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Internet Impact Brief

Proposal for a "Compensation Model for Telecommunication Service Providers by Large Users: Responsible and Sustainable Use of the System" presented by Conexis Brasil Digital within the scope of Anatel Call for Contributions No. 26/2023.

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Summary

Executive Summary

This Internet Impact Brief analyzed the proposal from Conexis, presented in Anatel's Call for Contributions No. 26/2023, which suggested a remuneration model for large-scale users of telecommunications networks based on the volume of data traffic generated by Value-Added Services (VAS), such as streaming platforms, social networks, and digital content providers. The analysis focused on the cross-cutting impacts the proposal could generate, particularly concerning issues like network neutrality, Internet fragmentation, concentration of economic power, and reduced competitiveness. It was found that the proposal could create financial barriers for new entrants and small and medium Internet Service Providers (ISPs), as well as exacerbate inequality in Internet access, disproportionately affecting less privileged regions. Additionally, the report evaluated the effects of the proposal on the essential enablers and critical properties of the Internet ecosystem, which ensure its openness, interoperability, and resilience. Concerns were raised about the potential degradation of service quality, the creation of isolated connectivity ecosystems, and increased costs for end-users. In conclusion, the proposal undermines the characteristics that make the Internet a global, secure, reliable, and open platform— such as network neutrality — and hampers the development of innovation and competitiveness in the digital environment.

1. Context

The debate over implementing network fee policies[1] in Brazil has gained prominence in recent years, reflecting tensions between telecommunications operators and digital content providers (referred to here as Value-Added Services—VAS). On May 29, 2024, this discussion intensified with the presentation of the proposal titled "Remuneration Model for Telecommunications Service Providers by Large Users: Responsible and Sustainable Use of the System,"[2] submitted by Conexis Brasil Digital — the entity representing the main telecommunications operators in the country—within Anatel's Call for Contributions No. 26/2023.

This was the second call for contributions proposed by Anatel on network fees, following Call No. 13/2023, which initiated the debate on regulating obligations for telecommunications service users

Call for Contributions No. 26/2023 was launched in January 2024 aiming to "continue the public debate on the necessity and form of regulating duties for telecommunications service users in a scenario where resource availability and service quality need to be more actively managed due to demand behavior and the economy's dependence on this sector."[3] The agency outlined six themes for discussion, including the "imbalance between the investments appropriate to each agent of the digital ecosystem aiming at the expansion and sustainability of network infrastructure," explicitly considering the creation of remuneration for network use by VAS.

In response to this discussion, Conexis submitted a contribution stating that large VAS—such as streaming platforms, social networks, and other digital services — generate a substantial volume of data traffic on telecommunications networks, earning significant profits without contributing proportionally to the investments necessary for maintaining and expanding these networks. According to Conexis, this asymmetry imposes an unfair financial burden on telecommunications operators, who bear the infrastructure costs alone, while the largest VAS benefit without bearing corresponding financial responsibilities.

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[1] In the Brazilian public debate, other terms are used to refer to this fee, such as "fair share," "network fee," and "Internet toll." For more details, see Appendix I.

[2] The proposal is available on the Conexis website: https://conexis.org.br/modelo-de-remuneracao-de-prestadoras-de-servicos-de-telecomunicacoes-por-grandes-usuarios .

[3] The Call for Contributions is available at: https://apps.anatel.gov.br/ParticipaAnatel/VisualizarTextoConsulta.aspx?TelaDeOrigem=2&ConsultaId=20202

The assertion sustained by the Conexis proposal is contradicted by the increasing revenues of major telecommunications operators and the rationale of infrastructure investments, which is already an inherent part of the sector's business model[4].

In 2023, telecommunications operators in Brazil invested approximately USD 10.72 billion to address the growing demand for data traffic projected for the period from 2024 to 2033[5]. However, these investments have been largely concentrated on mobile networks, driven largely by government incentives, while the expansion of fixed broadband infrastructure remains predominantly led by small-scale Internet Service Providers (ISPs) in local and regional markets, supplemented by public subsidies. This disparity has perpetuated persistent regional bottlenecks, which continue to hinder the efficient expansion of infrastructure necessary to support growing connectivity demands, particularly in underconnected areas[6].

It is important to highlight that connectivity infrastructure investments in Brazil originate from diverse sources, including public investment, the capital of major telecommunications companies, contributions from small-scale ISPs, as well as international gateways and Content Delivery Networks (CDNs) developed by technology companies and VAS providers. These investments also include contributions from submarine cable operators and data centers, ensuring the robustness and international transmission capacity that are essential for both fixed broadband and mobile network infrastructure. Public subsidies and incentives, often tied to universalization policies and regulatory obligations, also play a significant role in expanding coverage to underserved regions.

Regarding national network capacity, Reis and Guaranys[7] demonstrate that data traffic demand in Brazil is projected to grow from 297.01 exabytes annually in a low-demand scenario to 400.74 exabytes annually in a high-demand scenario by 2033. These projections, based on variables such as the number of broadband users, the prevalence of 4G and 5G services, and digital content consumption, indicate that the growth in data traffic is consistent with global trends of stable infrastructure investment. The findings do not suggest the necessity of significant revisions to operators' remuneration models.

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[4] According to the data from the study conducted by Marcelo Guaranys and José Guilherme Reis, operators are projected to record an annual investment growth of 6.7% from 2024 to 2033, reflecting stable (non-exponential) demand growth for digital services. See: José Guilherme Reis, Marcelo Guaranys. Projections of Data Traffic Demand in Brazil: An Update. 2024. p. 16.

[5] Ibid.

[6] Although public subsidies are applied to specific universalization initiatives, they represent only a fraction of the total investment and are primarily allocated to regions where commercial operators face economic challenges for expansion. In this regard, Ibid., see p. 15.

[7] See: https://internetaberta.com.br/wp-content/uploads/2024/05/Paper-1-PT-Projecoes-da-demanda-por-trafego-de-dados-no-Brasil.pdf.

Year	Low Demand Scenario (Exabytes/year)	Baseline Scenario (Exabytes/year)	High Demand Scenario (Exabytes/year)
2024	131.90	136.86	141.81
2025	150.12	160.52	170.46
2026	168.49	184.33	199.25
2027	186.95	208.23	228.13
2028	205.42	232.15	257.03
2029	223.88	256.05	285.91
2030	242.29	279.91	314.75
2031	260,63	303.69	343.51
2032	278.87	327.39	372.18
2033	297.01	350.98	400.74

Table I - Source: Reis, J.G., & Guaranys, M. Projections of Data Traffic Demand in Brazil: An Update, p. 13.

The proposal to implement a network fee is not new, having emerged in various forms over the past few years and faced significant resistance from different sectors of Brazil's Internet ecosystem. In a joint contribution to Anatel's Call for Contributions No. 13/2023, the Brazilian Chapter of the Internet Society (ISOC Brazil) and the Institute for Technology and Society of Rio de Janeiro (ITS Rio) raised concerns about the potential negative impacts of implementing a remuneration model as suggested. They argued that such a model could lead to inefficient infrastructure, higher costs, lower service quality, and increased risks of Internet fragmentation.

Other stakeholders, such as the Brazilian Internet Association (Abranet) and the Brazilian Association of Internet and Telecommunications Providers (Abrint), have also opposed proposals requiring network fee payments. These groups questioned Anatel's legal authority to regulate network use and argued that such measures represent a cross-subsidy that generates inefficiencies and could be detrimental to small-scale Internet providers. They also highlighted the critical importance of preserving network neutrality and freedom of expression on the Internet—principles protected by Brazil's Civil Rights Framework for the Internet (Marco Civil da Internet).

In Brazil's normative context, the Civil Rights Framework for the Internet, approved in 2014, establishes principles, guarantees, rights, and duties for Internet use in Brazil, enshrining the principle of network neutrality. According to this principle, connection providers must treat all data packets equally, without distinction by content, origin, destination, or service. Implementing a remuneration model that differentiates users or providers based on traffic volume or content nature has the potential to violate this fundamental principle.

In response to the actions of telecommunications operators, Bill No. 469/2024, presented by Federal Legislator David Soares (União-SP), explicitly proposes prohibiting the charging of network fees for network use. The congressman argues that such fees contradict the Civil Rights Framework for the Internet and could undermine network neutrality, hindering users' free access to information.

The discussion in Brazil occurs alongside similar debates in other parts of the world, such as the European Union and South Korea.

In the European Union, legislative and regulatory proposals are being driven by telecommunications operators, sparking controversies and opposition from VAS, civil society, the private sector, and the technical community. Like Brazil, European entities and experts have voiced concerns about the risks of Internet fragmentation, negative impacts on innovation, and potential violations of network neutrality.

Additionally, in South Korea, the implementation of network fee policies has become a cautionary tale for the local Internet ecosystem and society at large. In 2016, the Ministry of Science, ICT, and Future Planning of South Korea (now the Ministry of Science and ICT) introduced new interconnection rules mandating ISPs to adopt the "sender party pays" model. This approach requires networks to compensate one another for the traffic they send, directly opposing the traditional peering model, which relies on voluntary agreements between interconnected networks and is typically free of settlement obligations ("settlement-free").

In this regard, it is important to emphasize that the change in interconnection rules in South Korea had severe consequences. VAS providers like Meta chose to relocate their servers outside the country to avoid the fees imposed by South Korean ISPs. As a result, this relocation led to increased latency[8] and degraded service quality for users in South Korea, as content was now accessed from more distant servers. The impact was uneven, with negotiations favoring large ISPs

[8] Latency refers to the time that elapses between a user's request for data and the receipt of that response from the server. In simpler terms, it is the delay in communication between the user's device and the server that provides the requested content or service. Latency is measured in milliseconds (ms) and can vary based on several factors, such as the physical distance between the user and the server, network capacity, traffic congestion, and the route taken for data transmission.

over small providers. This shift put local ISPs at a competitive disadvantage, exacerbating competitive inequalities and negatively affecting the country's tech industry and startup ecosystem.

South Korea serves as an example of how implementing network fees led to increased costs for users[9]. Estimates suggest that transit prices rose by 10%, directly affecting the competitiveness of businesses[10] and demonstrating the risk of VAS providers passing these costs onto end-users.

In Brazil, beyond the Calls for Contributions, Anatel has included in its Regulatory Agenda for 2025-2026 a review of objectives related to user obligations, including the potential establishment of a network fee. A public consultation is planned for the first half of 2025, with a final decision expected in the second half of the same year. This indicates that discussions on the matter will remain active in the short term, with potential significant implications for the telecommunications sector and Brazil's digital ecosystem.

In response to this scenario, the Brazilian Chapter of the Internet Society has applied the Internet Impact Assessment methodology developed by the Internet Society (ISOC) to the proposal "Remuneration Model for Telecommunications Service Providers by Large Users" submitted in Call for Contributions No. 26/2023. The objective is to evaluate the potential impacts —both positive and negative — of adopting such a remuneration model on an open, globally connected, secure, and trustworthy Internet, as well as on market innovation and competitiveness within Brazil's digital economy.

This analysis encompassed a range of considerations, including the core principles underpinning the Internet's architecture, potential impacts on end-users, implications for innovation and economic growth, and the associated legal and regulatory challenges. The aim is to contribute to public discourse by providing robust, technical, and well-founded inputs to guide regulatory and legislative authorities in their decisions, ultimately safeguarding the values and benefits the Internet delivers to Brazilian society.

The ongoing debate will be crucial in defining the future of connectivity and access to information in Brazil, directly affecting how individuals and businesses use the Internet in the country, as well as the preservation of an open, globally-connected, secure, and trustworthy Internet.

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[9] As will be seen below, the proposal analyzed here does not refer to charges on transit and peering as in the South Korean case, but rather on data volume. Nevertheless, there are similarities in the impacts on the Internet, regardless of the justifications provided by telecommunications operators.

[10] See: Project Disco. South Korea's Internet Traffic Tax. 2022. Available at: https://project-disco.org/european-union/091422-south-koreas-internet-traffic-tax/. Accessed on: September 29, 2024.

In this context, it is important to understand the differences, realities, and interests at play between large operators and small ISPs. While the former argue that the increased traffic generated by VAS overloads their networks and justifies the implementation of network fees, small ISPs operate smaller networks, often restricted to local and regional markets, which leads to a distinctly different impact.

For small ISPs, there is a risk that large operators could leverage their extensive reach and market power to negotiate more favorable agreements with VAS. This could create competitive pressures on small ISPs, negatively affecting market competition.

There is also the risk that implementing network fees could enable exclusivity arrangements between large operators and VAS. In such a scenario, small ISPs might face barriers to accessing content of significant interest to users, undermining their ability to attract and retain customers. These dynamics could result in market concentration, further entrenching the dominance of large operators at the expense of smaller providers.

Furthermore, the claim made by large operators about economic pressure on the infrastructure, used to justify network fees, lacks detailed analysis demonstrating how such charges would benefit small ISPs or end-users, whether through improved access or enhanced digital service quality. The proposal offers no evidence that the remuneration model would bring tangible benefits to stakeholders other than the large telecommunications companies themselves, nor does it ensure that additional costs would be proportionate to the capabilities of those involved.

In fact, network fees could pose a medium and long-term financial and economic threat to small ISPs, creating additional barriers to their competitiveness. This is particularly concerning in a market where these providers — numerous and competitively driven — have brought connectivity to millions of Brazilians, including those in underserved and low-connectivity areas.

2. Methodology

To conduct a comprehensive analysis of the impacts of the proposal for remunerating telecommunications operators based on usage by large-scale users, we adopted the Internet Impact Assessment methodology developed by the Internet Society (ISOC). This approach considers the fundamental principles that underpin the architecture of the Internet, as well as the essential enablers for its functioning as an open, universally accessible, secure, and reliable system.

The Internet owes its strength and success to a foundation of critical properties that, when combined, represent the Internet Way of Networking (IWN). This includes: (1) an accessible infrastructure with a common protocol; (2) an open architecture of interoperable and reusable building blocks; (3) decentralized management and a single distributed routing system; (4) common global identifiers; and (5) a technology neutral, general-purpose network. Thus, we examined the effects of the proposal on the foundations of the IWN paradigm, which the Internet needs to exist and thrive as an open, globally-connected, secure, and reliable resource.

In addition to the critical properties of the IWN, the assessment also considers the essential enablers for the Internet to thrive as an open, globally-connected, secure, and reliable resource, as defined by the Internet Society (ISOC). These are: (I) easy and unrestricted access; (II) unrestricted use and deployment of Internet technologies; (III) collaborative development, management, and governance; (IV) unrestricted reachability; (V) available capacity; (VI) data confidentiality of information, devices, and applications; (VII) reliability, resilience, and availability; (VIII) accountability; (IX) privacy and (X) integrity of information, applications, and services.

We evaluated the effects on network infrastructure, service quality, and resilience from a technical perspective. From a socioeconomic standpoint, we considered the impacts on access to information, innovation, competitiveness, and user rights. Finally, we also analyzed the regulatory implications and the effects on Internet governance.

3. Understanding the Proposal

The central premise of Conexis' proposal, called the "Remuneration Model for Telecommunications Service Providers," is that the significant increase in society's reliance on telecommunications infrastructure, driven by digital transformation, brings new regulatory challenges. According to Conexis, this growing digitization creates an "unpredictable and increasing" demand, especially from large global content providers (grouped here under the concept of VAS), whose operations generate much higher traffic volumes compared to regular users.

Starting from this point, Conexis' proposal suggests implementing a remuneration model between VAS and fixed and mobile network operators, based on the intensive use of telecommunications infrastructure by large VAS. According to their analysis, the data traffic volume generated by these players is exerting pressure on networks, necessitating continuous and massive investments by telecommunications operators to ensure the maintenance and expansion of infrastructure. In this regard, the proposal argues that VAS, such as Meta, Alphabet, and Netflix, are responsible for over 50% of the data traffic on Brazilian telecommunications networks. Therefore, the current remuneration system does not reflect the economic impact on fixed and mobile network operators caused by the increased data traffic. The proposal advocates for a charging model that would distribute these costs "proportionally" to network usage.

It is worth emphasizing that the central premise of the proposal is purely economic, arguing that the imbalance created between fixed and mobile network operators and large VAS constitutes a market failure. While these companies capture a significant share of the value generated by the digital economy, the operators responsible for the infrastructure enabling these operations face difficulties in maintaining the economic sustainability of their businesses. This is attributed to constraints on offering differentiated treatment to large users in exchange for appropriate remuneration and the excessive competition in the national broadband market (in the case of fixed networks).

Additionally, Conexis' proposal introduces the obligation of negotiations between VAS and fixed and mobile network operators for implementing network fees. However, it is unclear whether these payments would be mandatory or if operators could choose not to charge VAS, using this exemption as a competitive advantage. In both scenarios, there are risks to the integrity of an accessible Internet infrastructure, making it essential to analyze these risks to understand the potential impacts of the proposal.

The proposal discusses: (i) whom to charge; (ii) what to charge; (iii) the measurement and charging points; and a fourth point that is redacted in the publicly available document.

(i) WHOM TO CHARGE

Conexis's methodology proposes that the regulator establish a lower traffic threshold to characterize a large user[11]. Once this threshold is exceeded, the VAS would be required to pay the network fee if, during the data transit, the threshold is surpassed. All operators (fixed and mobile) involved in the transit where the threshold was exceeded would be entitled to receive the fee. This implies that the network fee could be owed to multiple operators. In such cases, the involved operators would need to agree among themselves on how to divide the compensation paid by the VAS.

(ii) WHAT TO CHARGE

Regarding the amount to be charged, the proposal suggests that each operator independently defines a unit price per gigabyte for data traffic exceeding the threshold established by regulation. These rates should differ for fixed and mobile networks and be adjusted every 6 or 12 months, based on the convenience and traffic variation of each operator.

(iii) MEASUREMENT AND CHARGING POINTS

To implement the charges, Conexis proposes that the measurement points for traffic volume be defined by each operator and freely negotiated between the parties. The figure below, taken from the proposal, illustrates three scenarios for network fee measurement points, along with the pros and cons of each.

[11]The Conexis proposal classifies SVAs like Meta, Alphabet, and Netflix as "large industrial users" or "intensive users" of telecommunications infrastructure. However, this terminology may be considered inadequate within the logic of how the Internet operates, particularly concerning the role of VAS. In the Internet's architecture, the fundamental logic is that end users—individuals, companies, and organizations—demand services and content from the network. Big Tech companies, or VAS providers, are not users in the traditional sense; they are content and service providers delivering their products to the actual users—the final consumers who access these services. These services do not generate network demand autonomously; they simply respond to the demand created by consumers. In other words, traffic flows because end users make data or content requests to platforms (e.g., streaming a video on Netflix or accessing social networks like Instagram). Moreover, VAS providers maintain their own technological infrastructure, such as CDNs and data centers, which do not directly depend on telecommunications operators for global data transport. Often, these providers connect directly with operators through peering or transit agreements, underscoring that they are not merely users of the infrastructure. Instead, they act as collaborators with the network, facilitating efficient access to their content.

(Figure 17 from the proposal)

The methodology proposed involves creating traffic measurement points at strategic locations within the infrastructure. In the first scenario, "if traffic measurement occurs in the higher layers of the network, close to or before the network's distribution elements, there will be a clear incentive for large users to invest in CDNs and other equipment that improve network efficiency, as the charge will decrease as traffic at this point is reduced"[12].

In a second scenario, the proposal suggests measurement at "the lower layers of the network, close to access network elements. In this case, there is a disincentive to invest in CDNs, since measurement occurs near the end-user, and any traffic reduction from efficiency gains in higher layers would not result in a reduction in charges"[13].

In the final scenario, measurement occurs at "both points of the network, before and after the CDNs, ensuring a closer approximation of costs to captured resources while simultaneously promoting incentives to invest in such efficiency-enhancing equipment"[14].

Regarding the technical aspects, the proposal argues that adopting a tariff model under these conditions seeks to "create incentives" for VAS to manage their generated traffic more efficiently, promoting the adoption of technologies that reduce the "impact" of high traffic volumes on networks, such as greater investment in CDNs.

Another key element of the proposal concerns network neutrality. While acknowledging that this principle must be preserved, the proposal suggests that charging for infrastructure usage would not infringe the guidelines established in the Brazil's Civil Rights Framework for the Internet, provided that such charges are based exclusively on data volume and not on the type or content

[12] Literal citation from page 35 of the Conexis Proposal.
[13] Literal citation from page 35 of the Conexis Proposal.
[14] Literal citation from page 35 of the Conexis Proposal.

of the traffic. This interpretation, however, is highly debatable and contradicts the prevailing understanding of network neutrality.

In conclusion, while the proposal is anchored in a specific analysis of market conditions and infrastructure demands, it reflects a particular perspective on the relationship between traffic and costs. The feasibility and appropriateness of this charging model must therefore be assessed in a broader context, considering the interests of all other stakeholders, such as VAS providers, the technical community, small and medium ISPs, civil society, and especially end-users.

4. The Cross-Cutting Impacts of the proposal

The impacts of the Conexis proposal have wide-ranging implications, affecting several critical enablers and properties of the Internet. This section discusses the cross-cutting impacts, i.e., those that simultaneously affect multiple critical properties and enablers, influencing the network's overall functioning. Subsequently, a detailed description is provided of how these impacts manifest and interact with each critical enabler and property, offering an integrated perspective that underpins the subsequent analysis.

(I) Risk to Network Neutrality

One of the most severe cross-cutting impacts identified is the violation of the principle of network neutrality, a fundamental tenet that ensures equal treatment of data packets regardless of their origin, content, or destination. Based on this principle, an ISP (whether fixed or mobile) should not prioritize, block, or throttle data traffic based on commercial or technical criteria, except where such criteria are essential for service provision or in cases of emergency service prioritization. This principle, codified in the Brazilian Civil Rights Framework for the Internet (Marco Civil da Internet), guarantees a competitive and open environment where any service can be accessed equally by any user.

According to the proposal, the act of charging itself does not interfere with the technical treatment of data packets. In principle, VAS data packets would not be discriminated against or prioritized through deep packet inspection or other technical means. However, the creation of a financial barrier for data traffic could lead to content blocking or quality degradation, indirectly undermining the principle.

In this context, the proposal poses a risk to network neutrality by enabling telecommunications operators to impose commercial agreements to accept traffic from content providers.

It is also worth noting that, in scenarios where transit agreements already exist between telecommunications operators and ISPs, ISPs pay for the contracted traffic. Therefore, any attempt to apply additional charges to VAS for this same traffic would constitute double charging and violate the neutrality principle. For instance, if a small ISP pays to utilize specific bandwidth and access VAS content through a transit network, that content cannot be degraded or blocked based on commercial arrangements between the large operator and the VAS—a critical issue unaddressed by the proposal.

The proposal's reinterpretation of network neutrality fails to consider the benefits this principle brings to innovation and competition in the digital environment. Network neutrality is essential for fostering new services and applications, enabling them to compete on equal terms

with established players, thus encouraging diversity and technological advancement. Any review of this principle creates barriers to market entry for new players, further concentrating power in the hands of large telecommunications operators.

This scenario would result in an unequal infrastructure, with lower-quality services in poorer areas and no incentives for small providers to invest in underserved markets, thereby exacerbating Brazil's digital inequalities. Consequently, more developed regions would maintain privileged access to connectivity—though not necessarily with the quality seen in cases like South Korea—while rural and economically disadvantaged areas would struggle to integrate into the digital economy. This would hinder their social and economic development and limit access to essential services such as online education and telemedicine.

Impacted Enablers:
Easy and Unrestricted Access
Unrestricted Use and Application of Internet Technologies
Unrestricted Reach

Impacted Critical Properties:
An Accessible Infrastructure with a Common Protocol
A Technology neutral, General-Purpose Network

(II) Lack of Clarity and Transparency

Another critical and cross-cutting issue in Conexis's proposal is the lack of clarity regarding the obligation to charge the network fee and the conditions under which it would be applied. While the proposal specifies how and where traffic measurements would occur, the challenge lies in defining the criteria for its application across various scenarios. Notably, it suggests allowing parties to freely negotiate the terms, which could result in different outcomes, including, in theory, the possibility of exempting the fee altogether[15].

These ambiguities undermine predictability and legal certainty. While future regulations could potentially address these issues with greater precision, the current lack of clarity already affects the market, especially for small and medium ISPs. These providers could be disproportionately affected by a charging model that is not transparent or clearly defined. As a result, VAS providers and small and medium ISPs might face unexpected costs without a clear explanation of how these fees would be calculated.

Another factor that compounds the current uncertainty is the absence of robust accountability mechanisms. The proposal fails to define who would be responsible for auditing the

[15] For more details, see page 35 of Conexis's proposal.

traffic data or how transparency in measurements would be guaranteed. Although future regulations might establish such mechanisms, the current lack of specificity risks setting a dangerous precedent for abuse and unfair practices. Without a proper governance framework—including independent oversight and monitoring of fees—large operators could impose unfavorable conditions on small and medium ISPs, leading to market dominance. This concern is especially pressing in the fixed network sector, where small and medium ISPs account for 52% of broadband access and play a critical role in expanding fixed broadband services to rural areas.

Thus, the lack of clarity extends beyond technical measurement issues. The core challenge of this cross-cutting impact lies in the absence of clear criteria for applying the network fee and the lack of transparent, independent enforcement mechanisms. Without these elements, enforcing such fees could significantly distort the market, increasing the concentration of power among large operators and harming competitiveness and innovation, particularly for small and medium ISPs.

Impacted Enablers:
Accountability
Collaborative Development, Management, and Governance

Impacted Critical Properties:
Decentralized Management and a common Distributed Routing System

(III) Impacts on New Entrants and Small Providers

The Internet must remain an open space across all its layers—application, transport, network, link, and physical.

However, the imposition of a mandatory network fee for VAS providers exceeding a certain traffic volume on each operator's network could compromise this openness. This openness has been a cornerstone of the Internet's global expansion over the years and remains one of the pillars of its success. While the stated goal of this measure is to proportionally distribute the costs of maintaining and expanding network infrastructure based on usage, it would create barriers and economic uncertainty for new VAS providers and small ISPs that surpass such thresholds, imposing additional costs that could discourage their growth.

It is also important to note that traffic measurements are technically imperfect and prone to errors, which exacerbates the challenges of implementation. Data collection tools often struggle to accurately capture traffic volume in complex networks, potentially introducing distortions and

disputes between operators and providers. This unreliability increases uncertainty for VAS providers and undermines the feasibility of a fair system.

In addition, a practical consequence is that the traffic limit may not be uniformly applied to all VAS providers, as different regions exhibit distinct usage patterns. For instance, in large urban centers where digital service consumption is high, a VAS provider may quickly reach the traffic limit. In contrast, the same provider may not reach the limit in rural or less densely populated areas, even if it has significant market presence in those regions. This creates structural inequality in the market, penalizing VAS providers operating in high-demand areas while others remain exempt.

Consequently, there is a risk of market fragmentation, where certain regions in Brazil could bear a heavier burden from the network fee proposal depending on consumption habits and network infrastructure.

The imposition of a network fee, therefore, threatens innovation and the diversity of services that are essential for a healthy Internet ecosystem. It erects barriers for new entrants, particularly in underprivileged regions, where small and medium ISPs play a crucial role in providing Internet access to areas neglected by major operators. This fee could lead to higher prices for consumers or a deterioration in service quality, further deepening inequality in Internet access.

Impacted Enablers:
Easy and Unrestricted Access
Unrestricted Use and Deployment of Internet Technologies

Impacted Critical Properties:
An Open Architecture of Interoperable and Reusable Building Blocks

(IV) Fragmentation of the Internet

Historically, the Internet has developed based on interconnection agreements that are largely voluntary and grounded in the principle that different networks can connect freely, provided mutual benefits exist, such as traffic exchange at IXPs (Internet Exchange Points). This model enables the Internet to operate in a decentralized manner, ensuring interoperability and flexibility among networks, regardless of participants' size or economic power. This dynamic is essential to maintaining the Internet’s open nature.

However, the proposal to charge based on traffic introduces a mandatory payment model, disrupting this voluntary logic of interconnection[16]. When payment ceases to be optional and becomes a requirement for data traffic, telecommunications operators gain increased control over which content may or may not transit their networks, introducing an element of commercial discrimination into traffic management.

This paradigm shift is not merely a commercial issue; it represents a fundamental change in the Internet's architecture, which was originally designed to be content-agnostic and neutral regarding the entities involved. In the traditional model, network operators are tasked with transporting data packets on a "best effort" basis, refraining from interfering with the content passing through their networks. The introduction of the network fee, however, alters this foundational principle by enabling direct intervention in data flow.

If connectivity becomes dependent on financial negotiation capacity, networks where VAS providers cannot afford to pay the network fee may see their traffic degraded or blocked, resulting in a fragmented user experience and undermining unrestricted access and universal connectivity.

Operators could enforce such degradation through technical measures against VAS that do not establish commercial agreements, including shutting down CDNs hosted within their networks or dismantling peering agreements and IXPs connections. While such actions may not entirely block user access to content, they would lead to increased latency and reduced service quality, as traffic would be rerouted through longer or more congested paths, potentially even via international routes.

This fragmentation is further exacerbated by the potential for each operator to apply its own criteria for charging and traffic measurement. This scenario creates a fragmented Internet experience where access to services depends on the network to which the user is connected. Such fragmentation directly undermines the interoperable and universal nature of the Internet, creating "connectivity islands" with varying access conditions and service quality dictated by the commercial practices of individual operators.

[16] The proposal in question is ambiguous and does not clearly specify whether the charging of the traffic fee (network fee) would be mandatory or optional. However, an optional charge seems unlikely because, from a financial standpoint, it would not make sense to establish a fee that might not be applied.

Impacted Enablers:
Unrestricted reachability
Available Capacity

Impacted Critical Properties:
A Technology Neutral, General-Purpose
Decentralized Management and a Single Distributed Routing System

(V) Network Capacity and Investment Incentives

The proposal may discourage these providers from investing in their own infrastructure, limiting the network's ability to efficiently expand and meet the growing demand for data, particularly in more vulnerable areas.

Currently, large VAS providers invest significantly in CDNs and IXPs to optimize traffic and reduce latency, thereby improving the end-user experience. However, the imposition of traffic-based charges could diminish the incentive for such investments, as the operating costs associated with ISP networks would increase, reducing the economic advantages of these initiatives. This is especially true in cases where the measurement points for these charges are located solely at access points or distribution nodes.

Similarly, there is a risk that major telecommunications operators will be less incentivized to expand or improve network infrastructure in less profitable areas. With the introduction of network fees, a portion of the costs can be passed directly to VAS providers, easing the pressure on operators to invest in remote or underserved regions. This could create a vicious cycle in which the lack of infrastructure expansion constrains the growth and quality of Internet services in these areas, exacerbating inequality in network access.

Ultimately, this dual disincentive—affecting both VAS providers and telecommunications operators—may undermine the network's capacity to adapt to the rapid growth in data traffic. This would compromise the quality of services provided and hinder innovation, particularly in regions with limited connectivity.

Impacted Enablers:
Available Capacity

Impacted Critical Properties:
A Technology Neutral, General-Purpose Network

(VI) Internet Reliability and Resilience

Internet reliability refers to its ability to operate continuously without failures or unexpected interruptions, while resilience relates to the network's capacity to recover from issues and find alternative routes when parts of its infrastructure are compromised. A cross-sectional analysis of critical enablers and properties suggests that the Conexis proposal alters the dynamics of interconnection between operators and VAS, leading to indirect impacts on network resilience.

In regions with limited infrastructure, the reliance on large ISPs as transit intermediaries between smaller providers and VAS tends to be greater. While large VAS frequently leverage IXPs to connect with smaller networks, in areas with few IXPs, large ISPs play an essential role in mediating traffic. If VAS opt not to use these networks, users of smaller ISPs may encounter access issues—not due to technical failures, but because of a lack of viable alternative routes. This could lead to increased latency, reduced service quality, and diminished network resilience, ultimately harming connectivity in underserved regions.

Another potential consequence arises if large ISPs engage in blocking VAS content by manipulating data packet routing or restricting specific IP addresses, thus limiting users' access to these services. Although such blocking is difficult to implement effectively in practice—given the complexity of modern networks and the widespread use of multiple CDNs by VAS—it could still result in reduced access options and a degradation of service quality. Moreover, such measures would violate the Brazilian Civil Rights Framework for the Internet, particularly the principles of network neutrality, which prohibit the discrimination or blocking of data traffic based on content or origin, except in legally defined circumstances.

Additionally, there is a substantial risk that VAS may lack the interest or operational capacity to establish agreements with thousands of small ISPs, opting instead to negotiate only with larger operators. This could marginalize smaller ISPs, leaving them without optimized content access and reducing their competitiveness.

Compounding these risks, large operators might negotiate exclusive agreements for offering VAS content, further disadvantageing small ISPs. This phenomenon is already evident in sectors such as TV channel offerings and zero-rating services, where small providers struggle to access certain content.

Therefore, altering interconnection dynamics could compromise the Internet's resilience, particularly in regions where small ISPs are vital for connectivity[17]. While direct technical reliability

[17] See: https://telesintese.com.br/operadores-regionais-dominam-o-mercado-de-banda-larga-em-mais-de-cinco-mil-cidades-brasileiras/&sa=D&source=docs&ust=1729559687403682&usg=AOvVaw3KO-3E9MjUQUn0lRNnsF0E

may remain unaffected, the reduction in available routes and fragmentation of access could degrade service quality and weaken the network's capacity to recover from disruptions, especially in areas with more vulnerable infrastructure.

Impacted Enablers:
Reliability, Resilience, and Availability

(VII) Accountability and Responsibility

The proposal does not define the necessary supervision and governance mechanisms to ensure accountability for the commercial agreements established between ISPs and VAS, leaving critical questions about transparency and accountability unanswered.

In particular, the lack of clarity regarding who would be responsible for auditing traffic measurements is a key issue that must be addressed. Without a defined auditing structure, it becomes difficult to ensure that traffic measurements are conducted in a fair, transparent, and technically consistent manner, preventing potential distortions and discriminatory practices that could endanger the integrity of the Internet and its users.

Moreover, this lack of clarity contributes to regulatory uncertainty, as the absence of standardization and adequate oversight of measurements could open the door to commercial disputes and anti-competitive practices. Additionally, the inability to establish a robust governance framework risk undermining the trust of stakeholders, including both VAS providers and end-users.

Impacted Enablers:
Accountability
Collaborative Development, Management, and Governance

5. How Does the Regulatory Proposal Affect What the Internet Needs to Exist?

After analyzing the Conexis proposal, it is concluded that it directly impacts three of the five critical properties essential for the Internet's existence.

5.1. An Accessible Infrastructure with a Common Protocol

The Internet is an open platform platform where anyone, any person or network can connect and participate. The use of common protocols allows different networks and devices to communicate efficiently.

The Internet is supported by an accessible infrastructure based on common protocols that allow efficient and universal interconnection among different networks and devices. This characteristic is fundamental to ensuring interoperability, scalability, and the open nature of the Internet, enabling anyone or any network to connect and participate freely, without undue barriers.

The Conexis proposal primarily aims to implement charges based on the volume of traffic across operators' entire infrastructure, including access, distribution, and core (fixed and mobile networks)[18]. This significantly expands the current charging model, creating additional barriers to interconnection and potentially fragmenting the network.

Efficient interconnection relies not only on the availability of open protocols but also on commercial agreements that enable mutually beneficial traffic exchange. In the scenario where negotiations are mandatory, all VAS providers would be compelled to establish agreements with each operator to pay for the use of the networks. This would discourage the practice of open and voluntary interconnection, essential for the scalability and universality of the Internet, leading to an environment where only large companies could bear the costs and negotiation efforts, while small providers and new entrants would be disadvantaged.

Efficient interconnection relies not only on open protocols but also on commercial agreements that facilitate mutually beneficial traffic exchange. Under a scenario where negotiations become mandatory, all VAS (Value-Added Services) providers would be compelled to establish agreements with each operator to compensate for network usage. This approach discourages open and voluntary interconnection—essential for the scalability and universality of the Internet—and could lead to an environment where only large companies can afford the costs and negotiation efforts, disadvantageous to small providers and new entrants.

The impact of the Conexis proposal thus manifests primarily in the economic and operational efficiency of interconnection rather than in the technical protocols. While it remains technically feasible for any network to connect to another, economic conditions might render such

[18] In this regard, see pages 47-51 of Conexis's proposal.

interconnection impractical or less efficient for certain actors. For instance, the withdrawal of CDNs by VAS providers unwilling to comply with the proposed model would not violate technical protocols nor prevent interconnection per se but would lead to less efficient traffic routes. This could force the content of major VAS providers to be accessed through longer, potentially congested, or even international paths, increasing latency and degrading service quality for end-users.

Additionally, it does not clarify the outcomes if commercial agreements are not reached between operators and VAS providers. This raises the concern that operators might degrade traffic quality or even block access to VAS content in the absence of agreements. Such a scenario would compromise the universality and openness of the Internet, making user access to specific content or services contingent on commercial negotiations. This would violate the principle of accessible infrastructure for all and could result in the fragmentation of the user experience. Although subsequent regulation by the competent authority might address this lack of detail, the current gaps and the associated risks are concerning for network operation.

Thus, the proposal poses significant risks to the critical property of accessible infrastructure. In an alternative scenario where ISPs have the discretion to forgo charges and use this exemption as a competitive advantage, the impact would differ. ISPs opting not to impose fees could attract more VAS providers to their networks, offering users broader access to services and content without restrictions. This could foster competition among ISPs, driving investments in infrastructure and improvements in service quality. However, this approach could also create market inequalities, where only ISPs with greater financial capacity could afford not to charge fees, potentially marginalizing small providers. Moreover, a lack of uniformity in charging practices might confuse users and VAS providers, creating an unpredictable environment that could discourage innovation and investment in new services.

Therefore, the requirement for individual negotiations in all scenarios has the potential to fragment the user experience on the Internet, compromise accessible and universal infrastructure, threaten interoperability, limit the diversity of services, and discourage new content providers. This generates inefficiencies, undermines innovation, and harms the user experience on the network. Considering these considerations, the Conexis proposal represents significant and high risks to the critical property of accessible infrastructure supported by common protocols.

5.2. Decentralized Management and a Single Distributed Routing System

Distributed routing provides a resilient and adaptable network of autonomous networks, allowing local optimizations without affecting global connectivity.

Another fundamental characteristic of the open, flexible, and resilient nature of the Internet is its decentralized management and distributed routing system.

Throughout its history, the Internet has grown based on the principle that there is no centralized control determining how networks should interconnect or which routes traffic should follow. Each network, or Autonomous System (AS), makes localized decisions about its interconnections and traffic management, considering its own needs and circumstances. This creates a globally interconnected network where each operator voluntarily collaborates, ensuring that the Internet continues to grow organically and adapt to local demands. This characteristic enables the network's flexibility, scalability, and efficiency, ensuring that, even in the face of failures or disruptions, data traffic can find alternative paths to reach its destination.

As previously discussed, the proposal allows for two possible scenarios considering the mandatory nature of negotiation—one where commercial agreements between major VAS (Value-Added Services) providers and large ISPs are required to be remunerated, and another where operators may offer network fee exemptions as a competitive advantage. It is important to distinguish the technical and operational impacts of each scenario.

The first scenario could potentially impact the decentralized model, as the obligation to compensate operators for excess traffic volume might alter the voluntary dynamics of interconnection, imposing a more rigid control structure over data traffic. This could lead major ISPs or telecommunications operators to assume greater control over the traffic traversing their networks.

Historically, the Internet has allowed different networks to voluntarily choose whom to connect with, based on technical and commercial criteria that serve the interests of both parties. However, the Conexis Proposal appears to subvert this voluntary model by requiring major VAS providers to establish paid commercial agreements to ensure that their content traffic flows without degradation or blocking.

Introducing mandatory compensation forces major VAS providers to negotiate directly with large ISPs and telecommunications operators, which manage key routes for traffic delivery, to ensure their content reaches end-users without quality degradation. Without such agreements, the direct or preferred routes used by these VAS providers could be compromised, particularly if traffic measurement occurs at the distribution point, just before reaching CDNs.

If CDNs are removed, these actions would not completely block access to VAS content but would increase latency and degrade service quality, as traffic would be routed through longer, more congested paths, potentially even via international connections.

Moreover, while some regions and smaller ISPs have access to IXPs, allowing for direct routes between VAS providers and local networks, this is not always sufficient to ensure broad and efficient coverage. In many regions, large ISPs and telecommunications operators act as transit providers between regions and smaller ISPs and VAS providers, especially where IXP infrastructure is limited. As outlined in the transversal impacts, if these large ISPs degrade traffic from VAS providers without agreements, regions and smaller ISPs relying on these routes could also be affected, resulting in lower service quality for end-users.

Even though major operators mediate traffic for regions and smaller ISPs via tier 1 or tier 2 networks, the impact on the last mile remains significant, as many of these providers depend on outsourced transit networks to access content from major VAS providers. A lack of agreement between an operator and a VAS provider should not alter these routes, as regions and smaller ISPs already pay for this infrastructure. However, VAS traffic could be forced through the infrastructures of large ISPs, eliminating voluntary and decentralized alternative routes, thereby changing the current network dynamics.

This obligation could thus reduce route flexibility and limit open interconnection and innovation. From a technical perspective, this concentration of routes could reduce the network's resilience, as in cases of failures or congestion in these main routes, the Internet would have fewer alternative paths to ensure data traffic continuity. This could result in reduced redundancy and potentially greater vulnerability to regional failures or overloads.

In the second scenario, where payment for generated traffic volume is not mandatory, VAS providers would have the freedom to choose which ISPs to interconnect with and under what conditions. In this case, large ISPs might compete to attract VAS providers by offering better connectivity terms or waiving fees in exchange for competitive advantages.

However, even in this scenario, there may be subtle technical impacts on the network. For instance, if some major content providers decide not to interconnect with certain large ISPs due to costs, this could force traffic to be redirected through alternative routes. In certain regions or cases, these routes may be longer or less efficient, eventually impacting service quality and latency.

The primary issue would be balancing alternative routes with interconnection costs. If VAS providers opt for less direct or more complex routes to avoid charges from large ISPs, traffic efficiency could suffer. Additionally, end users relying on large ISPs might face connectivity issues if their operators lack agreements with certain VAS providers.

In conclusion, both scenarios present risks to the flexibility and efficiency of the distributed routing system, with the magnitude of the impact varying based on local infrastructure and the strategic decisions of VAS providers. In the case of mandatory remuneration, the impact would be more significant, with a medium-to-high probability of route centralization in the networks of large

ISPs. This scenario would result in a high negative intensity, as it would compromise network resilience and increase costs. In the optional scenario, the impact would be less severe, with a medium probability of occurrence but a moderate negative intensity, as alternative routes could be used, albeit with potential service quality degradation.

5.3. A Technology Neutral, General-Purpose Network

This property defines the Internet as a flexible and neutral platform regarding technologies and applications. It is designed to support a wide variety of technologies, applications, and services without favoring or discriminating against any specific use.

Conexis's proposal claims that the "insufficiency in revenue and operational results of telecommunications activity" is partly due to "legal and regulatory restrictions," such as "the prohibition of commercializing traffic prioritization on the network, imposed by Brazil's Civil Rights Framework for the Internet"[19].

The proposal further states that "based on a mistaken interpretation of the principle of network neutrality, which suggests that operators cannot offer differentiated treatment to VAS providers in exchange for remuneration, Big Tech companies have been increasingly demanding operational resources without proper compensation." Additionally, it argues that "instead of offering (and monetizing) network 'performance,' thereby ensuring, through pricing systems, the efficient use and proportional remuneration for telecommunications resources—which, as already recognized, does not violate the principle of network neutrality—operators have been forced to provide increasing 'raw capacity' for data transport and distribution without adequate compensation".

By asserting that "from the perspective of the telecommunications sector, the next stage of technological evolution in the architecture of information and communication services should involve the use of adaptive network resources to deliver service levels (availability, latency, jitter, throughput, and security) tailored to the needs of each user or application, rather than merely providing a 'wide pipe' through which data flows",[20] it makes it clear that Conexis perceives the principle of network neutrality as detrimental to the business model pursued by major telecommunications operators. For this reason, it suggests the principle's revocation or "flexibilization," allowing operators to impose charges on content providers based on traffic volume or the quality of services offered.

[19] In this regard, see p. 8.

[20] Similarly, see p. 6.

However, such premises affect a crucial aspect of the Internet's evolution: its design. Rooted in an agnostic, best-effort approach, the current design of the Internet has fostered innovation from its inception. It has enabled a wide range of services—such as voice communication, gaming, and streaming—to thrive without requiring approval from ISPs. This open environment has been pivotal in allowing small and medium-sized enterprises (SMEs) to reach global audiences, contributing to a vibrant and diverse online ecosystem.

When mandatory negotiation of commercial agreements between major VAS providers and ISPs for payment of a network fee is introduced, access to or quality of services becomes contingent upon such contracts. This poses significant risks to the network and undermines the fundamental principle of a global, open, general-purpose, and technologically neutral Internet.

The risks to this principle are substantial, particularly if VAS providers begin seeking ways to reduce traffic volume. For instance, a streaming provider might lower video resolution, leading to a noticeable decline in user experience quality.

The direct consequence for the Internet is a shift away from an agnostic, best-effort network model toward one where service quality and global implementation capability are conditioned by regulation and negotiations with operators.

In this scenario, the Internet could devolve into a fragmented collection of services accessible only to VAS providers capable of negotiating favorable terms with a select group of operators. This would fundamentally alter the Internet's character, limiting access and potentially excluding SMEs unable to participate on equal terms with major telecommunications operators in these negotiations.

To preserve the Internet's original design principles, it is essential to maintain its innovative spirit and ensure it remains an open, agnostic, and technologically neutral platform for all types of services.

6. How Does the Regulatory Proposal Affect the Realization of the Internet's Full Potential?

After analyzing the Conexis proposal, it is concluded that it directly impacts nine out of the ten enablers that ensure the Internet's full potential.

6.1 Easy and Unrestricted Access

It is easy to become part of the Internet, for networks and users alike. That means that for users the Internet is affordable and Internet services are accessible, and that networks can easily become part of the Internet, without unnecessary regulatory or commercial barriers for both groups.

Conexis's proposal could impose barriers to unrestricted access to services and applications on the Internet, directly undermining the goal of an open Internet.

From the perspective of end users, the proposal risks creating additional costs for accessing content provided by VAS, as these providers may need to pay for the traffic of their content through telecommunications networks. These costs could then be passed on to end users.

From the perspective of VAS providers, two distinct outcomes may arise. On one hand, large VAS may scale back their services in the country due to the additional financial burdens imposed by mandatory contracts with ISPs and telecommunications operators. These burdens could lead to a reduction in service quality — such as lowering video resolution, limiting access to features, or even withdrawing operations in specific regions—negatively impacting user experience and the local presence of digital services. Alternatively, there could be increased pressure to deploy additional CDNs as a way to optimize content delivery and reduce long-term operational costs. While this latter strategy may improve local Internet performance, it introduces additional costs for VAS providers and does not address the structural inequalities of the proposed pricing model.

Furthermore, the reduction in activity by these VAS could lead to distortions in the perception of total network traffic. With a decline in absolute traffic, the relative volume generated by smaller VAS users would proportionally increase. This could result in smaller VAS, previously below the regulator's traffic volume threshold to qualify as "large users," surpassing this limit without significantly expanding or altering their operations. Such a shift would not reflect the intrinsic growth of these smaller VAS but rather a decrease in the total volume of network traffic—in other words, a reduction of the "denominator".

As a result, smaller VAS—or even new entrants—could face significant disincentives to grow in the country, as they might become victims of their own success, being required to pay for the data traffic generated by their users once a certain threshold is exceeded. This dynamic creates a financial barrier to entry and growth, potentially restricting the number of players willing to compete, especially in the VAS field. Such a scenario negatively impacts the diversity of content and services, which is one of the foundational pillars of the Internet.

Additionally, the unpredictability in the availability of these services could have severe societal consequences, affecting essential day-to-day activities. Every component of the digital ecosystem depends on the others to function effectively. Infrastructure providers (telecommunications networks) rely on demand generated by VAS users, while VAS depend on infrastructure to deliver their services—such as video, audio, and messaging. If VAS operating costs rise and are passed on to end users, the number of users may decline, reducing the demand for infrastructure. This, in turn, directly affects the economic sustainability of networks, particularly in less profitable areas.

Ultimately, the enabler of easy and unrestricted Internet access is jeopardized not only by the direct imposition of costs on major players but also by an indirect effect that penalizes those seeking to grow. This undermines the promise of an open and inclusive Internet, fostering a scenario of power concentration, unequal access, and diminished diversity of content and services—core elements that have always defined the digital environment.

6.2 Unrestricted use and deployment of Internet technologies

The technologies and standards of the Internet are accessible for adoption without restrictions. This enabler extends to end-points, meaning that the technologies used to connect to and use the Internet do not require permission from a third party, operating system (OS) vendor, a network provider, or any other third party. The Internet's infrastructure is available as a resource to anyone who wishes to use it. Existing technologies can be integrated in and used to create new products and services that extend the Internet's capabilities.

The Internet was designed based on a modular model, where interoperable building blocks enable the creation of new functionalities without the need to completely overhaul the underlying infrastructure. This open architecture promotes an environment conducive to innovation, allowing different parts of the network to interact flexibly and independently, ensuring that new solutions can be seamlessly integrated into the Internet ecosystem.

The Internet's design has always fostered a natural evolution, driven by continuous development and adaptation to user demands and emerging technologies. This organic growth, anchored in the absence of barriers to entry and unrestricted access to network resources, is fundamental to its long-term sustainability and resilience. These characteristics enable the constant creation of new products and services, freely leveraging the existing infrastructure.

However, the negative impact of certain proposals on the Internet's full potential goes beyond limiting access for end users and VAS providers; it undermines the overall capacity to develop new technologies rooted in network operations.

From the users' perspective, additional traffic charges convey a message of restricted access and create barriers. From the perspective of technological development, these measures anchor innovation and network optimization to outdated standards, contradicting the vision of a more sustainable and advanced Internet. This discourages the development of technologies designed to optimize network performance and reduce traffic, such as CDNs and IXPs, while further contributing to an unequal playing field for technology developers.

Emerging technologies that require substantial data volumes for development and large-scale testing—such as augmented reality solutions, high-definition streaming, and novel forms of interactive services—may face significant setbacks. Smaller developers may scale down the reach and ambition of their innovations to avoid excessive costs, leading to missed opportunities for technological advancements that could benefit society as a whole.

Moreover, the imposition of specific contractual requirements risks fragmenting the use of the Internet's infrastructure. This fragmentation subordinates the capacity for innovation and experimentation to the constraints of commercial agreements, stifling the Internet's potential as an open platform for new developments. Technologies dependent on interoperability and unrestricted data traffic may be hindered by prohibitive costs imposed on content providers attempting to access or utilize portions of the network.

Thus, the impact extends beyond the continuity of VAS providers' activities, directly affecting the full utilization and continuous development of technologies that rely on an open, free, and neutral environment.

6.3 Collaborative Development, Management, and Governance

The Internet's technologies and standards are developed, managed, and governed in an open and collaborative way. This open collaboration extends to the building and operation of the Internet and services built on top of the Internet. The development and maintenance processes prioritized transparency and consensus, aiming to the optimize infrastructure and services to the benefit of the users.

The enabler of "Collaborative Development, Management, and Governance" is significantly impacted once the proposal has substantial potential to limit collaboration in the development, operation, and governance of the Internet in Brazil, introducing operational and financial barriers that discourage cooperation among the diverse stakeholders within the Internet ecosystem. These barriers directly challenge the fundamental goal of preserving an open and collaborative Internet.

As previously described, the requirement for negotiating agreements fragments the collaborative environment that has historically defined the Internet. With over 11,000 fixed broadband providers in the country, bilateral negotiation becomes impractical. This dynamic enables large VAS providers, equipped with greater bargaining power, to prioritize agreements with select ISPs and telecommunications operators. The result is a shift in the Internet's decentralized topology, concentrating traffic along specific paths and fostering structural inequalities.

Moreover, this approach shifts collaboration among stakeholders into competition for the most favorable agreements. This undermines network neutrality and diminishes the diversity and resilience of the ecosystem, creating "islands" of connectivity. Such fragmentation compromises the universality and interoperability of the network.

Throughout its history, the Internet has been governed through structures that integrate government, the private sector, civil society, the academic and technical communities, and end-users. These stakeholders collaborate to develop policies and standards that benefit all participants. Notably, during two public consultations conducted by ANATEL, only major mobile network operators supported the introduction of network fees. All other stakeholder groups, including representatives of small and medium-sized ISPs, largely opposed the measure[21].

Decisions made without broad multisectoral consensus risk undermining the effectiveness and legitimacy of governance processes. This concern is exacerbated by the potential concentration of decision-making power in the hands of telecommunications operators, marginalizing other stakeholders and increasing the risk of Internet fragmentation.

Additionally, such a proposal fosters tensions among ecosystem actors. VAS providers may no longer view telecommunications operators as partners in delivering services to end-users but as entities with potentially conflicting interests. This shift complicates cooperation in critical areas, such as implementing cybersecurity measures, combating illicit online activities, and promoting sustainable network management practices—similar to what has been observed in South Korea. The absence of effective collaboration may lead to fragmented responses to challenges that require coordinated efforts, ultimately affecting the Internet's resilience and security.

The concerns outlined above demonstrate that the proposal's underlying objective represents a direct restriction on collaboration. By prioritizing individualized commercial agreements over cooperative models of development and operation, it disregards the natural interdependence among large telecommunications operators, ISPs, and VAS providers.

[21] See: https://telesintese.com.br/guerra-de-pareceres-marca-tomada-de-subsidios-da-anatel-sobre-usuarios-das-redes/ and https://teletime.com.br/11/10/2023/anatel-recebe-mais-de-600-contribuicoes-sobre-deveres-das-big-techs/.

Traditionally, these actors collaborate to enhance network efficiency and improve service quality for end-users.

As such, the proposal risks undermining the open and distributed collaboration that characterizes the Internet, favoring centralization and creating bottlenecks that negatively impact innovation. Regulatory policies must carefully consider these impacts and prioritize solutions that promote collaboration, neutrality, and innovation to ensure the Internet remains an inclusive, dynamic, and transformative space for social, economic, and cultural development.

6.4 Unrestricted reachability

Internet users have access to all resources and technologies made available on the Internet and are able to make resources available themselves. Once a resource has been made available in some way by its owner, there is no blocking of legitimate use and access to that resource by third parties.

In an open and globally connected Internet, users can access services and content located anywhere on the network without facing any technical, commercial, or regulatory restrictions. Similarly, content or services provided by VAS can reach users anywhere on the Internet without any form of restriction.

The Conexis proposal negatively impacts this enabler. If a major operator, in the absence of a commercial agreement with a VAS, blocks its users' access to the content or services offered by that VAS, such content or services will no longer be able to reach all users without restrictions. This limitation arises purely from commercial considerations.

6.5 Available capacity

The capacity of the Internet is sufficient to meet user demand. While it's not expected to be limitless, there is sufficient infrastructure—such as ports, bandwidth, and services—to satisfy user needs.

The primary motivation behind Conexis's proposal to require large VAS to pay for the data traffic generated by their users is the alleged financial imbalance faced by ISPs, which purportedly lack sufficient resources to meet the growing investment demands for network evolution in response to increasing traffic volumes. If this claim were substantiated, the proposed payments might have a positive effect on network capacity.

However, there are significant disputes surrounding this alleged imbalance, with conflicting data presented by various studies, both in Brazil[22] and globally[23]. Notably, the figures provided by large ISPs seem to disregard substantial investments made by major VAS, both in their own transport networks—including submarine cables—and in ISPs' networks through the deployment of CDNs[24].

The figures also appear to overlook the beneficial role of IXPs. In Brazil, for example, NIC.br operates the largest IXP network in the world[25], comprising 36 IXPs, which significantly reduce the need for ISPs to invest in interconnection infrastructure.

Moreover, imposing mandatory payments on large VAS for the traffic they generate creates a strong disincentive for these providers to invest in network infrastructure and new technologies. This could result in outcomes contrary to the intended objectives, such as reducing the overall network capacity. Another potential adverse effect would be a slowdown in traffic growth on ISPs' networks, as VAS may take measures to minimize the fees paid, thereby reducing the demand for new capacity investments.

Finally, the proposal provides no assurance that the additional funds collected from VAS will be allocated to expanding network capacity. In practice, telecommunications operators might divert these resources to other purposes, such as increasing shareholder dividends or covering other operational expenses, without necessarily translating into infrastructure improvements for the Brazilian population.

6.6. Reliability, Resilience, and Availability

Data confidentiality, often achieved through tools such as encryption, enables end users to send sensitive information across the Internet without eavesdroppers and attackers being able to view the content or identify the parties involved. Allowing the transfer of sensitive information helps create a secure Internet. Data confidentiality also extends to data-at-rest in applications and on devices. (N.B., “confidentiality” also contributes to privacy, which is part of a trustworthy Internet).

[22] See Tiago S. Prado: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4517581.

[23] Also see the study by Analysys Mason: https://www.analysysmason.com/contentassets/4f86a8abd3e749718b4f0514c5d44e64/analysys_mason_impact_tech_companies_investment_-isp_economics_br_oct2022.pdf

[24] In this sense, see pp. 56-57: https://conselhodigital.org.br/wp-content/uploads/2024/05/CONSELHO-DIGITAL-Tomada-de-Subsídios-26-Anatel-Deveres-de-usuários.pdf

[25] In February 2024, IX.br registered an aggregate traffic exchange volume of 35 Tbit/s. The São Paulo IXP alone, which is the world leader both in traffic exchange volume and number of participants, reached 23 Tbit/s.

The enabler of "Reliability, Resilience, and Optimized Connectivity" is significantly impacted by the potential implementation of the proposal.

Various VAS provide essential services such as online banking, e-commerce, transportation, navigation, and productivity tools—services that support the daily activities of connected citizens. A small subset of these companies also operates the operating systems of our devices.

A key consideration is that ISPs and telecommunications operators are unable to distinguish between the types of traffic originating from specific sources. If the proposal leads these operators to restrict access to VAS traffic with which they do not have commercial agreements, it will negatively impact access to critical services that citizens rely on daily. This type of traffic restriction could severely hinder users' access to essential services.

This issue also extends to customer service (SAC), which often relies on messaging applications to provide fast and effective support. Restricting traffic could cause failures in these service channels, directly affecting the relationship between consumers and companies. Access to public services would be impaired as well, since many government health, education, and other essential service platforms depend on applications and servers operated by large VAS. Without access to such services, citizens would face difficulties in exercising their rights.

Another crucial point is the impact on operating system and security updates for devices, which are vital to maintaining data integrity and protection against digital threats. Blocking or restricting traffic would leave users vulnerable to emerging threats and significantly reduce the resilience of both devices and the network. Additionally, cloud services—widely used to store and share documents, photos, and personal data—would also be affected. It is important to note that this data belongs to the end-users, not the VAS providers, who merely offer the cloud storage infrastructure.

Thus, the proposal’s implementation could result in disconnection or a degradation in the quality of critical services, directly affecting the reliability and resilience of Internet infrastructure. The capacity for optimized connectivity would also be compromised, as restricting or blocking access to certain services or content would make the network less predictable and efficient in delivering the services users depend on.

In conclusion, the impact goes beyond simple commercial restrictions—it touches on crucial aspects of connected citizens' daily lives, affecting their digital security, access to essential services, and their ability to fully utilize the Internet infrastructure.

6.7. Accountability

Accountability on the Internet gives users the assurance that organizations and institutions they interact with are directly or indirectly acting in a transparent and fair way. In an accountable Internet, entities, services, and information can be identified and the organizations involved will be held responsible for their actions.

The enabler of "Accountability" is profoundly affected by the proposal to implement charges based on the volume of traffic generated by VAS users. Although issues of clarity and transparency have already been addressed in earlier sections of this report, it is crucial to delve deeper into the analysis to identify additional impacts and nuances the proposal introduces to accountability within the Internet ecosystem.

A central concern is that it could amplify the power of existing entities that lack adequate accountability mechanisms. Implementing individual charging agreements creates a situation where operators act not only as infrastructure providers but also as arbiters in traffic management and service access. This dual role could generate conflicts of interest, especially in situations where there is insufficient transparency regarding the criteria for setting tariffs and defining access conditions.

Moreover, it fails to outline clear governance or oversight mechanisms to ensure that these negotiations are conducted fairly and equitably. Another issue is the potential increase in opacity regarding network operations. If operators begin managing traffic based on non-transparent commercial agreements, end-users may face challenges in identifying the root cause of access problems or service degradation. This lack of clarity makes it difficult to assign responsibility in cases of service failures or poor quality, undermining users' ability to demand improvements or reparations. Furthermore, the proposal could compromise transparency in pricing and charging processes.

It is important to emphasize that the lack of transparency and accountability can erode user trust, not only in ISPs but also in VAS and the entire digital ecosystem. When users discover that their preferred services are being impacted for unclear reasons or due to unresolved commercial disputes, they may react with dissatisfaction and widespread distrust. This could hinder the adoption and use of the Internet as an essential tool in daily life.

Another possible consequence is the difficulty in establishing accountability in cases of legal or regulatory violations. If an ISP decides to block or degrade a VAS service without clear justification—or in ways that contravene existing legislation—the absence of transparent

mechanisms to identify and rectify such actions will hinder regulatory bodies and the judiciary from holding offenders accountable.

In conclusion, the lack of accountability and transparency could lead to situations where blocking tools are implemented without adequate oversight, posing risks to freedom of expression and users' rights. Therefore, without proper safeguards for accountability and responsibility, the proposed changes could result in a less transparent, less fair, and less reliable digital environment, allowing operators to act without adequate supervision and without clear accountability mechanisms.

6.8. Integrity of information, applications, and services

The integrity of data sent over the Internet, and stored in applications, is not compromised. That is, information sent over the Internet shouldn't be modified in transit, unless directed by the communicating parties (e.g., a captioning bot may be useful to turn spoken words into text). Critical underlying Internet services, such as DNS and the routing system, cannot be manipulated or compromised by malicious actors. Data stored in applications cannot be manipulated or compromised by third parties.

Data integrity is a critical concern, and the fundamental protocols of the Internet are designed to ensure that data reaches its destination accurately and intact. Even in scenarios where traffic is degraded, any corrupted or lost data packets during transmission are detected and retransmitted. Therefore, the proposal, in its current form, does not directly compromise data integrity in terms of corruption or irreversible loss.

However, traffic degradation and increased latency can indirectly affect the integrity of connected systems and devices. If the traffic related to software updates or security services is impaired, devices and applications may become outdated or vulnerable to attacks. System integrity depends heavily on the timely and reliable receipt of updates and security patches. Prioritizing traffic based on commercial criteria could delay or prevent these updates, thereby increasing the risk of third-party exploitation. Sectors such as healthcare, finance, and government, which rely on data integrity and confidentiality to operate securely, could be particularly affected. Disruptions in traffic could lead to failures in critical systems, exposure of sensitive information, and even compromise national security.

The unpredictability in service availability and quality may discourage the use of online platforms, negatively impacting businesses, consumers, and the digital economy in general. This represents a significant setback to the full potential of the Internet, as such unpredictability erodes user trust not only in specific services but also on the Internet as a whole, with long-term consequences.

6.9. Data confidentiality of information, devices, and applications

Data confidentiality, usually accomplished with tools such as encryption, allows end users to send sensitive information across the Internet so that eavesdroppers and attackers cannot see the content or know who is communicating. Allowing the transfer of sensitive information helps create a secure Internet. Data confidentiality also extends to data-at-rest in applications and on devices. (N.B., “confidentiality” also contributes to privacy, which is part of a trustworthy Internet).

Conexis's proposal may significantly impact the enabler of Confidentiality of Data in Information, Devices, and Applications.

Large VAS that offers essential security and privacy services may have their availability and performance impaired if they do not establish agreements with operators. This limits the predictability and reliability of these services, potentially compromising users' trust in the protection of their information.

Without an agreement between the parties, essential services and VAS that include automatic update systems for critical security patches may be disrupted. Any interruption or delay in distributing these updates can extend the time during which known vulnerabilities remain exploitable, jeopardizing the confidentiality and integrity of users' systems. Such disruptions increase exposure to security threats, highlighting the importance of timely and reliable update mechanisms to ensure system protection.

In summary, it has the potential to substantially weaken users' ability to preserve the confidentiality of their information. Traffic prioritization based on commercial agreements can lead to the degradation of essential services for data protection, discourage the use of secure tools, and considerably limit the availability of security services. Therefore, it is vital that these issues are carefully analyzed and debated before any implementation to ensure that users' confidentiality and security are not compromised in the name of commercial interests.

7. Final Recommendations

Based on the Internet Impact Analysis, it is recommended that the proposal be rejected. The evidence gathered demonstrates that the implementation of network fees, as proposed, presents unacceptable risks to the future of an open, globally connected, secure, and reliable Internet in Brazil.

If implemented, the proposal may result in: 1) Weakening network neutrality, creating an unequal environment for online service providers and limiting innovation; 2) Fragmentation of the Internet, compromising universal connectivity and creating disparities in access to services and content; 3) Market concentration, favoring large companies to the detriment of small providers and new entrants; 4) Increased costs for the end-user, directly impacting Brazilians' pockets and limiting Internet access; 5) Reduced network capacity and resilience, discouraging investments in infrastructure and innovation; 6) Intensification of connectivity access inequalities, impairing the availability and quality of service in socioeconomically vulnerable areas; and 7) Reduced transparency and accountability, making supervision and social control over the use and development of the Internet more difficult.

The magnitude of the identified negative impacts, coupled with the absence of positive effects, suggests that the proposal presents fundamental and foundational issues, which should also be taken into account in any similar proposals that may be reintroduced.

Instead of adopting measures that fragment the Internet and harm users, it is recommended that Anatel and other stakeholders in the Brazilian digital ecosystem focus on: 1) Strengthening existing mechanisms for infrastructure investment, encouraging competition, diversity of actors, and the expansion of connectivity in less favored areas; 2) Promoting collaboration among stakeholders through multistakeholder dialogues that include operators, content providers, civil society, the technical community, and the government; 3) Encouraging innovation and the development of new technologies that optimize the use of existing infrastructure and promote digital inclusion; 4) Ensuring network neutrality, guaranteeing that the Internet continues to be an open and equal space for all users; 5) Implementing effective mechanisms for transparency and accountability that ensure justice, equity, and adequate supervision over the use and development of the telecommunications layer.

The future of the Internet in Brazil depends on conscious decisions that prioritize the public interest and the construction of a more inclusive, innovative, and democratic digital ecosystem. Rejecting the proposal is a critical step in this direction. It is essential that Brazil position itself as a defender of an open, globally connected, secure, and reliable Internet, fostering a more just and prosperous digital future for all.

Appendix - Glossary

Value-Added Service (VAS): Refers to all types of digital services, such as streaming platforms, social networks, and other content providers that use telecommunications infrastructure to provide their services without being directly responsible for maintaining that infrastructure. Conexis's proposal refers to these services as "over-the-top" (OTT), a concept that designates platforms offering content directly to the consumer via the Internet, without involvement from infrastructure providers. However, for the purposes of this study, the term "over-the-top" does not adequately reflect the complexity of these services and their interaction with the network. Therefore, the term Value-Added Services (VAS) more accurately captures the role played by these companies in the Internet value chain.

Network Fee: Conexis's proposal employs the concept of "fair share" to justify the need for VAS to contribute to the maintenance of networks proportionally to the volume of traffic they generate, aiming to alleviate the financial impact on telecommunications operators. Although the term suggests an equitable distribution of costs according to the operators' perspective, it may not reflect the complexity of the proposal's impacts on different actors within the Internet ecosystem. Thus, for this analysis, the term "network fee" was chosen as it is a more technical and precise denomination, widely used in international discussions on the subject. It is worth noting that "fair share" carries a connotation of fairness in cost-sharing, which can distort the perception of the proposal's impacts on different actors within the Internet ecosystem. The use of "network fee" therefore seeks to ensure neutrality in the analysis and avoid interpretive biases[26].

Network Neutrality: A principle established by Article 9 of Law 12,965/2014 (Brazilian Internet Civil Rights Framework) in Brazil, which guarantees that all data traffic is treated equally, regardless of content, origin and destination, service, terminal, or application. Traffic discrimination can only result from “technical requirements indispensable to the provision of services and applications” or in case of “prioritization of emergency services,” with discrimination for commercial reasons being prohibited. According to this principle, operators cannot prioritize or discriminate against certain content or services, ensuring that the Internet remains equally accessible to all users. In the context of Conexis's proposal, network neutrality is one of the main points of controversy, as the introduction of a charging model based on traffic volume raises questions about its compliance with this principle. Differentiated charging, even if supposedly based only on traffic volume, can

[26] In the Brazilian public debate, other terms are used to refer to this fee, such as "fair share," "network fee," and "Internet toll." ISOC Brazil, for example, uses the term "Internet toll" in its campaign of the same name, aiming to highlight the potential negative impacts of the proposal on end-users. In international discussions, the term "cost sharing" is also frequently used, referring to the division of costs between internet providers and large traffic generators.

create barriers that affect equal access to certain services, compromising the open and accessible nature of the Internet.

Peering: The process by which two telecommunications networks, or Internet Service Providers (ISPs), establish a direct connection between themselves to exchange data traffic. This practice is generally done without costs, in a mutually beneficial arrangement where both parties gain by exchanging data directly without the need to use intermediary networks. The goal of peering is to reduce latency, improve service quality, and lower costs by allowing data traffic to flow more efficiently between networks.

Transit: A service whereby one ISP pays another ISP to transport its users' data traffic to networks not directly connected to it via peering. In other words, an ISP "buys" access to other networks through a transit provider. Unlike peering, transit is a paid service, and costs are usually based on the volume of data trafficked.

Traffic: Refers to the volume of data transmitted over a telecommunications network. This includes the movement of data packets between devices, servers, and networks, whether on the Internet or other telecommunications infrastructures. Traffic is measured in terms of data volume (usually in gigabytes or terabytes) and can vary significantly depending on the services used, such as video streaming, file downloads, videoconferencing, e.g.

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