating a market according to the mode of deployment. Indeed, customers seem to have different needs depending on whether they use the public cloud, private cloud or hybrid cloud<sup>44</sup>.
64. For example, some customers have decided to migrate some of their data to the public cloud and keep the rest of their data in their own data centres for reasons of sensitivity, applicable regulatory obligations or higher facility security requirements. Some also choose not to include a residual part of their data in the cloud ("on premise").
65. However, it appears from the investigation that cloud providers do not necessarily distinguish the cloud products and/or services they offer according to their deployment mode.

### *A market for the trusted cloud?*

66. Another segmentation could involve the trusted cloud. Indeed, as mentioned above, the ANSSI has deployed a "SecNumCloud" repository which corresponds to the highest level of data security. These offers are subject to high technical and legal criteria.
67. To date, seven offers have been qualified as "SecNumCloud"<sup>45</sup>. Some non-European cloud providers have announced that, through cooperation with French players, they are organising themselves to allow French organisations to benefit from hyperscale cloud technology while maintaining the security of their data. It would appear that these offers are aimed at specific customers (public service, regulated private companies, operators of vital importance, etc.). Prices seem to be higher than traditional public cloud offerings.

### *The existence of markets by sector?*

68. The investigation also revealed that certain customers from highly regulated sectors (such as the financial or health sectors) are subject to specific regulatory constraints, particularly from a data protection perspective. It is therefore necessary to verify which services are substitutable on the demand and supply side for such sectors, to determine whether they can potentially constitute separate relevant markets.

### *A call for tender market for the provision of cloud products/services?*

69. The Investigation Services would then like to clarify the way in which customer demand and cloud providers' offers meet. While the purchase of cloud products and/or services usually takes place directly on the suppliers' site *via* a standard contract, it seems that calls for tender can also be organised for customised solutions. In this case, customised calls for tender could be considered relevant markets.

---

<sup>44</sup> See glossary.

<sup>45</sup> The list is published on the ANSSI website ([link](#)). The providers involved are Cloud Temple, Oodrive, Outscale SAS, OVH and Worldline.

*Taking into account the completeness of offers in the definition of a market?*

70. Lastly, it appears from the investigation that cloud providers, particularly hyperscalers, want to meet all the needs formulated by customers by offering the most complete ranges of products or services possible. In addition, several players, who were initially present on a single model (e.g. IaaS), wanted to expand their range of services (e.g. by offering PaaS). The question of taking such offers into account in the analysis may therefore arise.

**iii. Related markets**

71. The Investigation Services question the existence of related markets in the cloud, such as the intermediation and data centre markets.

*A definition of intermediation markets?*

72. The Investigation Services question the existence of intermediation markets in the cloud sector.
73. Integrators therefore offer "managed" services, presented as complements to the services of cloud providers (especially hyperscalers). These are essentially consulting and support services for companies in the cloud.
74. Some providers also offer marketplaces that allow third-party providers to offer complementary products or services to their customers. Currently, several major market players, such as OVHcloud, AWS, Google and Microsoft, have set up marketplaces that include their products and products developed by third parties. These marketplaces are a way to organise trade relations, which can give visibility to certain solutions, payment guarantees and easier distribution of products within the supplier's system.

*The existence of a data centre market?*

75. Data centre operators make the physical infrastructure (buildings, servers) available to their customers, including to cloud providers, who can rent them and offer additional services (e.g. computing power).
76. However, it appears from the investigation that some cloud providers also own data centres in which significant investments have been made in construction, leasing, design and equipment.
77. The Investigation Services want to determine the substitutability between the demand and the supply for data centre operations.

**2. GEOGRAPHIC MARKETS**

78. The competition authorities' framework for analysing geographic markets is, like the product market definition, part of the conceptual framework of the "hypothetical monopolist test" mentioned *above*. The relevant geographic market is the area in which monopoly power could effectively be exercised (sustainable, significant and profitable price increase), without being exposed to competition from other suppliers located in other geographic areas.
79. The relevant geographic market comprises the area in which the undertakings concerned are involved in the supply and demand of products or services, in which the conditions of competition are sufficiently homogeneous and which can be distinguished from



neighbouring areas because the conditions of competition are appreciably different in those area[s].

80. The *Autorité* has been able to consider the IT services markets to be national in scope, in particular due to the need for IT service providers to communicate regularly in the language of their customers and maintain relative proximity to them<sup>46</sup>. However, other competition authorities have not ruled out a European or even broader dimension to these markets.

---

<sup>46</sup> Decision 19-DCC-259 of 18 December 2019 regarding the acquisition of sole control of Softeam by La Poste Group.

### ***Issues***

- 5) Appendix 1 is based on the main types and categories of cloud services identified on the websites of the major cloud providers. Do you agree with this analysis? From your point of view, are any essential types or categories missing? Explain your answer.
- 6) Do you agree with the workload examples listed above? Can you give us other examples of typical workloads? Explain your answer.
- 7) Based on the methodology defined above, which involves delineating the relevant market starting from the narrowest level of segmentation (i.e. types of cloud services), what do you think is the level at which segments are no longer substitutable? For example, can certain types of cloud services be substituted for others? If so, can certain categories of cloud services be substituted for others? etc., with the relevant level of segmentation reached when the answer is no. Explain your answer.
- 8) Do you consider that cloud products and/or services can be substituted with the same on-premise products and/or services? For what reason(s)? Explain your answer.
- 9) In your opinion, are there any additional relevant markets that would be delimited by:
  - a. deployment mode
  - b. industries
- 10) Do you consider that delineating the cloud market from the perspective of the trusted cloud could be another criterion for cloud segmentation? Explain your answer.
- 11) Do you consider that delineating the cloud market by calls for tender could be another criterion for cloud segmentation? Explain your answer.
- 12) In your opinion, can the consulting and support services offered by integrators be substituted by the consulting and support services offered by cloud providers? Explain your answer.
- 13) Can the services offered on the marketplaces be substituted with the services offered outside the marketplaces? Explain your answer.
- 14) Can the services offered by a data centre operator be substituted with the services offered by cloud providers? Explain your answer.
- 15) At what geographical level (local, national, European or global) is the choice between different cloud providers made? Are there any differences between the product markets you identified above? Explain your answer.
- 16) Do you have any other comments on the "markets" section that you would like to bring to the attention of the *Autorité de la concurrence*?

### **III. Positions and competitive advantages of the various players involved**

81. The public cloud sector is evolving rapidly, marked by significant technological innovation and strong growth momentum. The Investigation Services are seeking to assess the competitive situation in view of the number of players positioning themselves to capture part of the market.
82. Several elements can affect competition and the market power of certain players. For example, the provision of infrastructure-related services (IaaS) requires significant investments to build a sufficiently large infrastructure prior to customer acquisition. While the necessary infrastructure can be built in-house, leased or outsourced, the capital requirement to provide an offer over a large territory seems particularly high and is therefore likely to create a barrier to entry and expansion for existing players.
83. The homogeneity of the goods and services of the various players in these infrastructure-related segments could, however, limit the market power of the incumbents. Differentiation capabilities could also exist, for example in terms of the quality of solutions, their global presence or their environmental impact. Similarly, obtaining "SecNumCloud" certification could create a barrier to entry for some players and therefore give a certain market power to national players with sufficient capacity to meet the criteria.
84. Competitive advantages could also be linked to the development of software solutions and services for developers (PaaS), which would constitute attractiveness and differentiation and could generate significant economies of scale. In this segment, barriers to entry could also be lower, both for market players already present in infrastructure services and for new entrants positioning themselves directly in this type of service, due to potentially lower initial investments. However, players who can offer customers a wide range of services, from infrastructure to managed services, could have significant competitive advantages. The extent of the catalogue could be an important element in the choice of provider, as the customer will prefer the offer that covers all its potential future needs. The suppliers with the most comprehensive catalogues could therefore have significant market power.
85. Under these assumptions, several large players - notably the hyperscalers - could combine several advantages, such as a certain lead when launching offerings, a wide range of services, strong investment and takeover capabilities, technological capabilities, international sales forces, and a strong reputation and customer base. Presence at all levels of the value chain could also allow for technical synergies. Similarly, their well established position in digital markets, outside the *cloud* field, could favour their expansion.
86. At the same time, opening up systems, hosting third-party solutions, and partnerships could be factors in building offerings that cover many demands and thus lowering the barriers to entry and expansion. However, other factors need to be evaluated, in particular the existence of network effects that may strengthen the position of certain stakeholders. Learning costs and the marketing of cloud services *via* integrator providers could also help to steer the market towards certain technologies.

### ***Issues***

- 17) Are there any significant barriers to entry or expansion to providing (i) certain types of cloud services, (ii) certain categories of cloud services, (iii) certain workloads, (iv) IaaS services, (v) PaaS services, (vi) different deployment modes (public cloud, private cloud, hybrid), (vii) "trusted cloud" offerings, (viii) sector-specific offerings, (ix) a complete service offering, (x) related markets (data centres, intermediation services), as defined in the previous section?
- 18) What investment and time would be required to provide a competitive offer in France on these different segments, depending on the positioning of the stakeholder in question (for example, new entrant, stakeholder already present in the IaaS or another part of the sector)?
- 19) What would be the time horizon for a new entrant to achieve profitability in the cloud sector? Please distinguish according to the degree to which the new entrant has invested in its own infrastructure. How broad a range of cloud services would be needed to achieve this level of profitability? What would be the market share threshold for achieving such profitability?
- 20) Are there any avenues of differentiation likely to generate competitive advantages in the various segments mentioned? Do you see the provision of PaaS services as a differentiator that could provide a competitive advantage? Is the ability to offer a wide range of services and a significant catalogue an important competitive advantage?
- 21) Do you consider that certain players have advantages that could give them significant market power?
- 22) Is opening up to services provided by third parties and partnerships likely to increase the attractiveness of certain offers?
- 23) Are there certain players that you consider essential partners for the success of certain services?
- 24) Are there any factors (for example, learning costs, marketing *via* integrators, reputation and customer base) that you believe favour certain technologies?

## **IV. Practices likely to be put in place by the various stakeholders**

88. With regard to the functioning of the markets and the potential competitive advantages of certain stakeholders, the Investigation Services are seeking to analyse certain practices implemented or likely to be implemented in the cloud sector, to assess the extent to which any of them could restrict the development of competition on the merits.
89. The practices discussed below mainly concern, but are not limited to, a set of practices identified during the investigation and likely to be implemented in the public cloud. Practices relating to other aspects of the cloud could also have negative effects on competition or be qualified as anticompetitive practices.

***Issue***

25) Do you consider that certain practices related to the cloud but outside the scope of the public cloud, for example concerning the private cloud, raise competition issues?

**1. TECHNICAL PRACTICES**

91. In this section, the Investigation Services wish to examine certain technical practices that could raise competition issues, in particular by contributing to increasing the barriers to entry or expansion in certain markets or extending the market power of a player. In particular, competition issues may be related to a lack of compatibility, common standards or interoperability between different cloud services.

**Barriers to migration**

92. The Investigation Services are seeking to assess the extent of technical barriers to migration in the cloud sector and whether certain practices implemented by providers are likely to reinforce them. The ability to migrate is an important aspect of the competitive functioning of a market, since it limits foreclosure on a supplier which would otherwise potentially have significant market power over its customers.
93. Technological barriers to migration can result from normal market development. In a context of strong innovation, several competing solutions can be proposed and evolve in parallel, leading to increased migration costs. De facto standards or standards imposed by norms may gradually emerge, allowing greater homogeneity and substitutability.
94. For cloud technologies, some services, especially among the most widely marketed, particularly at the infrastructure level, seem to be undergoing a form of standardisation. However, the investigation has shown that there are still substantial differences between the infrastructure services (IaaS) of the various providers. This observation seems even more true for the most recent and innovative services, especially in PaaS. Technical barriers and migration time (e.g. for data migration, rewriting certain scripts, adapting tools) seem to be among the main obstacles to changing providers, as put forward by companies.
95. While the existence of technical barriers to migration does not in itself constitute a practice likely to restrict competition, a stakeholder may put certain practices in place to lock in its position, by creating additional technical barriers that would increase migration costs for the customer. For example, practices aimed at integrating all its services and solutions or shutting down its system could have an anticompetitive purpose or effect if implemented by a company in a dominant position and would therefore be likely to constitute an infringement under competition law.
96. In addition, it appears from the investigation that several services, whether open-source (Kubernetes initially developed by Google Cloud) or proprietary (simple storage service initially developed by AWS), are tending to become standards adopted by all players. While these developments increase compatibility between solutions, the Investigation Services are interested in their potential implications over time. For example, certain standards could be imposed because they are used by the market leaders, who may have the ability to control the evolution of these solutions, with the other players needing to assume the costs of compliance with these standards.

### ***Issues***

- 26) In your opinion, are cloud infrastructure services (IaaS) standardised or in the process of being standardised? Specify the services considered.
- 27) Do you consider that certain services (outside of infrastructure) have become market standards? If so, which? Do you think this has pro- or anticompetitive effects?
- 28) What are the main technical barriers to migration for infrastructure services (IaaS)? What about PaaS? Specify your response and the services considered. Do you feel the barriers are greater in either case?
- 29) If you are a customer of cloud solutions, can you estimate the migration costs (in financial amount and migration time) in relation to the services you use? Do you consider these costs too high to consider migration?
- 30) Are technical barriers the main obstacles to migrating from one cloud provider to another, in your opinion?
- 31) Are you aware of any technical practices implemented by certain stakeholders that may increase the barriers to migration?

### **Barriers to multi-cloud strategies**

97. Multi-cloud is a term used by industry players to refer to the parallel use by a single company of services from multiple cloud providers. Many companies today seem to be implementing or wanting to implement a multi-cloud strategy. According to a 2020 Gartner survey of public cloud users<sup>47</sup>, 81% of respondents indicated that they used services from at least two providers.
98. The investigation revealed that several multi-cloud strategies can be distinguished:
  - Using multiple vendors for different workloads. The company will choose the most appropriate vendor for different workloads, which may be managed by different business units, given the variability of needs and the fact that these workloads generally interact very little with each other. The technological obstacles (and especially the interoperability requirements) seem limited for this type of strategy, which currently appears to be the most widespread and in particular developed by the large companies which have diversified and relatively independent internal needs.
  - Using multiple vendors for the same workload. For example, a company might use one supplier to host a database and another to mine that data with an artificial intelligence service. This strategy requires strong interoperability between services. The investigation conducted so far shows that it is not yet widespread among user companies.
  - The simultaneous use of similar services from competing providers for the same workload. For example, a company could use multiple storage providers for the same

---

<sup>47</sup> Gartner survey of public cloud users ([link](#)).

data. This strategy could be described as multi-homing.<sup>48</sup> However, multi-homing strategies seem to be underdeveloped in the cloud. There are several reasons for this, including the additional costs associated with duplicating the service, the complexity of mastering two solutions, and the increased risk of vulnerability to cyber-attacks (due to the increased number of targets).

99. Of particular interest to Investigation Services is the use of multiple suppliers for the same workload. This possibility appears to be a favourable element for competition, limiting barriers to entry and expansion on the one hand, and the risks of dependence on a supplier, on the other. It is therefore necessary to assess the extent of the technical obstacles applied to this type of multi-cloud strategy and any practices that might reinforce them.
100. For example, there may be technological barriers because a provider's services integrate a set of underlying services managed by the provider itself and that work closely with its other services. They can also result from poor interoperability between the services of different providers and thus the complexity of using different solutions simultaneously. These technical barriers can create a strong incentive to use a single supplier for the same workload.
101. Such barriers can be reduced by implementing interoperability arrangements. This approach already exists in part with the opening up of some vendors to specific complementary solutions, acquired *via* the provider's marketplace or directly from the developer. This openness limits the barriers to entry for new players. Some cloud providers also offer technical solutions (such as Anthos, BigQueryOmni or Kubernetes) that facilitate interactions between the different cloud providers used by the customer.
102. Conversely, certain practices could contribute to increasing the technical costs of multi-cloud for the customer and be likely to have anticompetitive objectives or effects. For example, a supplier could apply less favourable technical conditions, such as interoperability, compared to its own products or services. Tied selling can also result from technical barriers that are too high from the provider, discouraging customers from using third-party suppliers and thus encouraging them to use the supplier's own brand of software. Such practices, implemented by a dominant player, would probably be considered anticompetitive.

---

<sup>48</sup> "Multi-homing refers to a situation in which users tend to use several competing platform services in parallel", European Commission, Study on "Support to the Observatory for the Online Platform Economy", *Analytical paper #7: Multi-homing: obstacles, opportunities, facilitating factors*, March 2021, p. 8.

### ***Issues***

- 32) Do you think multi-homing is of particular interest for certain types of cloud services? What would be the relevant instances of use? Are there any specific obstacles to multi-homing?
- 33) What are the main obstacles to using multiple cloud service providers for the same workload?
- 34) Is the integration of services from certain providers a significant barrier to multi-cloud?
- 35) Are you aware of any technical practices implemented by certain stakeholders that may increase the barriers to multi-cloud?
- 36) Do you think that the solutions developed by some cloud providers could gradually remove some of the technical barriers to multi-cloud?
- 37) What are the incentives for developing these types of solutions from the supplier's perspective? Are they greater for stakeholders in a "challenger" position?
- 38) Do you see cloud services moving toward more interoperability?

### ***Tools to remove technical barriers to migration and multi-cloud***

104. The obstacles to migration and multi-cloud raise issues with regard to competitive dynamics. Several initiatives can be envisaged, faced with the risk of user foreclosure with a single supplier or the creation of an essential player. The Investigation Services are seeking to assess whether certain initiatives can be encouraged to act directly on these obstacles, particularly with regard to the potential effects of greater openness of the systems on competition and efficiency gains.
105. Among these initiatives, the development of best practices, codes of conduct through self-regulation and common standards have been encouraged in recent years, in particular to facilitate the change of service provider, following the example of the SWIPO working groups set up by the Commission and the Gaia-X initiative<sup>49</sup>. While the objectives of these initiatives seem to be supported by many stakeholders, several of them note an imbalance of influence that may affect the outcome.
106. Lastly, regulations can also change the technical conditions under which markets operate. The proposed Data Act, adopted by the Commission on 23 February 2022, includes a set of obligations to facilitate migration between providers, including the removal of technical barriers, the use of open interfaces and compatibility with the specifications of European interoperability standards.

---

<sup>49</sup> SWIPO (Switching Cloud Providers and Porting Data) is a multi-stakeholder association facilitated by the European Commission to develop voluntary codes of conduct for the application of the EU Regulation on the free movement of non-personal data ([link](#)).



### ***Issues***

- 39) Do you consider that certain technical practices lead to the foreclosure of competitors and the concentration of public cloud markets?
- 40) Do you consider that the standardisation of certain solutions could have negative effects on competition and/or innovation?
- 41) Do you think that self-regulation initiatives have removed some of the technical barriers to migration or multi-cloud?
- 42) Do you believe it necessary to impose certain rules to remove the obstacles to migration and allow the development of multi-cloud?
- 43) Do you think the measures proposed in the draft Data Act are likely to facilitate migration between providers?

## **2. TRADE PRACTICES**

107. In this section, the investigating authorities wish to examine certain trade practices, particularly contractual or pricing practices, that could raise competitive issues, in particular by contributing to increasing the barriers to entry or expansion in certain markets or extending the market power of a player.

### **Contractual practices**

#### ***Contractual clauses***

108. In addition to the technical aspects developed above, the Investigation Services want to analyse whether contractual practices may contribute to imposing the use of the supplier's services and thus reinforcing customer foreclosure and the eviction of competitors.
109. On the one hand, it appears that the majority of contracts between suppliers and customers of cloud products and/or services would be concluded directly online, notably *via* the acceptance of general terms and conditions of sale and use. This means that only large customers would be able to negotiate certain clauses of the contracts binding them to their cloud providers for the provision of customised products and/or services.
110. The vast majority of contracts for the provision of cloud products and/or services would therefore be membership contracts. This way of contracting could lead a customer unable to negotiate a tailor-made contract to accept exorbitant conditions in terms of payments, liability or the transfer of intellectual property rights, for example.
111. On the other hand, some contracts or licences may contain clauses preventing the use of other suppliers or requiring the group purchase of several products or services.

#### ***Market place conditions***

112. As seen above, some providers offer marketplaces that allow third-party providers to offer complementary products or services to their customers. The conditions for accessing these marketplaces usually include several restrictions set by the provider, for example regarding the type of products that can be marketed, the region of availability, the technical tools and

licences used, other marketing channels (e.g. parity clauses) or hosting at the provider's premises.

113. The Investigation Services are interested in the potential effects of these conditions on competition. In the context of opening up to other solutions, the conditions imposed on other suppliers may be legitimate in terms of efficiency gains (security, quality of technical integration, consistency of the offer, protection of intellectual property, protection against parasitism, etc.), but may also be a source of competition problems. A supplier could thus create barriers to entry for certain suppliers, create unfair access conditions between players or favour its own solutions, both in terms of marketing conditions and in terms of marketing to customers.

#### ***Issues***

- 44) As a customer of cloud products and/or services, have you encountered any issues with the standard contractual clauses included in the terms and conditions of the cloud products and/or services you use?
- 45) As a customer of cloud products and/or services, were you able to negotiate the terms of your contract? What clauses were negotiated and what benefits did your cloud provider grant?
- 46) Are you aware of any contractual practices, as listed above, introduced by certain players, that may restrict competition, prevent the use of alternative suppliers, or lead to the purchase of multiple products or cloud services together?
- 47) Do you think there are competition issues with the terms of a supplier's marketplace?
- 48) Do these marketplaces allow access to a customer base that would otherwise be inaccessible?
- 49) Do you consider that other contractual practices also raise competition issues?

### **Pricing practices**

#### ***Cloud credits and other acquisition programmes***

115. The Investigation Services are questioning the pricing practices implemented by certain players in their strategy to acquire new customers. Cloud credits are among the practices identified. These trial offers allow customers to use a provider's services for free for several months or years.
116. The investigation work tends to show that there are multiple cloud credit strategies that vary by provider, for example:
- In some cases, these cloud credits are granted to customers on the basis of significant purchase volumes (discounts for start-ups and shorter-term promotional credits). This would help pass on cost savings to suppliers for larger and less uncertain consumption quantities.
  - Regardless of volume, credit offers would also be available to customers with smaller workloads or projects to help them discover and experience products and services at low costs. It appears from the investigation that the offers proposed are generally of the order of a few hundred euros of credits.

- Some programmes are exclusively for start-ups, which are considered companies that experiment a lot but often fail. The objective is to support them and give them the benefit of computing capacities without forcing them to draw on their capital. They also represent high-potential customers that need to be won over quickly. Credit programmes for start-ups can also be coupled with mentoring and personalised coaching. The investigation shows that these credits for start-ups can reach up to €100,000 per year.
- Cloud credit programmes are also available for non-profit organisations that want to implement cloud-based solutions or are specifically targeted for education and research.
- Some programmes are also open to all clients.

117. These practices raise questions from a competitive perspective. For a company, choosing to move to the cloud can include costs, so it could be efficient from a global perspective for providers to participate in the funding, if they have the capabilities. Cloud credits also lower the barriers to entry for customers for whom the cost and the uncertainty regarding the adequacy of the service for their needs would represent a barrier to the use and development of cloud technologies. That said, the amount, duration and number of companies covered by these programmes are all parameters that could potentially raise issues from a competitive standpoint. In particular, it is appropriate to question the risk of excluding existing players or new entrants, firstly because these credits might not be offered by all companies in a profitable manner, but also because they might be part of a more global strategy of customer foreclosure, in particular when, for certain providers, they are accompanied by fees levied on outgoing data flows (see next section).

#### ***Issues***

- 50) As a customer, do you receive cloud credits? If yes, please specify their nature (supplier, value, duration, etc.). How do these credits factor into your choice between different cloud offerings?
- 51) Do you think the cloud credit programmes presented above (targeted companies, amounts) are justified? Why?
- 52) Do you think that cloud credits (alone or coupled with other practices seen in the market) may represent a barrier to entry/risk of exclusionary conduct or lead to customer foreclosure by cloud providers? Why?

#### ***Egress fees***

- 119. The Investigation Services have identified certain pricing practices related to bandwidth<sup>50</sup> use that may raise competition concerns. These practices would mainly concern the use of services offered by the main public cloud providers, in particular hyperscalers.
- 120. Some hyperscalers interviewed explained during the investigation that they have implemented a delivery model for a public cloud infrastructure service based on charging

---

<sup>50</sup> The bandwidth flow refers here to the data traffic circulating on the wired, generally fibre, networks used by cloud providers to connect their various data centres around the world. The bandwidth costs incurred by a cloud provider then depend on the level of investment it has made in developing its own network. At the extreme, these investments can correspond to the development of the entire wireline network and other necessary network equipment (e.g. routers). A provider may also decide not to have a network of its own and pay only for access to third-party networks, including those of national telecoms operators or other cloud providers present. A provider can also position itself at an intermediate level of the investment ladder and adopt a hybrid strategy.

customers for their outbound bandwidth use only. Practically speaking, these pricing structures for bandwidth costs involve a cloud provider charging an egress fee each month for transferring a certain amount of data to a destination outside of the provider's cloud environment. These external transfers can be a transfer of data from the provider's data centre to another cloud provider's data centre, for multi-cloud use, or to the customer's on-premise site. Lastly, these "egress fees" would also concern data flows on the bandwidth between two data centres belonging to the same cloud provider but relatively distant geographically. On the other hand, data transfers to the provider's cloud environment from outside that environment ("ingress traffic") are free and unlimited.

121. The existence of such egress-only pricing models is also corroborated by several stakeholders interviewed during the investigation and by several public articles<sup>51</sup>. Moreover, the public cloud hyperscalers themselves publish certain pricing tables<sup>52</sup>, which, according to the information collected, are still negotiable, especially for large customers. It can also be noted that other than hyperscalers, it would appear that most other cloud service providers charge little or nothing for outbound traffic.
122. These outbound traffic pricing practices could raise the risk of customer foreclosure in a growing market by making it more difficult for cloud users to leave their provider, switch providers, use multi-cloud or simply move their data out of the cloud as they see fit. Risks could also arise from excessive pricing or a difficulty for customers to anticipate and accurately estimate the monthly transfer fee they will incur.

### *Issues*

- 53) Are there different network architectures between the different cloud providers present in France (fibres, routers and other equipment necessary for the deployment of the bandwidth)? Are there different levels of investment in these networks? Could you describe the main differences between the networks used by the different cloud providers present in France?
- 54) What is the trend in network costs in recent years worldwide and in France? What is the trend in the price of third-party bandwidth access worldwide and in France?
- 55) How do rates vary for customers in France (distance, countries, continents, etc.)? What are the underlying principles of the pricing schedules and, in particular, what are the geographic equalisations? What are the different categories of costs reflected by these egress fees?
- 56) How do you think the ratio of egress fees to network costs has changed in France in recent years? Are there any differences between cloud providers?
- 57) Why do you think some cloud providers are implementing egress-only pricing models? What would be the consequences of this asymmetric traffic pricing for customers and competing providers? To what extent can competition limit the extent of egress fees?
- 58) Can cloud service customers anticipate and accurately estimate the monthly charges they will incur for the use of their provider's bandwidth?

---

<sup>51</sup> The Cloudflare Blog, "AWS's Egregious Egress", 23 July 2021, <https://blog.cloudflare.com/aws-egregious-egress/>

<sup>52</sup> <https://azure.microsoft.com/en-us/pricing/details/bandwidth/>

### *Evolution of prices and pricing methods*

124. The investigation services are also interested in the evolution of prices and pricing methods for cloud services. The main cloud providers indicate a rather downward trend in their cloud services, primarily reflecting the decline in technological costs (hardware, storage and computing capacity, etc.). This development could reflect significant competition for relatively homogeneous products or services.
125. That said, several stakeholders have emphasised the need for clarity in the prices charged by suppliers. The clarity of pricing practices can be disrupted by the many free services offered (migration support, training days, "free tier", certain network services, internal data transfer, etc.), with monetisation by the provider through billing for other services. For these services, customers may also find it difficult to assess their needs and any changes, which affects their ability to negotiate with suppliers who demand commitments on purchase volumes. In view of all these elements, it is difficult to analyse pricing trends and the potential existence of excessive tariffs. Discounting and bundling practices can also increase the risk of user foreclosure, particularly by integrated players or those present in several markets.
126. Regarding the pricing practices of cloud providers, several players have reported significant price increases on certain SaaS products, when bundled with cloud solutions. According to several players, the move to a SaaS model is instrumental in changing the trade relationship, as the shift from a perpetual licence system to a subscription model increases the difficulty of renegotiating contracts and therefore leads to higher overall costs. In addition, licence pricing models designed for on-premise use are generally unsuitable for a move to the cloud (especially when pricing per machine). If pricing methods are not adapted, licence fees can lead to very high costs and potentially constitute a barrier to entry for providers unable to host certain software used by their customers at an acceptable rate.
127. It can be noted that the prices charged on the suppliers' marketplaces have also evolved over the last few years, with some players reducing prices or with a wide variety of commission rates depending on the solutions proposed by the sellers. Overall, the prices charged also seem to vary greatly between marketplaces. These prices and their evolution can be interesting indicators of the essential nature of certain systems or the importance of network effects.

#### *Issues*

- 59) Do you think that changes in cloud service prices reflect the changes in the costs incurred by providers?
- 60) Can cloud service customers anticipate and easily estimate pricing changes? If not, why not?
- 61) Do you consider that the prices of cloud services are sufficiently clear?
- 62) Are you aware of any problematic pricing practices related to certain SaaS products or software solution licences intended for on-premise use?
- 63) How will the commissions charged on marketplaces change?
- 64) Are you aware of any other pricing practices that are problematic from a competition standpoint?

### **3. RISKS RELATED TO THE LEVERAGE CAPABILITIES AND ECOSYSTEM BENEFITS OF CERTAIN PLAYERS**

129. Some players might tend to use the competitive advantages gained in markets outside the cloud to pre-empt cloud markets and vice versa. The investigation has shown that the presence of vertically integrated players in the cloud markets or indeed the existence of potential conglomerate effects could raise competition concerns.

#### ***Strategies of the historical software players (vertical integration)***

130. The Investigation Services note the presence in the cloud markets of players historically established in software product markets. The multiple interactions and even integration between software and cloud services tend to blur the line between software publisher and cloud service provider. In this context, the Investigation Services have identified two main types of practices that are likely to raise competition issues.
131. On the one hand, historically established players in software product markets may be able to define a number of restrictions for customers using software licences on their on-premise architecture, preventing the migration of those licences to a cloud other than that of the software publisher. These restrictions may be technical or pricing-related. They could raise competition concerns if they come from vertically integrated players with significant market power in one or more SaaS markets.
132. On the other hand, publishers could restrict some cloud providers from accessing their software, which is otherwise necessary for the provision of certain cloud services as it is essential for the customer. These may be pricing restrictions, for example when it is less expensive for a customer to purchase this software directly from the publisher. They may also be commercial, for example if partnerships between software publishers and certain cloud service providers impede access by other cloud providers to the software that is the subject of those partnerships.

### ***Issues***

As a customer of software vendors and cloud service providers:

- 65) Did you have to agree to purchase cloud products and/or services for which you had no identified need when negotiating on-premise software licences? Or were you offered any discounts or benefits during these negotiations related to the purchase of cloud products and/or services?
- 66) Did you encounter any difficulties migrating your on-premise software licences to the cloud and, more specifically, to a cloud other than that of your software provider or its partner?
- 67) Does migrating from on-premise software to the cloud differ in terms of cost from one provider to another?

As a cloud service provider:

- 68) Did you have to forego offering certain cloud products and/or services due to the excessive cost of the software needed to run those cloud products and/or services? Because of the inability of the supplier of this software to provide it to you? If so, what reasons were you given?

In general:

- 69) Are you aware of any other practices by the software providers that are problematic from a competition standpoint?

### ***Conglomerate effects***

133. The Investigation Services are concerned about the existence of certain conglomerate effects that could give rise to questionable practices from a competitive point of view.
134. Several players already present in many digital markets seem to have significant competitive advantages and are forming an ecosystem that includes their cloud activities, potentially reinforcing market foreclosure. The integration of solutions would allow these players to easily attract a number of customers already accustomed to their services in other markets and who thus avoid the learning costs associated with changing tools, interfaces, etc. Many corporate users are often accustomed to using the services of a single provider since their university education. In addition, players present in multiple markets would be more likely to integrate their different services, for example through unified connections between all the services offered (cloud and non-cloud) and the centralised management of cloud and non-cloud accounts, which would also help foreclose the user into a single provider.
135. In addition, the Investigation Services hypothesise that certain cloud players may be able to strengthen their market power by combining the competitive advantages acquired either in the cloud markets or in one or more non-cloud markets. This assumption can take different forms, for example:
  - 1) A dominant player in a cloud-related market, known as the primary market, and in which dominance is based in part on the possession and/or exploitation of a large amount of data, could use this market power to pre-empt one or more cloud markets. The data collected in the primary market could then be a lever for converting customers from other services to cloud services, in a more or less forced way. But this data could also be used to improve the performance of a cloud service offering through more detailed knowledge of customer needs. In

this case, a more in-depth analysis should be carried out, weighing the anticompetitive and pro-competitive effects, particularly with regard to the efficiencies that this practice could bring about.

- 2) Conversely, the competitive advantages gained by a company with market power in the cloud could be used to enter with greater impact or to strengthen a position in adjacent/connected non-cloud markets. For example, the fact that a player with market power in the cloud could offer targeted marketing services, audience analytics, etc. directly on its cloud platform could strengthen its position in the online advertising market.
- 3) Lastly, a player with market power in either a cloud or primary market could use that power to develop discount, non-price advantage, or cross-subsidy schemes to attract its customers to the market in which it is not dominant or does not have market power.

#### *Issues*

- 70) Are you aware of any proven problematic practices in these cases?
- 71) Are you aware of any other risks or practices related to the ability of certain stakeholders to leverage and benefit from their ecosystem?

#### **4. CARTEL RISKS**

136. Lastly, in its opinion, the *Autorité* will seek to determine whether there are any concerted practices or parallel behaviours likely to distort competition in the sector.
137. In particular, stronger partnerships between cloud service providers or between cloud service providers and integrators, or specific interoperability agreements between certain cloud and SaaS players, could be likely to raise issues according to the Investigation Services.
138. It is also important to note that many cloud provider groups and associations have formed in recent years. The fact, on the one hand, that these entities group together autonomous and sometimes competing companies and, on the other hand, that their operation implies contacts between these same companies exposes them, and their members, to risks with regard to the rules prohibiting cartels. But these entities can also be particularly useful relays for the development of companies in their market and for conveying claims and alerting government. It is therefore recalled that while a certain degree of concertation between companies through these entities is possible, this concertation must not have an anticompetitive purpose or effect. In particular, concertation between cloud providers through these entities regarding the prices charged for cloud services could be considered as having an anticompetitive purpose.
139. Some industry players have also reported potential coordinated actions by several companies that may, for example, have delayed work at the European level to improve the functioning of the industry by establishing codes of conduct to promote switching and interoperability.
140. Other stakeholders question the importance attributed by both private and public players to standardisation solutions, which at first glance promote interoperability and therefore provider switching, but which could, in some cases, become problematic. If this practice is carried out by several entities acting in concert, prevents the emergence of alternative



solutions and paralyse innovation, it could entail risks with regard to the rules prohibiting cartels, particularly if it leads to an increase in the price of the favoured solution.

**Issues**

- 72) Do you consider that the cases presented seem to raise risks with regard to antitrust law? Are you aware of any proven problematic practices in these cases?
- 73) Have you found any other potentially problematic practices under antitrust law that are not covered in these developments?

## 5. CONCENTRATION PRACTICES

- 141. The trend toward concentration in the cloud industry can be reinforced and accelerated by takeover strategies. Over the past few years, there have been a number of major takeovers, particularly by established players. As an example, in July 2019, IBM acquired software provider Red Hat for \$34 billion to bolster its hybrid cloud offering, and between 2018 and 2022, Microsoft acquired 26 companies, with the aim of enhancing the Azure, Microsoft 365, Office 365 and Dynamics 365 offerings.
- 142. In addition, the creation of new entities in the form of joint ventures bringing together major players in the sector to provide offerings specifically designed to address new market segments (such as the "trusted cloud") leads to reflection on the competitive advantages that these new entities will *de facto* have and the potential for competition from players who do not have the same power. Projects such as the partnership between Thales and Google Cloud to co-build a trusted solution in France and the Bleu joint venture between Capgemini and Orange based on Microsoft Azure technologies were mentioned by many industry players during the investigation<sup>53</sup>.
- 143. Therefore, in its opinion, the *Autorité de la concurrence* may pay attention to the takeover and merger strategies of cloud players, as these strategies may affect the structure of the market or be implemented in order to prevent the emergence of new competitors or new technologies.

**Issues**

- 74) Have you found a trend toward the concentration of stakeholders in the cloud industry?
- 75) Are you aware of any takeover practices that may entail risks from a competition law perspective?
- 76) How do you view the creation of new entities intended to provide "trusted cloud" offerings?

---

<sup>53</sup> Press release of 6 October 2021, Thales and Google Cloud announce a strategic partnership to jointly develop a Trusted Cloud offering in France ([link](#)); Capgemini and Orange press releases of 22 June 2022, Capgemini and Orange announce that Bleu will start engaging with future customers by the end of 2022, ([link](#) and [link](#)).

## V. Perspectives

144. The investigation shows that the players anticipate an acceleration in the adoption of cloud services by all categories of customers over the next few years, offering strong growth prospects for providers of cloud products and/or services. At the same time, new technologies that improve the performance of products and services are expected to emerge, and potentially change the structure and competitive balance of cloud markets.
145. In addition, industry players expect the regulatory framework to evolve towards the establishment of new rules, both general and specific, to govern the design, operation, marketing and use of cloud products and/or services.

### *Issues*

- 77) What do you think will be the main developments in the market over the next five to ten years?
- 78) Are there any innovations that you believe could change the competitive balance of the market, for example by encouraging the entry or expansion of stakeholders?
- 79) Do you have any recommendations for improving the competitive operation of the cloud industry?
- 80) Do you consider that the points discussed cover all the competitive issues in the cloud industry?
- 81) Is there anything else you would like to bring to the attention of the *Autorité de la concurrence*?

## Glossary

To enhance understanding of the public consultation, the terms used in it should be interpreted as follows:

- **API:** this term is defined in the *Autorité de la concurrence* Opinion 18-A-03 of 6 March 2018 on data mining in the internet advertising sector as "*an acronym for "Applications Programming Interface", i.e. a programming interface that allows two programmes or software to interact with each other, by connecting to exchange data. An API is in principle open and offered by the programme owner. It allows software to use the services and features of other software.*
- **Cloud:** this term is defined by the U.S. National Institute of Standards and Technology (NIST) 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*<sup>54</sup>."
- **Public Cloud:** according to NIST, this term refers to products and/or services for which "*the cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organisation, or some combination of them. It exists on the premises of the cloud provider*<sup>55</sup>."
- **Private cloud:** according to NIST, this term refers to products and/or services where "*The cloud infrastructure is provisioned for exclusive use by a single organisation comprising multiple consumers (e.g. business units) It may be owned, managed, and operated by the organisation, a third party, or some combination of them, and it may exist on or off premises*<sup>56</sup>."
- **Hybrid Cloud:** according to NIST, this term encompasses products and/or services for which "*the infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardised or proprietary technology that enables data and application portability*<sup>57</sup>."
- **Data:** in the proposal for a regulation on harmonised rules for fair access to and use of data<sup>58</sup>, adopted by the Commission on 23 February 2022, data is defined as: "*any digital representation of acts, facts or information and any compilation of such acts, facts or information, including in the form of sound, visual or audio-visual recording*".

---

<sup>54</sup>See the English version on the NIST website.

<sup>55</sup>French translation proposed by the training services (see English version on the NIST [website](#)).

<sup>56</sup>French translation proposed by the training services (see English version on the NIST [website](#)).

<sup>57</sup>French translation proposed by the training services (see English version on the NIST [website](#)).

<sup>58</sup> [link](#)

- **Hyperscalers**: a term for very large companies that have built global hosting capabilities and developed dedicated applications used by millions of users<sup>59</sup>. Examples: Amazon with AWS, Microsoft with Azure, Google with Google Cloud Platform, Alibaba with Alibaba Cloud, etc.
- **IaaS** (Infrastructure as a Service): this term is defined by NIST as "*the capability (...) to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g. host firewalls)*"<sup>60</sup>."
- **Multi-cloud**: a strategy for a company cloud service user to use more than one cloud service provider.
- Platform as a Service (**PaaS**): "*The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming, languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment*"<sup>61</sup>.
- **SaaS** (Software as a Service): this term is defined by NIST as "*The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g. web-based email), or a programme interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings*"<sup>62</sup>."

---

<sup>59</sup> Ernst & Young study, "A French Cloud market still being structured", November 2020, page 21 ([link](#)).

<sup>60</sup>French translation proposed by the training services (see English version on the NIST [website](#)).

<sup>61</sup>French translation proposed by the training services (see English version on the NIST [website](#)).

<sup>62</sup>French translation proposed by the training services (see English version on the NIST [website](#)).