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Report for Amazon Web Services

Cloud and telecoms in Brazil: complementary but different

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Contents

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Executive summary

A vibrant and well-managed digital economy is a vital source of innovation, economic growth, wellbeing and sovereignty. Digital infrastructure provides the foundations on which services and applications are built. Digital skills and the ability of firms to take advantage of software and data are key to enabling the benefits of digital technology to affect the rest of the economy.

In this context, the question of regulation is ever-more present. In some jurisdictions new statutes and regulatory tools are being implemented to tackle some of these new topics; in many other jurisdictions, existing tools persist. In both cases, the effectiveness of regulation in the digital economy remains uncertain and is only beginning to be tested.

This paper focuses on the particular case of Brazil. The government of Brazil has long recognised the importance of the digital economy to its future growth and the wellbeing of its citizens, with objectives to develop infrastructure, services and skills to foster these outcomes. There is currently no dedicated digital ecosystem regulation in Brazil, but competition law applies. However, Anatel, historically the regulator for communications (in particular telecoms), appears intent on expanding its remit to broader parts of the digital infrastructure and services landscape.[1] This is visible in recent regulatory initiatives to expand its oversight of interconnection and data centres, in particular.

In this paper we discuss the differences between the cloud and telecoms sector, as well as the potential impact of expanding a regulatory framework designed for telecoms to cloud and CDNs.

On the demand-side, cloud customers are businesses and administration who have historically invested in and operated their own IT infrastructure and capabilities (the traditional 'on-premises' model). As such, these customers have the business IT knowledge to support the alternative forms of supply available in the cloud sector. In comparison, most telecoms users do not have the knowledge nor the means to self-supply their own communications services. As Brazilian law guarantees freedom of enterprise, the protection of citizens' and consumers' rights, and the Federal Government has a duty to ensure access to telecoms services, telecoms access provisions are justified and proportionate. These provisions are less relevant in the context of a sector where businesses have the ability to self-supply services, and where the majority of activity happens in the business-to-business part of the sector.

On the supply-side, the current telecoms regulatory framework evolved from a history of regulation moving from a state-owned monopoly to more open competition, a markedly different context to that of the cloud sector. Supply in the telecoms sector remains relatively concentrated, provided by a few vertically integrated operators, as a result of a historical state-owned monopoly and presence of direct network effects in messaging and telephony. In contrast, cloud services started as inherently competitive services and Brazilian businesses have access to a wide range of services from an array of cloud providers, with network effects that are primarily indirect. These differences are structural and far-reaching, affecting market entry, vertical integration, and economies of scale and scope.

1 For instance, initiatives 3, 7, 9 and 18 from Anatel's 2025–2026 agenda (Internal Resolution 399, 2025).

- In telecoms, market entry is affected by significant barriers including licensing requirements, access to scarce resources such as spectrum, and substantial up-front capital investments. The cloud sector exhibits comparatively lower barriers to entry, enabling a more fluid and competitive environment.

- The telecoms sector is shaped by vertical integration and infrastructure barriers, leading to regulatory measures like wholesale access rules to encourage competition. In contrast, the cloud sector's open, interoperable structure allows for competition and innovation without the need for telecoms-style regulation.

- Telecoms networks demand high upfront investment and have significant barriers to entry due to their location-dependent infrastructure and slow payback periods. Cloud infrastructure, by contrast, is less geographically restricted, offers faster returns, and faces fewer entry barriers.

Cloud and telecoms act as complementary enablers for consumers and businesses offering and accessing services over the internet. Not only is extending telecoms regulation to the cloud sector unlikely to be justified, proportionate or effective, but it is likely to be harmful to cloud customers and providers, and potentially also detrimental to telecoms operators.

Expanding the telecoms regulatory framework to include cloud and CDN providers would directly affect their costs and incentives to invest in Brazil, potentially undermining the choice and quality available to Brazilian businesses and administration that use cloud for their own IT operations and to reach end users across Brazil and in international markets.

The impact of higher costs, including for IP interconnection, will ultimately be borne by end users, including Brazilian businesses and content providers, and by consumers. This would slow the adoption of cloud services and innovations including data centres and AI, going against the government's efforts to spur digital transformation under its digital agenda. This would come at a cost for Brazilian competitiveness.

If cloud and CDN providers face higher costs and adverse incentives related to their investment in infrastructure, this could affect the telecoms sector through higher costs and investment requirements, reduced competition and poorer competitive outcomes, including for consumers.

Repurposing a complex regulatory framework designed for the specific characteristics of telecoms, to apply it to a very different sector, risks fundamentally undermining regulatory certainty. Policy makers need to ensure that any new regulation on cloud and CDN providers responds to a clearly established problem or market failure, which cannot be remedied through existing instruments, in a proportionate way.

1 Introduction

The emergence of generative artificial intelligence (genAI) on the global stage has underlined the importance of developing a vibrant and well-managed digital economy as a source of innovation, economic growth, wellbeing and sovereignty. Digital infrastructure, including domestic and international networks, satellite communication platforms, and data centres, provides the foundations on which services and applications are built. Digital skills and the ability of firms to take advantage of software and data are key to enabling the benefits of digital technology to affect the rest of the economy.

In this context, the question of regulation is ever-more present. It covers existing topics, such as competition, trade and security. Regulators also grapple with new issues such as online safety. In some jurisdictions, in particular the European Union, new statutes and regulatory tools are being implemented to tackle some of these new topics; in many other jurisdictions, existing tools persist. In both cases, the effectiveness of regulation in the digital economy remains uncertain and is only beginning to be tested.

This paper focuses on the particular case of Brazil, a country with one of the largest populations in the world and a vibrant economy. The government of Brazil has long-recognised the importance of the digital economy to its future growth and the wellbeing of its citizens, with objectives to develop infrastructure, services and skills to foster these outcomes. It is important that regulation is consistent with these objectives. However, at this stage, we understand that responsibility for digital regulation has not been fully codified, and we observe initiatives by Anatel, historically the regulator for telecoms, to expand its remit to broader parts of the digital infrastructure and services landscape.

Cloud and content delivery network (CDN) services provide important building blocks for businesses and public sector organisations operating from and in Brazil to offer digital services and applications to other Brazilian businesses and consumers, and to export their services to customers in other parts of the world. Cloud and CDN services act as technical enablers and intermediaries, selected and paid for by business customers, including software vendors and enterprises managing their own IT needs.

Anatel has taken steps that may bring CDNs and some of the infrastructure underlying cloud services under its regulatory oversight (Section 2). Given the historical focus of Anatel on telecoms, we discuss the differences between the cloud and telecoms sector (Section 3), as well as the potential impact of expanding a regulatory framework designed for telecoms to cloud and CDNs (Section 4).

We invite readers to also access the paper we published in 2024, which focuses on the European case but expands on many of the discussions in this paper.[2]

[2] Analysys Mason (2024), *The European telecoms regulatory framework: not a good fit for the cloud sector*.

2 Brazil's digital ambitions and recent regulatory developments

Regulation of the telecoms sector in Brazil has evolved to achieve specific objectives that reflected the starting point, and desired evolution, of the sector. Any regulation of the cloud sector must be proportional and support free economic activity to the benefit of consumers.

2.1 Digital policy objectives and initiatives

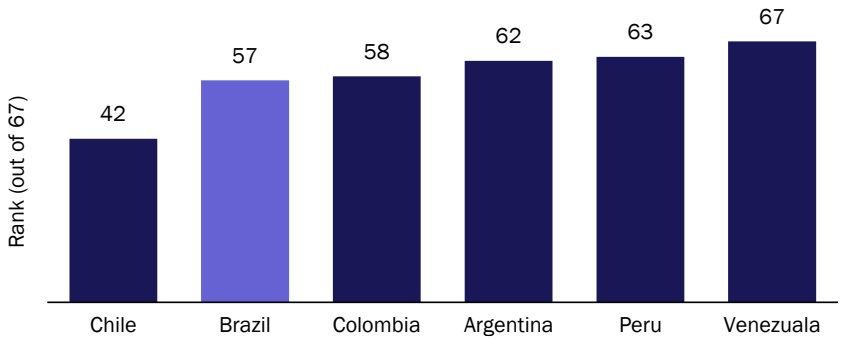
The Brazilian government recognises the importance of digital technologies and innovation in driving economic growth, social inclusion and global competitiveness. Cloud is one such technology, the use of which reduces barriers to development and innovation, allowing customers of any size access to state-of-the-art, hyperscale (or global-scale) infrastructure at competitive prices, contributing horizontally to the digital transformation of all economic sectors.

The Brazilian Federal Constitution declares that the State shall promote technology and innovation.[3] In the digital space, this led to the development of the Brazilian Digital Transformation Strategy (2022–2026), which focuses on:[4]

A. expanding high-quality, cost-effective access to the internet and digital technologies
B. stimulating the development of new technologies
C. ensuring that the digital environment is secure, reliable and respects citizens' rights
D. training society for the digital world
E. strengthening Brazil's leadership in global forums on digital issues
F. fostering the digital transformation of the Brazilian economy
G. digitising Federal government provision of services to citizens.

The overarching objective of digital policies in Brazil are for "new jobs […] to be created, income levels […] increase, and the digital inclusion of citizens, that is, the promotion of access to the services and facilities that ICT can provide".[5]

Figure 2.1: Digital competitiveness ranking for 2024 (Ranked out of 67) [Source: The IMD World Competitiveness Center, Switzerland, www.imd.org/wcc, 2025]



3 National Constituent Assembly (2017), *Brazil 1988 (rev. 2017) Constitution*.

4 Ministry of Science, Technology and Innovation (2022), *Digital Strategy 2022-2026*.

5 Ministry of Science, Technology and Innovation (2022), *Digital Strategy 2022-2026*.

In pursuit of these objectives, the Ministry of Communications leads several programs to promote digital inclusion and expand internet access across the country, with a focus on connectivity.[6] However, the Government's objectives go beyond simply expanding access to connectivity; as connectivity is an enabler for innovation, economic growth and global competitiveness. In alignment with this vision, the government has articulated clear objectives and implemented strategic initiatives to foster a robust digital ecosystem, while recognising the achievement of such objectives requires investment from both public and private sources.[7] Recent developments include the Brazilian Artificial Intelligence Plan 2024–2028 and a National Data Centre Policy.

The Brazilian Artificial Intelligence Plan 2024–2028 outlines the nation's ambition to become a world leader in AI. The plan identifies the need for substantial investment in advanced technological infrastructure to support AI development and deployment in order to improve quality of life, optimise delivery of public services and promote social inclusion. The plan allocates significant funding (estimated at BRL23 billion) to foster innovation and attract private sector participation.[8] Investment from cloud players is a crucial component of this private-sector participation. For example, under the "Microsoft Mais Brasil" programme, Microsoft has committed to a BRL14.7 billion investment over three years to enhance its cloud and AI capabilities in Brazil.[9]

In September 2025, the president took the first step in developing a National Data Centre Policy, adopting Provisional Measure 1,318 establishing the 'Special Taxation Regime for Datacentre Services' (REDATA).[10] The regime offers tax reductions in return for making capacity available to meet domestic customers' demand, investing in research, development and innovation and complying with sustainability criteria. The initiative is designed to enable the expansion and modernisation of digital infrastructure in the country in order to increase economic competitiveness, strengthen technological leadership and consolidate Brazilian digital sovereignty.[11] Significant private-sector investment in data-centre infrastructure, particularly from cloud providers (for example, AWS's BRL10.1 billion investment for 2023–2034)[12] will be key to achieving these goals.

6 For instance: Wi-Fi Brazil, Computers for Inclusion, Internet Brazil, Connected Schools and Connected North and Northeast. Ministry of communications (2025), *Programs and Actions*.

7 See for example, a 2023 study by the Ministry of Development, Industry, Trade and Services, *Strategy for the implementation of public policy to attract data centres* and a 2024 report by the OECD Economics Department on *Scaling-up infrastructure investment to strengthen sustainable development in Brazil*.

8 Ministry of Science, Technology and Innovation (2025), *Brazilian Plan for Artificial Intelligence*.

9 Microsoft (2024), *Microsoft announces 14.7 billion Reais investment over three years in Cloud and AI infrastructure and provide AI training at scale to upskill 5 million people in Brazil*.

10 National Press (2025), *Provisional Measure No. 1,318*.

11 Ministry of Science, Technology and Innovation (2025), *REDATA submission*.

12 Reuters (2024), *Amazon's AWS to invest $1.8 billion in Brazil through 2034*.

2.2 The status of digital regulation in Brazil

There is currently no dedicated digital regulation in Brazil; like any other business, digital players are held accountable by the competition authority. If the digital sector were to be regulated it should be done in a manner according to the core tenets of Brazilian law: proportionality, free economic activity and consumer benefit.

There is currently no dedicated regulation of the digital sector in Brazil, but a few laws and regulations affect the functioning of the internet, and therefore indirectly the services that are accessed over the internet, including cloud services. Law 12,965 enacted in 2014, establishes the principles of internet use in Brazil, such as net neutrality,[13] and the 2016 update (Decree 8,771) states that network management will be allowed to preserve network stability and security in adherence with international standards and that the telecoms regulator, Anatel, will monitor and verify any infractions.[14] A data protection law (Law 13,709) was enacted in 2018, establishing a National Data Protection Authority,[15] but for any matters outside of these laws, digital players are beholden to Brazil's competition authority, Conselho Administrativo de Defesa Econômica (CADE).

In recent months, the legislative and regulatory agenda has seen a renewed focus on digital infrastructure and related matters.

In Novemeber 2024, a bill (PL 4557) was submitted to the Chamber of Deputies proposing a reorganisation of internet governance in Brazil.[16] While the main aim of the bill is to regulate social media, the implications extend beyond the application layer to the underlying infrastructure and architecture of the internet. Under the bill, authority over domain name registration and IP address allocation would shift from the internationally established multi-stakeholder model currently in place, to the responsibility of the telecoms regulator, Anatel.[17]

In September 2025, a bill (PL 4675) was submitted to the Brazilian National Congress to amend Brazilian Competition law (Law 12,529 of 2011) in order to establish a framework within CADE to deal specifically with digital markets. The proposed bill would introduce obligations to digital players with systemic relevance and is limited to corporate groups with either a gross annual global revenue exceeding BRL50 billion, or a gross annual revenue in Brazil exceeding BRL5 billion.[18]

In addition, Anatel has included a number of upcoming regulatory initiatives in its 2025–2026 agenda,[19] which we discuss further in the next section.

13 CGI.br (2014), *Marco Civil Law of the Internet in Brazil*.

14 Presidency of the Republic (2016), *Decree Marco Civil*.

15 Presidency of the Republic (2018), *L13709*.

16 Portal of the Chamber of Deputies (2025), *PL 4557*.

17 Internet Society (2025), *Protect and Promote Collaborative Internet Governance in Brazil*.

18 Portal of the Chamber of Deputies (2025), *PL 4675*.

19 Anatel (2025), *2025–2026 Regulatory Agenda*.

Figure 2.2: Items from Anatel's 2025–2026 agenda relating to the digital sector [Source: Anatel, Internal Resolution 399, 2025]

Initiative	Description of actions relating to digital	Status
Proposal to amend the regulation on cyber security in the telecoms sector[20]	• Following resolution 747 which stated that cyber-security policies must include the "cybersecurity aspects related to the contracting of data processing and storage and cloud computing services used by the provider", update the current regulation (Resolution 740, 2020) to include "regulatory aspects related to the provision of cloud computing services and data centres when associated with the telecoms sector"	Anatel is reviewing comments from the public consultation on draft regulation
Simplification of telecoms regulation and services	• Revoke the ordinance that approved Norma 4 (1995) on the use of public telecoms networks for internet access as of January 1 2027 (Resolution 777):[21] "*Norma 4 establishes internet connection services as value-add services, distinct from telecoms services, and therefore subject to different taxation regimes. Anatel announced plans to revoke Norma on the basis of simplifying taxation".* • Declaration that data centres should fall under Anatel's remit: "Data centers currently make up the telecommunications network and should be subject to evaluation by Anatel" (Analysis 49, April 2025)	Resolution 777 was approved April 28 2025, after facing significant opposition Anatel did not have appropriate authority to make this decision. Anatel has shown willingness to revisit the decision if necessary.
Regulation of users' duties	• In March 2023, Anatel launched a request for input on a regulatory initiative to assess the need for regulation on the duties of users of telecoms services, specifically for large users or those making massive use of telecoms networks. The request outlined the arguments for a "fair share" approach and included a question on the role of CDNs.[22]	A draft resolution and draft public consultation have been prepared and are being reviewed by Anatel's Board of Directors
Reassessment of the regulation on conformity assessment and approval of telecoms products	• Amend the existing regulation (Resolution 715, 2019) to include a requirement for a conformity assessment for data centres that are part of telecoms networks, with obligations including continuous operation, robust physical security, cyber security and sustainable practices	Resolution 780 was approved 1 August 2025[23]

20 Anatel (2024), *Resolution 767*; Anatel (2025), *Draft Resolution*; and Anatel (2025), *Judgement 261*.

21 Anatel (2025), *Resolution 777*; Anatel (1995), *Standard 004/95*; CGI.br (2025), *PUBLIC NOTE on the decision of Anatel's Board of Directors on Rule 004/1995*; and NIC.br (2025), *Pressured by the Internet sector, Anatel admits to revisiting the end of Rule 4*.

22 Anatel (2023), *documento_consulta_externa.php*. Anatel justified need to evaluate the relationship between digital platforms and telecoms service providers on the basis of Article 61 of the general telecoms law, giving it responsibility to oversee the conditions and relationship between value-add service (VAS) providers and telecoms service providers, and the basis that VAS providers are users of telecoms networks and Anatel is responsible for regulating users' use of telecoms networks.

23 Anatel (2025), *Resolution No. 780.*

If digital regulation is codified in Brazil, we expect that it will fulfil the core tenets of regulation as set out in law, based on fundamental rights and constitutional principles: proportionality, equal treatment before the law, consumer protection and the freedom to conduct a business.

Proportionality	Measures must be appropriate and necessary to achieve the objectives pursued by the legislation, and they should not exceed what is necessary to achieve those objectives. Regulation should be evidence based; Article 20 of Decree 4,657 (as amended in 2018) mandates that reasoning "shall demonstrate the necessity and appropriateness of the imposed measure or the invalidation of an act, contract, agreement, proceeding, or administrative regulation, including in light of possible alternatives."[24]
Equal treatment before the law	Comparable situations must not be treated differently and different situations must not be treated in the same way, unless such treatment is justified on the basis of an objective and reasonable criterion and is proportionate to the aim pursued in light of the fundamental objective. The Brazilian Federal Constitution establishes foundational principles for economic freedom, including the guarantee that all individuals are equal before the law, that the principle of consumer protection be observed and that the free exercise of any economic activity is ensured to all.[25]
Protection of consumer rights	This is set out in Law 8,078, and includes rights to transparent information, protection against abusive practices and freedom of choice.[26] The emphasis on consumer protection is reflected in the enactment of Laws 13,848 and 13,874 in 2019 requiring a Regulatory Impact Assessment prior to the adoption of new, or amended, regulatory acts, which ensures that any regulatory intervention is evidence-based, proportionate, and designed to protect consumers without imposing unnecessary or distortive measures on competitive markets.[27]
Freedom to conduct a business	This includes the right to engage in economic or commercial activity, freedom of contract and free competition. These can be limited by law, as long as these limitations respect the essence of those rights and freedoms, and comply with the principle of proportionality.[28]

24 Presidency of the Republic (2010), *Del4657*.

25 National Constituent Assembly (2017), *Brazil 1988 (rev. 2017) Constitution*.

26 Presidency of the Republic (2022), *L8078*.

27 Presidency of the Republic (2019), *L13848* and *L13874*.

28 Presidency of the Republic (2019), *L13848* and *L13874*.

2.3 Anatel's attempts to regulate the digital sector

Despite not having a mandate to regulate cloud, Anatel has recently attempted to regulate aspects of the cloud sector by referencing it within telecoms regulation. However, the current telecoms regulatory framework evolved from a history of regulation moving from a state-owned monopoly to more open competition, a markedly different context to that of the cloud sector (as discussed in Section 3).

The current Brazilian telecoms regulatory framework was put in place to facilitate evolution from a state-owned monopoly to an open, competitive sector. The regulatory interventions have historically responded to clear market failures or sectoral inefficiencies and have been based on evidence. Some of these regulatory measures remain necessary and are still enforced to address the specific challenges inherent to the telecoms sector.

Historically, the telecoms sector in Brazil consisted of a state-owned monopoly (Telebras). Between 1995 and 1998 the Brazilian government undertook a number of regulatory actions to introduce competition to the telecoms sector in order to improve coverage and quality of service. This started from the realisation that substantial changes were required to achieve desired telecommunication service coverage goals.[29] The government took steps to restructure and privatise Telebras (which happened in 1998), [30] and codified the transition to a competitive landscape (including for mobile services) into the Minimum Telecommunications Law of 1996.[31] Ten regional mobile cellular concessions were auctioned in 1997 to establish competition between two providers in each region.[32]

This process culminated in the enactment of the 1997 the General Telecoms Law (LGT), defining telecoms as "the transmission, emission or reception, by wire, radio waves, fibreoptics or any other process of symbols, characters, signs, writings, images, sounds or information of any kind". The LGT sets out the duties of the government (including guaranteeing access to telecoms, adopting measures that promote competition, and stimulating technological development), the right of users and creating an independent regulator (the National Telecoms Agency, Anatel).[33]

Ex-ante regulatory intervention liberalised the telecoms sector by addressing specific barriers to entry, regulating actors with market power (caused by persistent structural features of the telecoms sector) and dealing with defined policy objectives and consumer-protection issues. Continued areas of focus for telecoms regulation reflect this history of regulation (see Figure 2.3).

Anatel's regulatory practice is steeped in the history and dynamics of the telecoms sector. These fundamentally differ from those at play in other sectors, in particular the cloud sector. In the current absence of legislation specifying regulatory needs in the digital sector, Anatel appears to be attempting to

29 ITU (2001), *Effective regulation case study: Brazil*.

30 Anatel (1995), *Constitutional amendment No. 8*.

31 Presidency of the Republic (1996), *L9295*.

32 ITU (2001), *Effective regulation case study: Brazil*.

33 Presidency of the Republic (1997), *L9472* and *D2338*.

regulate aspects of the sector. As a starting point, these attempts have focused on the interface between networks and digital services, as per Anatel's 2025–2026 agenda (see Figure 2.2).[34]

Figure 2.3: Overview of key recent Brazilian telecoms regulation [Source: Analysys Mason, 2025]

Issue	Regulation	Details
Persistent bottlenecks in infrastructure access and market concentration	The General Plan of Competition Goals (2012, revised in 2025)[35]	• Sector-specific regulatory remedies should only be applied when ordinary antitrust tools applied by CADE, proved insufficient • Anatel is responsible for identifying operators with significant market power (SMP) in relevant telecoms markets and for setting asymmetric remedies such as wholesale access, infrastructure sharing, and transparency obligations
Rising complaints highlighted difficulty cancelling accounts, billing disputes and poor customer service[36]	Resolution 632 (2014, later replaced by Resolution 765 in 2023)[37]	• Regulated the rights of telecoms users across all telecoms services • Guaranteed clear information, billing transparency, minimum service standards, and streamlined complaint handling
Disputes between operators over interconnection between telecoms networks	Resolution 693 (2018)[38]	• Mandated public interconnection offers and set out the contractual basis for interconnection • Defined the technical conditions for interconnection and provisioned for suspension and interruption of interconnection • Sets requirements for holders of SMP in the fixed or mobile telecoms network traffic termination markets
Continued requirement for universal fixed-line telephone service, despite shifting consumer demand	Law 13,879 (2019)[39]	• Reformed the General Telecommunications Law allowing operators with fixed-line concessions to transition to more flexible private authorisation regimes in return for broadband investment and coverage obligations

These attempts have already raised concerns and faced some opposition.[40] In Section 3 we explore the differences between cloud and telecoms and in Section 4.1, we discuss why, as a result of these differences, expanding specific aspects of the regulation of telecoms to the cloud sector is unlikely to be justified, proportionate or effective in protecting consumers.

34 Anatel (2025), *2025-2026 Regulatory Agenda*.

35 Anatel (2025), *Resolution No. 783*.

36 Globo (2014), *Anatel publica regulamento que estabelece cancelamento automático de serviços de telecom - Jornal O Globo* and Bloomberg (2013), *Telephone-Bill Crackdown Looms for Carriers: Corporate Brazil*.

37 Anatel (2014), *Resolution No. 632*.

38 Anatel (2018), *Resolution No. 693*.

39 Presidency of the Republic (2019), *L13879*.

40 For instance, Abranet (2025), *The end of Rule 4 is a serious setback for the Internet sector* and NIC.br (2025) *The silent coup against the Internet in Brazil*.

3 Differences between cloud and telecoms and implications for regulation

The cloud and telecoms sectors are intrinsically different, with supply-side characteristics influenced by historical market evolution and demand-side characteristics driven by the difference in customers.

In this section we explore these differences, comparing the nascent, dynamic and global nature of cloud services with the mature, stable, location-specific telecoms sector. We discuss how telecoms regulation has evolved to mitigate specific market failures, and that these market failures are not present in the cloud sector. This underpins the explanation in Section 4 that as a result of these differences, expanding specific aspects of the regulation of telecoms to the cloud sector is unlikely to be justified, proportionate or effective in protecting consumers.

3.1 Cloud customers are businesses and administration, whereas the majority of telecoms revenue comes from individual consumers

Cloud services are targeted at businesses, which are progressively migrating IT workloads from their own infrastructure to cloud platforms, resulting in the growth of the cloud sector, in sharp contrast with the maturity and stability of the telecoms sector which caters to both consumers and businesses.

Cloud services offered by cloud providers are targeted at businesses, which are progressively migrating IT workloads from their own infrastructure to cloud platforms to improve efficiency, flexibility and resilience, resulting in the growth of the cloud sector.

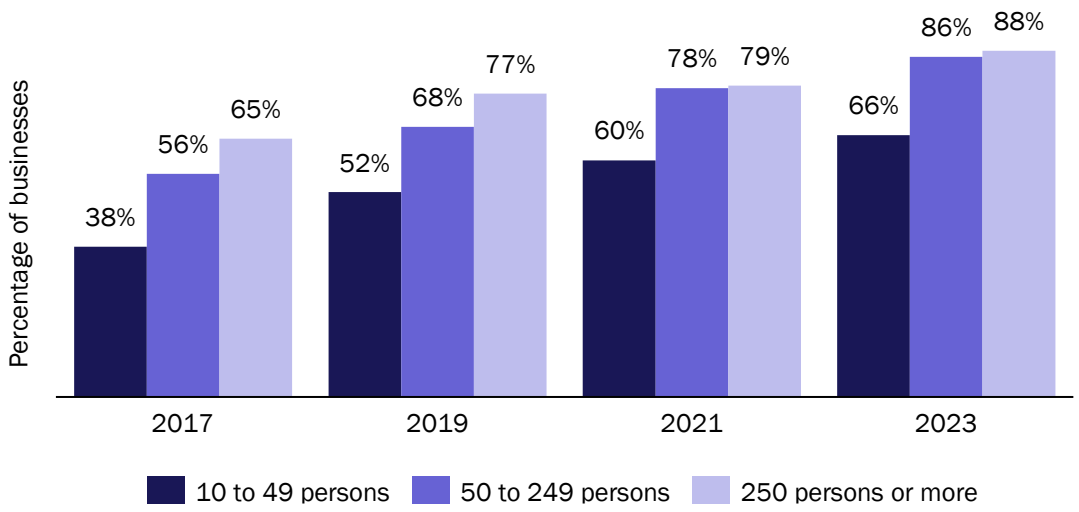
Customers of cloud services are primarily businesses who have historically invested in and operated their own IT infrastructure and capabilities (the traditional 'on-premises' model). These customers have the business IT knowledge to support the alternative forms of supply provided by the cloud sector.

Another important category of cloud users consists of so-called 'cloud native' businesses. These include software-as-a-service (SaaS) providers who focus on developing online services that they deploy, scale and distribute through cloud and CDN services. The 'elasticity' of cloud services has been an important enabler for these new businesses: instead of investing upfront in expensive IT infrastructure, they have been able to focus their capital on developing their core services and tailor their use of cloud resources to their pace of growth, significantly derisking their start-up and scale-up phases.

On the whole, customers buying services directly from cloud service providers are knowledge and well-resourced businesses, increasingly choosing to buy services rather than build their own IT infrastructure. Adoption of cloud services by Brazilian businesses has grown at a CAGR of 9.2% in the period 2017–2023, and is currently skewed towards larger enterprises (see Figure 3.1).[41]

41 OECD (2025), *Share of businesses purchasing cloud services*.

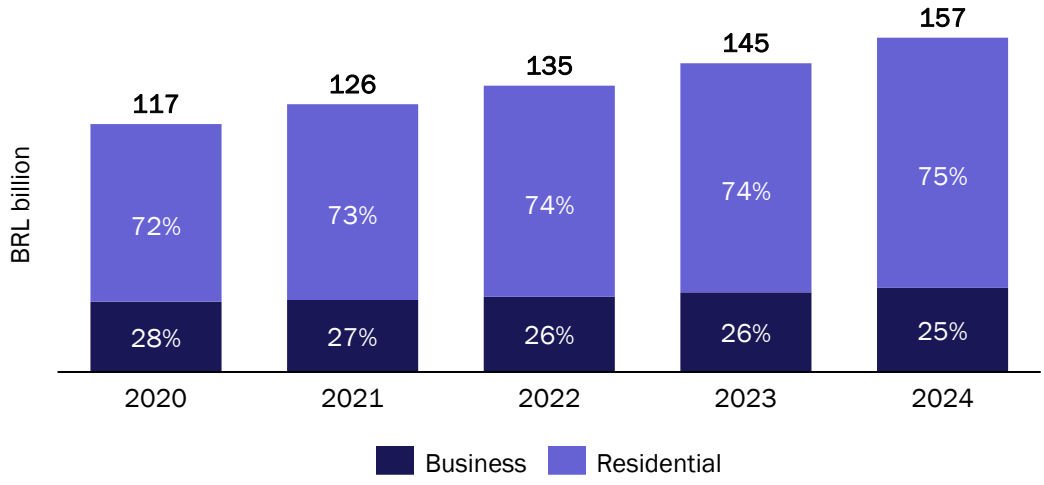
Figure 3.1: Businesses purchasing cloud computing services in Brazil [Source: OECD, 2025]



Cloud trends contrast with telecoms services that cater to both consumers and businesses, with most end users on the consumer side. Most telecoms users do not have the knowledge nor the means to self-supply their own communications services. A limited number of businesses with high connectivity requirements may have the scale and expertise to deploy private networks, but typically they rely on managed services provided by internet service providers (ISPs) or enterprises connectivity providers, particularly given the high costs and complexity of network deployment, and the importance of interconnection.

Brazilian law guarantees freedom of enterprise, the protection of citizens' and consumers' rights, and provides that the Federal Government has a duty to ensure the entire population has access to telecoms services. These provisions are justified and proportionate in the context of a telecoms sector where consumers and businesses have very limited ability to self-supply such services, and where the majority of activity (measured by number of customers and by retail revenue) happens in the business-to-consumer part of the sector (see Figure 3.2).

Figure 3.2: Brazilian telecoms operator retail revenues by source [Source: Analysys Mason Research and Insights, 2025]



3.2 Cloud and telecoms differ in market access, network effects, vertical integration, economies of scale, which have shaped telecoms regulation over three decades

Supply in the telecoms sector remains relatively concentrated, provided by a few vertically integrated operators, as a result of a historical state-owned monopoly. In contrast, cloud services started as inherently competitive services and Brazilian businesses have access to a wide range of services from an array of cloud providers. These differences are structural and far-reaching, affecting market entry, vertical integration, economies of scale and scope.

Telecoms and cloud service providers differ in their ability to enter the market as a result of contrasting histories and varied investment lifecycles, barriers to entry are further complicated by differences in interoperability. Both sectors benefit from economies of scale, although to different degrees, and cloud services do not benefit from network effects in the same way telecoms services do.

Market entry and licensing of telecoms services is tightly regulated, reflecting both history and sector dynamics

The contrasting histories of the telecoms and cloud sectors reflect fundamentally different contestability[42] dynamics. In telecoms, market entry is affected by significant barriers including licensing requirements, access to scarce resources such as spectrum, and substantial up-front capital investments. The cloud sector exhibits comparatively lower barriers to entry, it does not have the same licensing requirements or reliance on resources, enabling a more fluid and competitive environment.

Most telecoms markets have evolved from monopolistic state-owned service providers to competitive multi-player markets, facilitated by targeted regulatory intervention designed to ensure efficient market entry and establish a level playing field. As outlined in Section 2.3, this is clearly visible in Brazil where Telebras operated as the sole provider until government-led reforms privatised and restructured the incumbent and issued competing licenses. Former state-owned, monopolistic incumbents like Telebras retain significant and durable market power due to their legacy state-funded infrastructure and resources, established customer and supplier relationships and historical government patronage. Privatisation also introduced commercial incentives, such as profit maximisation and market share expansion, compounding the challenges faced by new entrants.

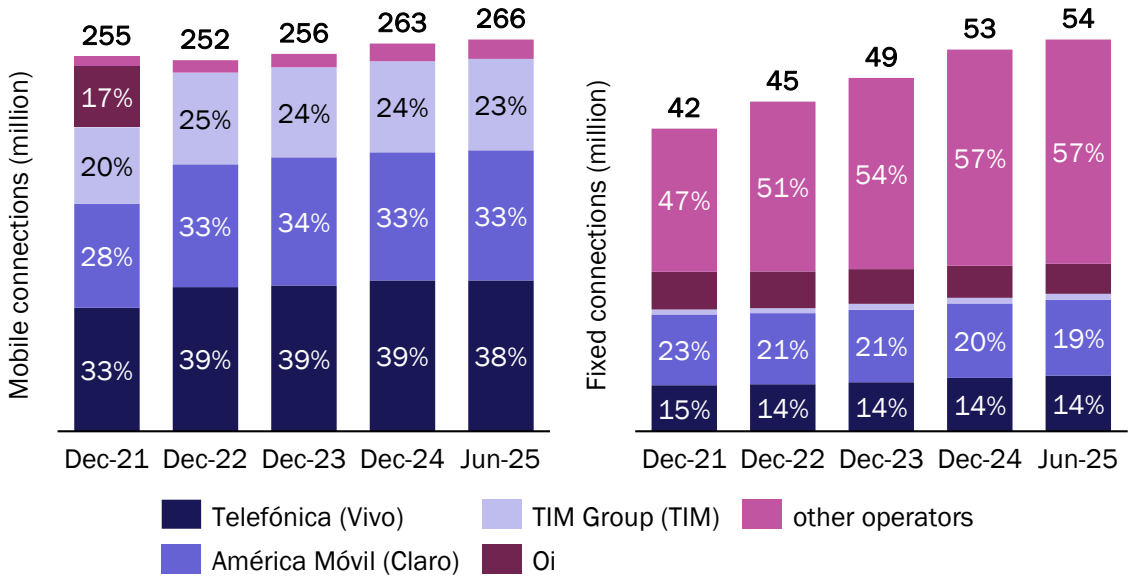
Recognising these challenges, Anatel implemented a progressive transition from monopoly to competitive market – combining active regulation of interconnection between providers and access to the infrastructure of operators with SMP, to gradually improve competitive conditions. The enduring influence of a historical state-owned incumbent operator is still evidenced today with the retention of ex-ante regulation in four designated 'relevant markets'[43] where competitive dynamics remain insufficient to achieve the desired outcomes, in terms of economic efficiency, investment incentives and consumer protection.

42 Contestability is defined as the ability and ease with which firms can enter or exit a market.

43 Passive infrastructure, fixed interconnection, mobile interconnection and national roaming. This was reduced from seven markets with the deregulation of leased lines, copper networks and high-capacity transport in 2025. Anatel (2025), *Significant Market Power (SMP)* .

The outcome of the last three decades of market opening and competition has been a market with multiple operators, offering services at scale across fixed and mobile telecoms, as shown in Figure 3.3Figure 3.3 below.

Figure 3.3: Evolution of market shares of mobile and fixed providers in Brazil [Source: Anatel, 2025]



In contrast, cloud services started as inherent competitors to businesses self-supplying IT services, and are now offered by a range of service providers. Since the launch of AWS in 2006, cloud providers have worked to expand their customer base by convincing businesses to move IT workloads from their own on-premises infrastructure (i.e. self-supplied) to the cloud. This has resulted in a rapidly growing sector in which both new and existing cloud providers can compete for previously unserved demand, rather than displacing entrenched players; indeed, the closest thing to an 'incumbent' in the cloud sector is self-supply.

New telecoms entrants also face structural barriers to entry, including the need for substantial up-front infrastructure investment, licensing requirements and access to scarce public resources. These barriers stem from telecoms operators' role as providers of essential public services – subject to licensing, infrastructure obligations and universal service goals. Scarce public resources include telephone numbers, and, for mobile network operators, radio spectrum. Policy has evolved to allow new entrants to compete fairly for these resources, and to ensure their efficient usage to the benefit of the public.

By comparison, cloud services can be launched with relatively modest initial investment and without relying on scarce, nationally managed resources. While both sectors are capital intensive, cloud providers benefit from scalable investment models, often starting with leasing space in co-location data centres and leveraging standardised, open-source platforms and tools.

The mechanisms designed to facilitate telecoms market entry address incumbent advantages, infrastructure bottlenecks, geographically constrained service provision, and scarce public assets;

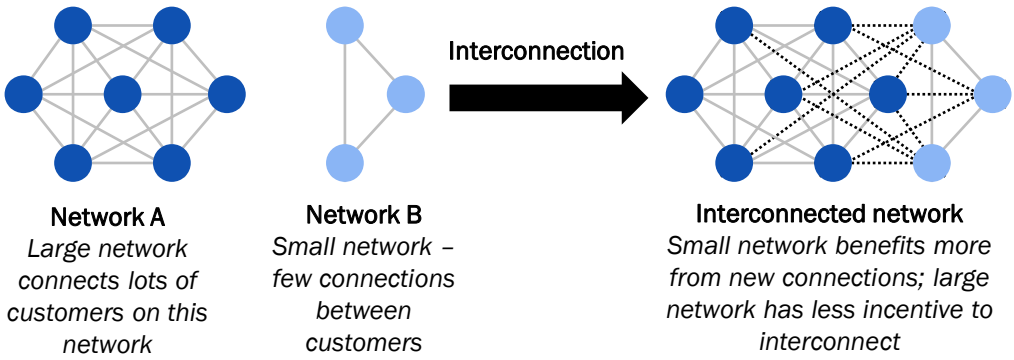
whereas cloud markets are dynamic and decentralised, where the closest incumbency effect is firms' prior self-supply rather than a state-funded monopoly. Extending telecoms-style regulation to the cloud sector would misalign policy tools with market realities.

Telecoms services traditionally exhibited direct network effects, and relied on interoperability and interconnection for scale and competition

Historically, direct network effects in messaging and telephony were important factors in the telecoms sector that required regulatory intervention for interconnection, whereas in the cloud sector network effects are primarily indirect.

Direct network effects associated with telephony, where the ability to reach another user was central to the service, benefited large established network operators at the expense of new entrants (see Figure 3.4). In mature sectors and markets, where few new users start using the service over time compared to the number of existing users, network effects play out in full. Where incumbent providers can exclude smaller players from accessing their users, network effects act as a barrier to effective competition. Regulation of the telecoms industry dealt with this challenge through imposing interconnection obligations.

Figure 3.4: Illustration of the role of network effects in interconnection [Source: Analysys Mason, 2025]



The regulatory obligation to interconnect is designed to address the imbalance between new entrants and incumbents in the telecoms sector derived from network effects and economies of scope, scale and density. Without regulation, there is a significant risk established operators may abuse their network effects by refusing to interconnect with a new entrant, or by imposing prohibitive price barriers. In traditional telephony, network effects are evident in call-termination rates, where receiving networks charge fees for terminating calls from other networks. Interconnection between telephone networks has been regulated by Anatel in the aforementioned relevant markets for many years to address the specific challenges related to the importance of direct network effects in telephony.

While the public-cloud business model benefits from aggregating demand from many customers to enable synergies and economies of scale, cloud services are not reliant on direct network effects. Each customer's use of a cloud service is independent, relying on the public internet or private connections for any necessary linkages. This independence means the value of the cloud service for one user is not

directly affected by the number of other users on the same platform. This structural characteristic allows cloud providers to start small and focus on optimising their services for individual performance and reliability rather than network scale.

Because telecoms operators are licensed and tend to operate primarily at the scale of a country, interoperability and standards are essential to achieving economies of scale in equipment costs, and to allow for roaming and international calls. Telecoms standardisation is achieved through long and complex international processes at organisations such as the International Telecommunications Union (ITU) and the 3rd Generation Partnership Project (3GPP). The importance of standardisation, combined with the high degree of technological maturity in the telecoms sector, makes incremental innovation long and complex.

In the cloud sector, standards also play an important role in the fundamental building blocks of compute, storage and networking, but less so in the context of cloud services themselves. Cloud services benefit from global economies of scale within individual platforms, without the need for these international standardisation processes, leading to faster innovation.

'IP interconnection' between cloud providers and ISPs, or between CDNs and ISPs, is fundamentally different from traditional telephony interconnection. The internet is a global 'network of networks' and IP interconnection between networks delivers traffic from, and to, any point on the internet. IP interconnection is essential to end users' ability to access cloud services: cloud providers and customers are entirely dependent on the ability to exchange traffic with one another for the service to work. As such, all providers are incentivised to interconnect using commercially negotiated interconnection agreements on the basis of mutual value. These agreements enable better connectivity through the public internet, through a set of diverse routes that limit congestion and offer low-latency options.

This type of interconnection is different from interconnection in the context of traditional telephony, which Anatel has historically focused on. Interconnection between telephone networks has been regulated in relevant markets for many years to address the specific challenges related to the importance of direct network effects in telephony. This concern is not relevant to cloud services, where direct network effects are not prevalent, and services are provided 'over the top'. Market failures related to direct network effects are therefore not a significant risk, because cloud customers do not benefit directly from a cloud provider having more customers, beyond economies of scale. This prevents the emergence of the market failures that Anatel's regulation of telecoms interconnection addresses.

The telecoms industry was historically highly vertically integrated, with regulation creating wholesale products and services which, in the cloud sector, have existed since the beginning

The telecoms sector is shaped by vertical integration and infrastructure barriers, leading to regulatory measures like wholesale access rules to encourage competition. In contrast, the cloud sector's open, interoperable structure allows for competition and innovation without the need for telecoms-style regulation.

Barriers to entry in the infrastructure level can be circumvented if entry is possible at the service level. This entails the use of an infrastructure operator's network on a wholesale basis, to sell services to the

end user at the retail level. However, the telecoms industry has historically been, and to a significant extent remains, vertically integrated, with owners of passive and active infrastructure frequently also supplying retail services. This has reduced incentives for incumbents to provide access to new entrants, thereby constraining retail competition.

To counteract this in Brazil, Anatel introduced wholesale access regulation, and applies ex-ante regulation to operators with SMP in relevant markets, enabling the entry of service providers with limited network assets to offer retail services. However, the physical constraints of telecoms networks and the commoditised nature of their products make it difficult for customers to engage multiple providers simultaneously. This results in an effective 'access monopoly' for a given customer at a given point in time. While there has been a recent trend towards the separation, or 'delayering', of physical infrastructure (i.e. mobile towers, ducts and fibre optic cables) from networks and services,[44] this is still at an early stage, its commercial viability remains uncertain in the Brazilian context,[45] and many telecoms operators remain mostly vertically integrated.

In contrast, the cloud sector exhibits a fundamentally different structure; it is inherently more delayered and interoperable than telecoms. Cloud services are 'horizontal' in nature, offering common functionalities to cloud customers in any industry and sector, typically through application programming interfaces (APIs). Software that runs on cloud infrastructure includes cloud customers' own software, and third-party software from a wide range of vendors, which can all use the same APIs. Some vertical integration does exist, in that the major cloud providers that operate in Brazil supply SaaS solutions built on their own platforms and using their own infrastructure. However, independent software vendors (ISVs) and businesses can also leverage the same cloud infrastructure to deliver more diverse services. Major cloud providers also operate marketplaces, where users can discover, purchase and deploy software from a large number of ISVs, with instant integration and unified billing. This modular approach is evolving all the time, AWS in particular has announced that its marketplace would allow ISVs to list any SaaS products, even if they are hosted outside AWS.[46]

Furthermore, businesses have the option to access cloud services across the value chain at every stage, enabling them to self-supply certain (or all) elements of the IT stack, or to buy from (multiple) suppliers as they see fit, leveraging the building blocks from cloud providers (see Figure 3.5 below). This avoids the requirement to take all services from a single vertically integrated provider that is prevalent in the telecoms industry. Only in niche scenarios do companies have the scale, expertise and incentive to deploy private telecoms networks.

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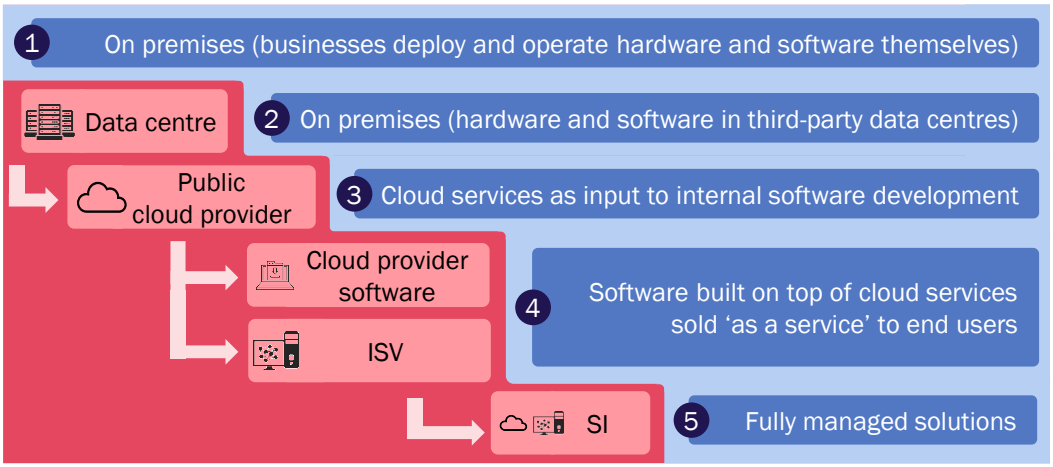
44 For instance *TIM sells 51% equity stake in FiberCo. to IHS* (Leaders League, 2021) and *Telxius doubles its size in Brazil and consolidates its position as one of the main neutral infrastructure operators in the country* (Telixus, 2019)

45 For example, TIM has bought back its stake in I-systems, formerly FiberCo: *TIM: The neutral network model "lacked economics," says CEO* (BNamericas, 2026)

46 AWS, 2025, *AWS Marketplace announces upcoming expansion to SaaS product catalog.* At the time of writing, Brazilian customers can purchase services from international ISVs on the platform.

Figure 3.5: A simplified view of the components of the cloud value chain [Source: Analysys Mason, 2025]



As a result of these key differences in levels of vertical integration, self-supply and associated incentives between telecoms and cloud sectors, the mechanisms imposed by Anatel in the telecoms sector do not appear appropriate to address any concerns that may arise in the cloud sector. Whereas telecoms required wholesale access regulation to foster service-based competition as an alternative route to a 'ladder of investment', Brazil's cloud sector is already achieving these outcomes through market forces and technological openness. Any regulatory response should therefore reflect the cloud sector's delayered structure and focus on specific market failures rather than transplanting telecoms-specific mechanisms.

Telecoms infrastructure is primarily deployed where the demand is located, with economies of scale closely linked to the density of demand in a specific location, unlike cloud's global scale

Telecoms networks demand high upfront investment and have significant barriers to entry due to their location-dependent infrastructure and slow payback periods. Cloud infrastructure, by contrast, is less geographically restricted, offers faster returns and faces fewer entry barriers.

Terrestrial telecoms networks must be deployed where the customers are and, in turn, customers can only access networks that are deployed to their locations. Building fixed or mobile networks for nationwide services requires large-scale investments in infrastructure, with long payback periods. The complexity and high up-front capital cost of establishing a national telecoms network is a persistent barrier to entry in the telecoms market.

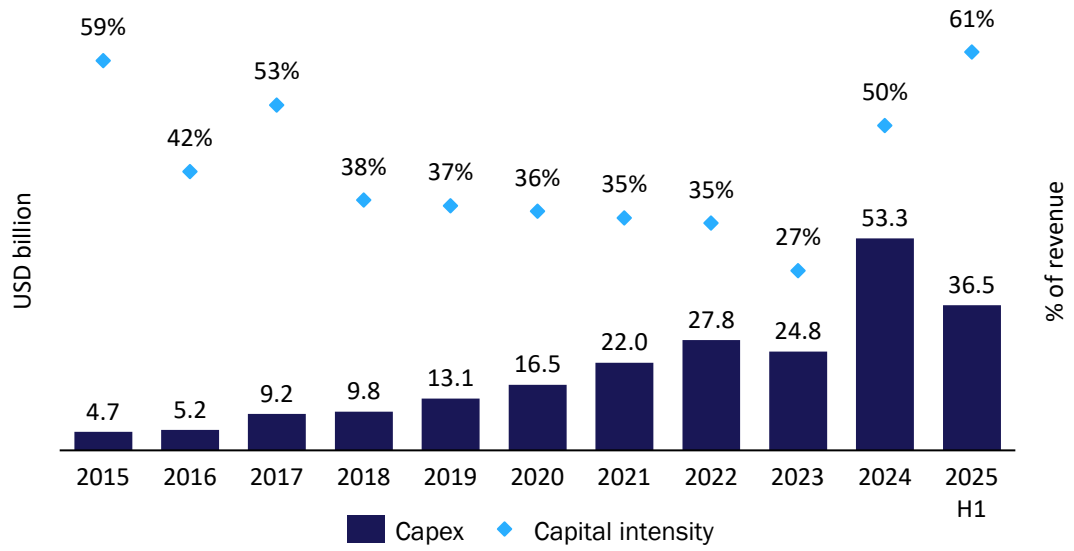
Conversely, cloud infrastructure is less geographically constrained; while location can be important for performance and data sovereignty, these requirements do not require that data centres are deployed in specific locations within a country or region. These factors significantly reduce the structural barriers to entry in the cloud sector and enhance its contestability relative to telecoms.

Entering a fast-growing sector like the cloud sector is also very different to entering a slow-growing, mature market such as the telecoms sector – where a new entrant has to acquire customers that are already served by incumbents. As such, the mechanisms imposed by telecoms regulation to account for

the specific market characteristics of the sector, particularly the impact of a historical state-owned incumbent, do not appear necessary, nor appropriate, when in the context of the cloud sector.

The cloud sector has short payback periods with servers depreciated over five years, enabling quick adoption of new developments compared with the long payback periods of telecoms sector where active equipment depreciates over 8–10 years and passive infrastructure over much longer. Cloud providers must invest to increase the capacity of their services to meet growing consumer demand. As a result, capex spend by public cloud providers continues to increase rapidly (e.g. for AWS in Figure 3.6).

Figure 3.6: Evolution of AWS's capex intensity [Source: AWS annual reports, Analysys Mason, 2025][47]



3.3 Despite their differences, cloud and telecoms act as complementary enablers for internet services access

Cloud providers operate global private networks by linking data centres across regions and availability zones, utilising diverse connectivity solutions, including submarine cables. They do not provide last-mile connectivity, relying instead on end users connecting to the internet (or directly through cloud 'on-ramps') provided by ISPs.[48] CDNs complement cloud services by optimising content delivery. IP interconnection between networks is typically managed informally without regulation, promoting high-quality, low-latency service. Cloud and telecoms sectors are therefore complements and not substitutes, with demand in one sector positively correlated with demand in the other sector.

47 In this figure, we use net addition to property and equipment as a conservative proxy for capex. Amazon reported total capex of USD48.1 billion in 2023 and USD77.7 billion in 2024, driven primarily by AWS, which suggests actual capex intensity for AWS is higher than illustrated in the chart. AWS is presented as an example for cloud operators as Google and Microsoft do not provide financial breakdowns for cloud operations.

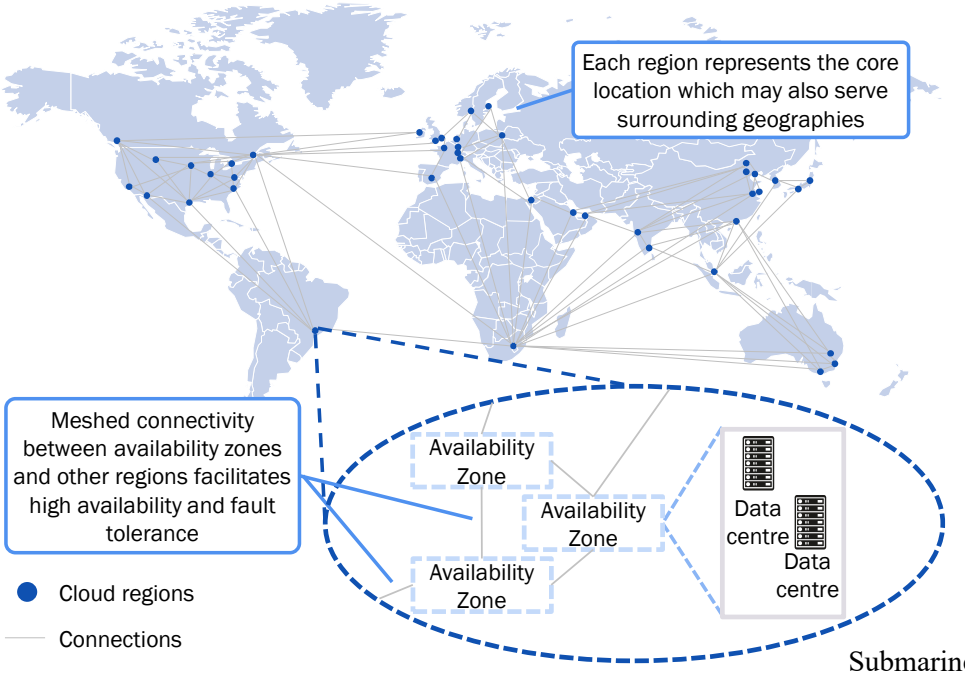
48 On-ramps are dedicated connectivity products sold by operators to cloud users to avoid the public internet.

Cloud providers operate global private networks linking their infrastructure using inputs from many different providers, similar to other large multinational businesses

To offer their services, cloud providers deploy data centres worldwide in 'regions' and 'availability zones'. Regions are spread globally to best serve customers, comply with data sovereignty requirements, improve fault tolerance and provide disaster recovery capabilities. Each region is made up of multiple isolated data centres or availability zones (themselves consisting of one or more isolated data centres), each with their own independent power, cooling and networking infrastructure to further increase fault tolerance in the case of localised issues.

Cloud data centres are connected through network links combining international and domestic links, as illustrated in Figure 3.7. Connectivity between data centres in a given region is provided by a combination of dark fibre (on which the cloud provider operates its own networking equipment) and enterprise connectivity solutions from enterprise-focused telecoms operators, in the same way as other large multinational businesses.

Figure 3.7: Illustrative global view of regions and availability zones [Source: Analysys Mason, 2025; this does not represent any specific cloud provider's deployment]



Submarine cables are essential to operating global networks for any organisation running its own wide area network. In the majority of cases, submarine cables are commissioned and operated through a consortium model, with multiple stakeholders funding, owning and operating part of the cable. In some cases, cables can be private, and in recent years some private cables have been built by large content and cloud providers for their own use.[49]

Whilst cloud providers buy and build their own private networks, they do not actively sell capacity on these networks. Likewise, cloud and CDN providers do not offer 'last-mile' connectivity (i.e. all the way to the end user) of any kind in Brazil at the moment.

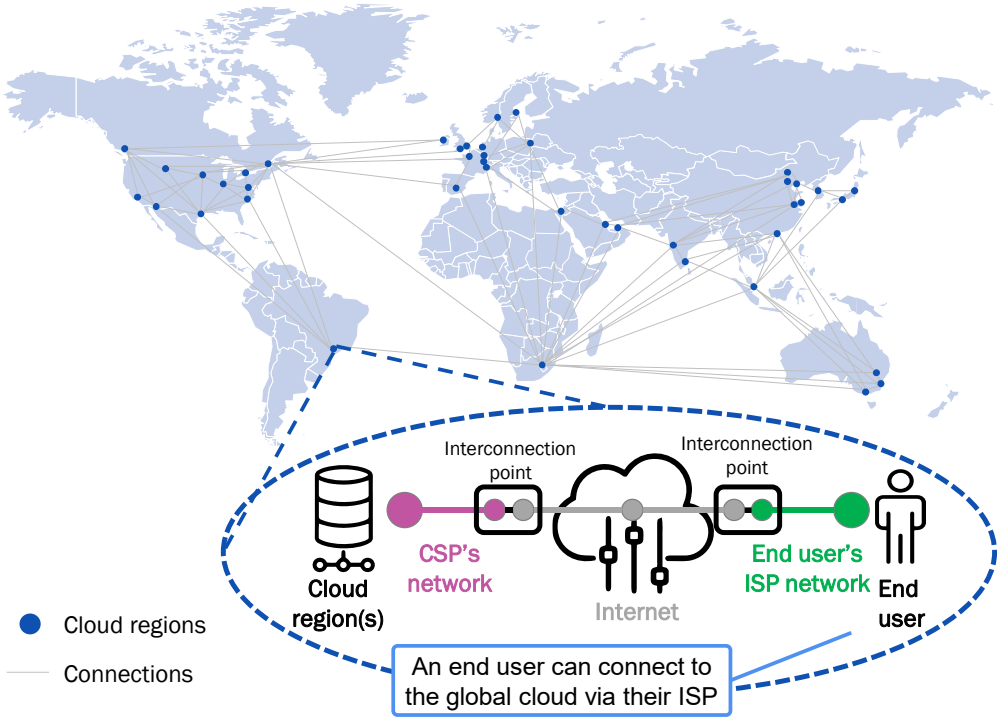
49 Google has for example invested or fully funded Firmina, Junior, Monet and Tannat, all of whom land in Brazil.

The globally connected nature of cloud services allows cloud customers to benefit from state-of-the-art infrastructure at scale, and reach customers and employees anywhere in the world

Cloud services are by nature 'online' services: they can only be used by customers who are able to reach the cloud platforms through some sort of electronic communication network and service. Businesses and public sector users use cloud services to host and deploy services for their own employees and customers.

Most cloud customers rely on an ISP to connect to their cloud services, either through the public internet or through an on-ramp service provided by their ISP. Finally, cloud services and CDNs are chosen and paid for by cloud users, who internalise the required quality of service they need and other considerations in their choice of approach.

Figure 3.8: Illustrative view of how end users access the cloud [Source: Analysys Mason, 2025]



CDNs enable companies and administrations to reach end users anywhere, with a good quality of experience, through a choice of competing providers

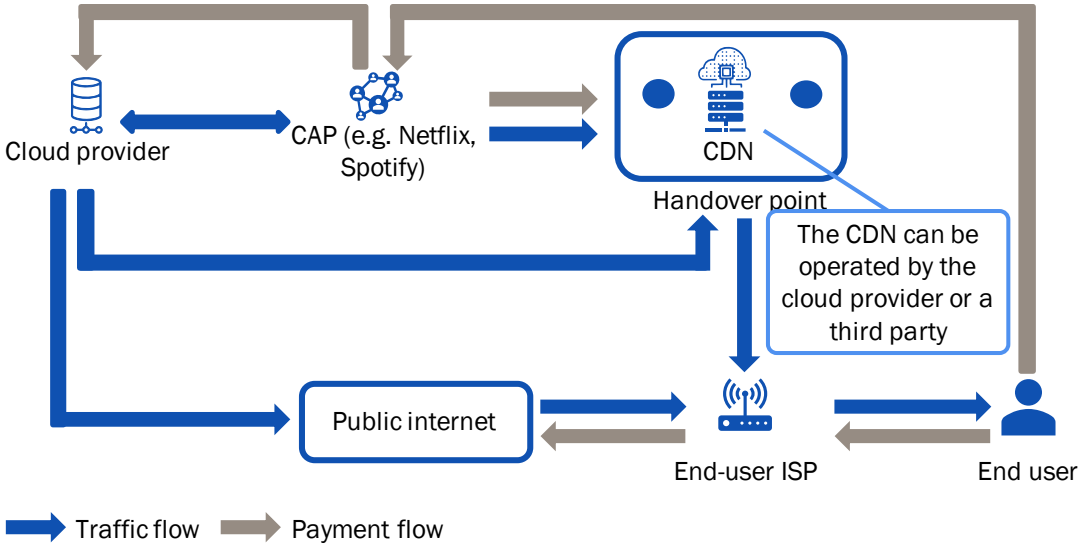
Some cloud customers who provide services to end users that are hosted on the cloud, including internet content and application providers (CAPs), use CDNs to optimise the delivery of their content across the internet. CDNs are complementary to cloud services but distinct, and the use of CDNs predates the broad availability of public-cloud services.

CDNs use servers that store (or 'cache') content close to end users, sometimes within ISPs' premises ('on-net CDNs'). Some large content providers operate their own CDNs (e.g. Netflix Open Connect

and Meta Network Appliances).[50] Most CDN users buy CDN services from third-party providers, including Akamai, Cloudflare, Fastly, and public-cloud providers including AWS, Microsoft and Google Cloud.[51]

The mechanisms through which content flows on the internet have been described at length in previous papers, including from Analysys Mason[52] and in a BEREC paper.[53] Put simply, upon the request of a specific piece of content by an end user, CDNs then serve the content from the cache that best optimises (1) the quality of the user's experience, and (2) the cost of delivering the content (see Figure 3.9). Using a CDN is the CAP's decision, and the cloud provider, CDN and ISPs can exchange traffic through peering relationships without having to manage commercial relationships and payment flows.

Figure 3.9: Traffic and payment flows in cloud networks with CDNs and CAPs [Analysys Mason, 2025]



Because of the benefits they bring to content providers, telecoms operators and end users, CDNs are now an essential component of the architecture of the internet. They are used extensively by broadcasters, streaming providers, online games companies and many other CAPs. As a result, a significant share of internet traffic delivered to end users now goes through CDNs, as evidenced by recent research from the French regulator Arcep[54] and survey findings published by BEREC.

50 See Netflix, *Open Connect Overview*; Spotify (2020), *How Spotify Aligned CDN Services for a Lightning Fast Streaming Experience* and Google, *Spotify case study*; AWS, *ProSiebenSat.1 Media SE Delivers Interactive TV Experiences Using AWS Serverless Solutions*.

51 Akamai started offering CDN services in 1999, Akamai, *Company history (accessed October 2025)* and Meta, *Meta Network Appliances* and Netflix, *Open Connect* (accessed October 2025).

52 Analysys Mason (2024), *The impact of network usage fees on the Brazil cloud market*, and Analysys Mason (2020), *IP interconnection on the internet: a white paper.*

53 BEREC (2024), *BEREC Report on the IP Interconnection ecosystem.*

54 Arcep (2024), *The State of the Internet in France*, Breakdown by origin of traffic to customers of the main ISPs in France (end of 2023).

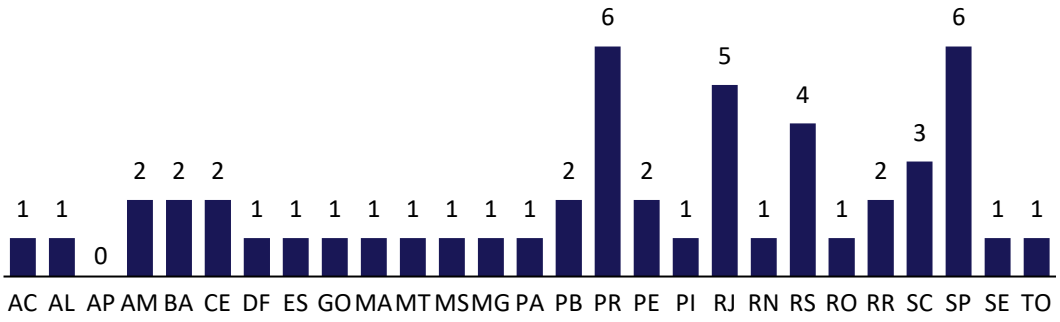
Importantly, third-party CDNs that act on behalf of CAPs are intermediaries and do not control or modify the content that these CAPs deliver to end users through CDNs. The relationship is first and foremost between these CAPs and their own customers, with CDNs and ISPs simply facilitating the flow of content from one to the other, with the highest quality and lowest cost possible.

Cloud and telecoms providers invest in their own networks and exchange traffic in many locations, to optimise the quality of service experienced by their common customers

Cloud and CDN services have evolved so that cloud customers benefit from state-of-the-art compute infrastructure, hosted in large data centres around the world, without having to invest in any networking infrastructure of their own. In addition, any business or administration that hosts applications on the cloud can reach any user connected to the internet immediately from signing up.

The internet evolved under a principle of separation between networks and services. Networks interconnect but operate autonomously, with incentives to deploy infrastructure and exchange traffic in multiple locations. This has been extremely successful, leading to hundreds of points of interconnection between ISPs and cloud providers. For example, AWS reports over 410 points of presence (PoPs) in over 90 cities across 48 countries.[55] Brazil is also home to 51 peering locations (or 'exchanges' as reported by PeeringDB) across almost all federated states and districts, as shown in Figure 3.10, which demonstrates the wide distribution of interconnection points used by cloud providers and IT networks more generally.

Figure 3.10: Number of peering points per Brazilian state [Source: PeeringDB, Analysys Mason, 2025]



Most interconnection arrangements are informal agreements.[56] Others are framed by commercially negotiated contracts, which are subject to competition law but not ex-ante regulation. These agreements enable better 'best-effort' connectivity through the public internet, through a set of diverse routes that limit congestion and offer low-latency options. They also enable telecoms operators and cloud providers to partner to offer 'cloud on-ramps' to cloud users, as discussed earlier. In practice, every party on the

55 See AWS, *Points of presence* (Accessed October 2025).

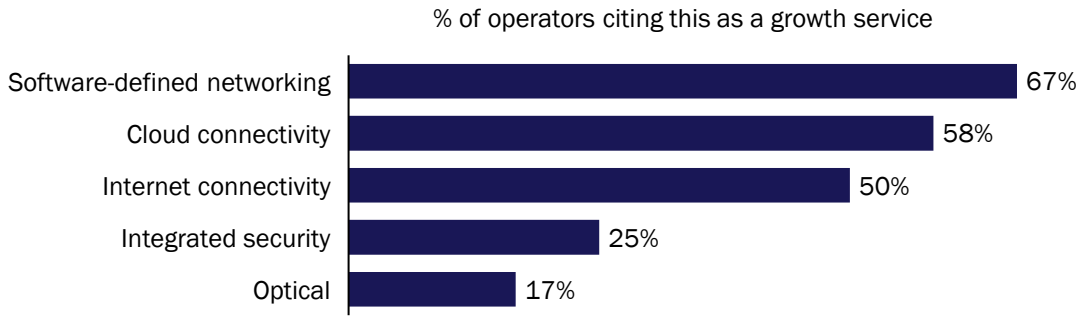
56 Packet Clearing House conducts a broad survey of peering agreements every five years. The latest survey, from 2021, surveyed over 15 million agreements, covering over 17 000 carrier networks around the world. It found that 99.998% of these agreements were informal 'handshake' agreements. See Packet Clearing House (2021), *Survey of Internet Carrier Interconnection Agreements*.

internet carries traffic over its own network to a point of interconnection with another network, which is freely chosen by both parties.

IP interconnection on the internet has worked, and continues to work very well in the absence of regulation, unlike in legacy telephony markets.[57] We are not aware of any IP interconnection disputes involving cloud providers, and where IP interconnection disputes have occurred, they have tended to involve ISPs foreclosing access to end users.[58] This suggests that there is no unique characteristic of cloud services that is likely to require regulating IP interconnection on the internet.

The growing importance of cloud for enterprise users of connectivity is illustrated in a recent survey of ISPs, shown in Figure 3.11, which highlights the growing demand for software-defined services and cloud connectivity.

Figure 3.11: Fixed connectivity services cited by operators as delivering revenue growth[59] [Source: Analysys Mason, 2025]



57 See for example BEREC (2024), *BEREC Report on the IP Interconnection ecosystem*: "Generally, the IP-IC ecosystem is still driven by competitive forces which are functioning without regulatory intervention." (p.37). See also Packet Clearing House (2021), *PCH Peering Survey 2021*: Of the 15.1 million internet interconnection agreements analysed, 0.002% are formalised in written bilateral agreements while the remaining 99.998% are "agreements in which the parties agreed to informal or commonly understood terms without creating an individual written agreement."

58 See Analysys Mason (2022), *IP interconnection on the Internet: a European perspective for 2022*; WIK (2022), *Competitive conditions on transit and peering markets*.

59 Based on responses from an unpublished Analysys Mason survey with 12 ISPs; while software-defined networking (SDN) is a networking technology (not a cloud access solution), in practice, operators are using SDN to meet customer demands relating to increased cloud and SaaS usage, hybrid and multi-cloud networking.

The quality of the connectivity provided by the ISP is important to the experience of cloud users, both in terms of latency and speed, and in terms of resilience and availability. Cloud providers and telecoms operators work together to achieve a high quality of service for their customers.[60] The importance of connectivity as an enabler of cloud services for end users is evident in the digital transformation of businesses: as they adopt cloud services, they increase their demand for high-speed, reliable connections, including new services such as on-ramps and multi-cloud networking. Conversely, as ISPs enhance their network infrastructure, it becomes easier and more attractive for businesses to adopt cloud services. This points to a degree of complementarity between cloud and telecoms services, although this remains asymmetric: cloud providers and customers both need access to connectivity as a critical enabler of cloud services, but telecoms operators do not rely on cloud services to offer connectivity.

In Section 4.2, we explore the potential impact of taking an expansive approach to regulating IP interconnection on the basis of the regulation of telephony interconnection.

60 For example the partnership between Telefónica and Oracle, offering B2B customers an on-ramp to Oracle Cloud infrastructure; Deutsche Telekom and Microsoft cloud are partnering, targeting medium to large enterprises; Telia connecting to AWS, Microsoft and Google in the USA, Europe and Asia.

4 Potential impact of expanding the regulatory framework

Any regulator entrusted by Brazil's legislator and government to regulate digital services will need to conform to its brief and respect the fundamental tenets of regulation in Brazil: justification for intervention and equality before the law, proportionality, protecting the interests of consumers as well as the right of free enterprise. In the absence of such a mandate, Anatel's initiatives rely on expanding telecoms regulations in a way that progressively includes the digital sector. In doing so, it is essential that it demonstrates the need for such intervention and their compatibility with the law, and carefully assesses their potential impact.

4.1 Extending telecoms regulation to the cloud sector is unlikely to be justified, proportionate or effective

Any regulation applied to the cloud sector in Brazil (and indeed any sector) must be demonstrably necessary and proportionate, including to protect consumers, while respecting the principles of equal treatment before the law and compatible with free economic activity.

As set out in Section 3, the cloud sector is intrinsically different to telecoms. These differences, and the absence of the market failures that have been present in the telecoms sector since its opening to competition, undermines the application of telecoms regulation to the cloud. This is true in Brazil, but also more broadly.[61]

This is the foundation of the opposition[62] to the revocation of Norma 4 and bills such as PL 4557 that would treat the internet the same as telecoms, and bring it under Anatel's control; the internet has evolved in a distinct way to telecoms: it is by its very nature open, diverse and interconnected. The internet is different to telecoms, and in particular as shown in Section 3, cloud services are very different to telecoms in ways that matter to regulation. Brazilian telecoms regulation is designed to address specific market failures that emerged as a result of the historical evolution of the telecoms market from a state-owned monopoly to a mature, competitive market. Applying the Brazilian telecoms regulatory framework to cloud services lacks a fundamental objective, and fails to recognise the unique characteristics of each sector – in contrast with the principles of equality before the law.

Additionally, regulations specific to the telecoms sector, in particular those regulating interconnection and access to network facilities, were enacted and enforced to address barriers to entry and competition issues that arose under the telecoms market structure. The differences between the telecoms and public-cloud sectors shown in Section 3 above clearly demonstrate that these regulations are neither necessary nor proportionate for the public-cloud sector.

61 Analysys Mason (2024), *The European telecoms regulatory framework.*

62 For instance, Abranet (2025), *The end of Rule 4 is a serious setback for the Internet sector* and NIC.br (2025) *The silent coup against the Internet in Brazil.*

The key regulated areas in the telecoms sector are interconnection and access, competition and contestability, and consumer protection. The market failures that have necessitated these regulations are not present in the cloud sector.

Interconnection regulation including dispute arbitration

The current telecoms regulation is designed specifically with traditional telephony interconnection in mind, in order to realise direct network effects and ensure smaller operators can compete with larger ones.

As discussed in Section 3, there is no evidence of market failure in IP interconnection. In relation to cloud and CDN services specifically, direct network effects are not prevalent (cloud customers do not benefit directly from a cloud provider having more customers, beyond economies of scale), and services are provided primarily over the internet, in a way that is independent of the underlying ISPs.

Expanding interconnection regulation to IP interconnection over the internet would not solve any clearly identified issue. We have written about the rationale for, and impact of, 'network usage fees' extensively, and other regulators that have investigated have found IP interconnection to be functioning well in the absence of any specific regulation.[63]

One potential impact of imposing interconnection-type regulation is that competition in the telecoms sector may be distorted in favour of larger operators, which have championed the regulation of IP interconnection as a way to extract payments to terminate internet traffic to their subscribers. This would recreate the historical issue with fixed and mobile termination rates, and risks distorting competition in the telecoms sector to the benefit of larger operators.

The form of 'ex post' regulation of interconnection being discussed, in the form of mandatory arbitration in the case of interconnection disputes, is likely to lead to similar outcomes as direct regulation. Applying dispute resolution mechanisms to IP interconnection could incentivise large ISPs to trigger disputes in order to extract payment from customers for delivering traffic, effectively implementing 'network usage fees' with the same potential impact on competition as historical fixed and mobile termination rates.[64]

Competition and contestability regulation

Ex-ante telecoms regulatory intervention liberalised the market (i.e. allowed market entry) by addressing specific barriers to entry and by limiting the power of specific regulated actors, whose market power was partly derived from persistent structural features of the sector. Telecoms regulation has been constructed from the start with the need to ensure new entry is efficient and facilitated in ways that could enhance consumer welfare, despite the maturity of the sector. The current Brazilian telecoms regulatory framework recognises the progress made towards more effective competition, encouraging

63 See Analysys Mason (2024), *The impact of network usage fees on the Brazilian cloud market*.

64 See for example Plum Consulting (2025), *Study on the negative impacts of mandated dispute resolution in IP Interconnection*.

deregulation where possible while still maintaining it where needed, e.g. to provide access in relevant mature markets with SMP or for the assignation of scarce public resources. The telecoms sector remains subject to general competition law, which continues to be the main recourse mechanism for other competition issues.

In contrast, cloud services started as inherently competitive services, and cloud does not face these specific issues; it is a growing sector where players can compete for new, rather than incumbent, customers, and it has a wide range of models which do not rely on scarce public resources.

As such, general competition law, administered by CADE, should be sufficient to address most concerns. If Brazil's legislators and government choose to regulate digital services, including cloud, in a specific way that goes beyond competition law, this will need to be constructed through the legislative process, and applied and enforced in a careful, proportionate way that respects fundamental rights. Expanding telecoms regulation to cloud based on Anatel's own initiative is highly unlikely to satisfy these requirements.

Consumer protection, including network coverage and cybersecurity

In the telecoms sector, Anatel has taken steps, including imposing coverage obligations, to ensure a high degree of service coverage by telecoms networks, across the nation, even where not directly commercially viable. Anatel has also taken steps to protect networks, including from cybersecurity risks, and to foster improvements in quality of service.[65]

The cloud sector, on the other hand, is incentivised to invest in infrastructure because it serves businesses and thus operates on a purely commercial basis. The environment is competitive, so if providers do not invest in this way, then they will lose market share. Resilience and cybersecurity are equally important, and cloud providers comply with the most stringent cybersecurity standards, including sector-specific ones for critical infrastructure and financial services, without the need for direct regulation.[66]

As the telecoms sectoral regulator, Anatel can take steps to ensure the use of cloud services by telecoms operators is consistent with the standards and objectives it sets for telecoms. However, this does not justify the expansion of these standards to other sectors or to cloud as a whole, and may, in fact, undermine the ability and incentive of cloud providers to serve Brazilian telecoms operators.[67]

65 Anatel *Cybersecurity* and *Quality of Services*.

66 For instance, *Cloud Compliance - Amazon Web Services (AWS)* and *Cloud Compliance - Regulations & Certifications | Google Cloud*.

67 Analysys Mason tracks partnerships between public cloud providers and operators, see for instance *Cloud provider and operator partnerships for business services: trends and analysis* (2025).

4.2 Extending existing telecoms regulation to cloud is likely to be harmful to cloud customers and providers, and potentially also detrimental to telecoms operators

In this section we provide initial thoughts on the potential consequences of bringing cloud services under the telecoms regulatory framework. We have considered the impact on cloud and CDN providers and customers, telecoms operators and their customers, and the broader Brazilian digital policy agenda.

Impact on cloud and CDN providers and their customers

Expanding the telecoms regulatory framework to include cloud and CDN providers would directly affect their costs and incentives to invest in Brazil, potentially undermining the choice and quality available to Brazilian businesses and administration that use cloud for their own IT operations and to reach end users across Brazil, and in international markets.

If the telecoms regulatory framework were expanded to include cloud and CDN services and infrastructure, including data centres, the providers of these services would face additional cost and complexity in operating in Brazil. Additional costs include administrative and staff costs, compliance systems and processes, and additional legal fees.

As cloud providers and CDNs operate over the internet from a distributed network of data centres, they may reduce their investments in Brazilian digital infrastructure, to mitigate the risks and costs associated with regulation. This could reverse ongoing trends towards more decentralised cloud regions, which provide low latency and high service quality and support data sovereignty, as well as more extensive interconnection infrastructure, which enables networks to lower costs and improve performance and resiliency.

This would reduce the quality and resilience of Brazilian internet infrastructure and increase costs throughout the internet ecosystem, including for cloud and CDN providers, telecoms operators, and ultimately, the Brazilian businesses and public sector organisations that use cloud. Additionally, CDNs would face higher cost and lower-quality services as a result. The reversal of recent trends towards more decentralised internet infrastructure would also be detrimental to the resilience and security of Brazilian digital infrastructure.[68]

Ultimately, however, the impact is likely to fall primarily on end users, who increasingly rely on the internet for their work, social engagement, interaction with the government and entertainment. Email, software access, social media, data storage, gaming, video streaming, and almost any other online activity, increasingly rely on a combination of cloud and CDNs. Cost increases may be passed on to end users, who will also feel the effects of any decrease in infrastructure investments. As demand for online services including cloud may slow, the impact of the network usage fees can begin to multiply at the expense of the benefits of digitalisation to the economy and society.

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68 We recently published an update of the situation in South Korea, where network fees have been legislated into existing since 2016 and imposed de facto on cloud providers since at least 2020. We found this had significantly impacted international connectivity in South Korea, as well as competitive dynamics in the telecoms sector. See Analysys Mason (2025), *History and implications of IP interconnection regulation in South Korea*, and here for a Brazilian Portuguese version.

Competition in the cloud sector may be reduced as existing providers may reconsider expansion and prospective entrants may focus elsewhere, in light of a more challenging regulatory landscape. This would affect the choice and quality of services available, further affecting cloud service adoption and ultimately the growth of the sector.

Additionally, size will be a differentiator of impact among cloud providers, with larger players likely to be better able to cope with the added compliance burden. This could be counterproductive to competition in the Brazilian cloud sector, and deter entry from new providers.

Impact on telecoms operators

If cloud and CDN providers face higher costs and adverse incentives related to their investment in infrastructure, this could affect the telecoms sector through higher costs and investment requirements, reduced competition and poorer competitive outcomes, including for consumers.

Beyond the impact on cloud and CDN providers and infrastructure, an expansion of the telecoms regulatory framework to include cloud and CDN could result in distortions to the telecoms sector itself.

If cloud and CDN providers reduce their investment, Brazilian telecoms operators would have to incur additional costs to expand their own network capacity, including to exchange traffic with international cloud providers outside Brazil. A shift from decentralised infrastructure to greater use of transit, whilst detrimental to many smaller ISPs, could be beneficial to the largest operators with large transit operations.

Reduced competition between telecoms network operators would likely further diminish incentives for infrastructure investment, as dominant players would face less pressure to improve their services. Finally, if quality of service is diminished then operators' revenue streams may, in turn, be negatively affected.

Impact on Brazilian digital agenda

The impact of higher costs, including for IP interconnection, will ultimately be borne by end users, including Brazilian businesses and content providers, and by consumers. This would slow the adoption of cloud services and innovations, including data centres and AI, going against the government's efforts to spur digital transformation under its digital agenda. This would come at a cost for Brazilian competitiveness.

Public CDN and cloud services provide a material input to the Brazilian digital economy. They are already supporting day-to-day operations across a wide range of sectors of the Brazilian economy and society, including finance, education, healthcare, retail and consumer goods, technology, telecoms and transportation, as well as start-ups who can use cloud services to quickly reach the market.

Many of the objectives of the Brazilian Digital Transformation Strategy will be strongly influenced by cloud services, including the promotion of secure networks, long-term investment in compute and storage infrastructure, and the promotion of research, development and innovation – leveraging advanced functionalities that are increasingly available on cloud platforms (including AI). Promoting transformative digital initiatives to small and medium-sized businesses is a key objective as well, including through the adoption of digital and cloud-based services.

If the telecoms regulatory framework were expanded to include cloud and CDN services and infrastructure, then the take-up of these services could be hampered, directly impacting the realisation of the Brazilian digital agenda. Brazilian businesses and consumers will suffer from more expensive cloud services and as a result reduce take-up of technology, including AI and data-driven innovations that could foster competitiveness, in contradiction with the goals of the digital agenda.

Reduced choice and quality of cloud services available could further impact cloud service adoption and ultimately the growth of the sector. This could entail slowing or reducing the scale of digitalisation for Brazilian businesses, negatively affecting the competitiveness of the regional business sector. Smaller businesses would see greater impact from such developments due to their limited ability to self-provision.

Beyond businesses, the Brazilian public sector, including government, education and healthcare, will also need to allocate more resources to cloud services and may face a reduced choice of services affecting its digitalisation.

4.3 Conclusion

Repurposing a complex regulatory framework designed for the specific characteristics of telecoms, to apply it to a very different sector, risks fundamentally undermining regulatory certainty. Policy makers need to ensure that any new regulation on cloud and CDN providers responds to a clearly established problem or market failure (which cannot be remedied through existing instruments), in a proportionate way.

The key questions when considering regulating a sector of the economy are whether there is a market failure that needs to be addressed and, if so, how best to do so. In considering expanding the telecoms regulatory framework to cloud services, policy makers and regulators therefore need to articulate the problem or market failure they are trying to solve. They should then consider whether existing regulation applicable to cloud providers (e.g. competition law) could effectively address these issues. If regulatory or competition concerns subsist, they should assess whether the purpose, history and mechanics of the telecoms regulatory framework in Brazil can be adapted to remedying these problems, and conduct a detailed impact assessment to ensure the regulatory action is appropriate.

Both the cloud and telecoms sectors are vital for Brazilian digitalisation and competitiveness. Cloud services, however, differ fundamentally from telecoms networks. They are nascent, dynamic, global, and lack direct network effects, whereas the telecoms sector is mature, stable, location specific, with significant direct network effects. The telecoms regulatory framework, designed based on a different history, sector dynamics and set of services, is not best suited to regulating the cloud sector. Applying telecoms regulation to cloud services could even stifle growth and competition, disrupt the competitive balance among telecoms operators, incur higher costs for cloud users, and reduce choice and quality of services for users in both sectors. It could also hinder key digital initiatives, while disproportionately affecting smaller providers and users across the ecosystem. The intrinsic differences between the cloud and telecoms sector, and the absence of established market failures that were present in telecoms, undermines the application of telecoms regulation to cloud.

In conclusion, we reiterate the importance of well-functioning cloud and telecoms sectors to the digital agenda for Brazil, and to the Brazilian businesses and public-sector organisations that use cloud services and stand to benefit from them – including in the context of AI and other highly innovative aspects of IT and digital technology. Regulators should acknowledge the potential adverse impacts of extending the telecoms regulatory framework to encompass cloud services, without clear justification or assessment of its impacts.