Exploring the negative impacts of legally mandated dispute resolution in IP interconnection

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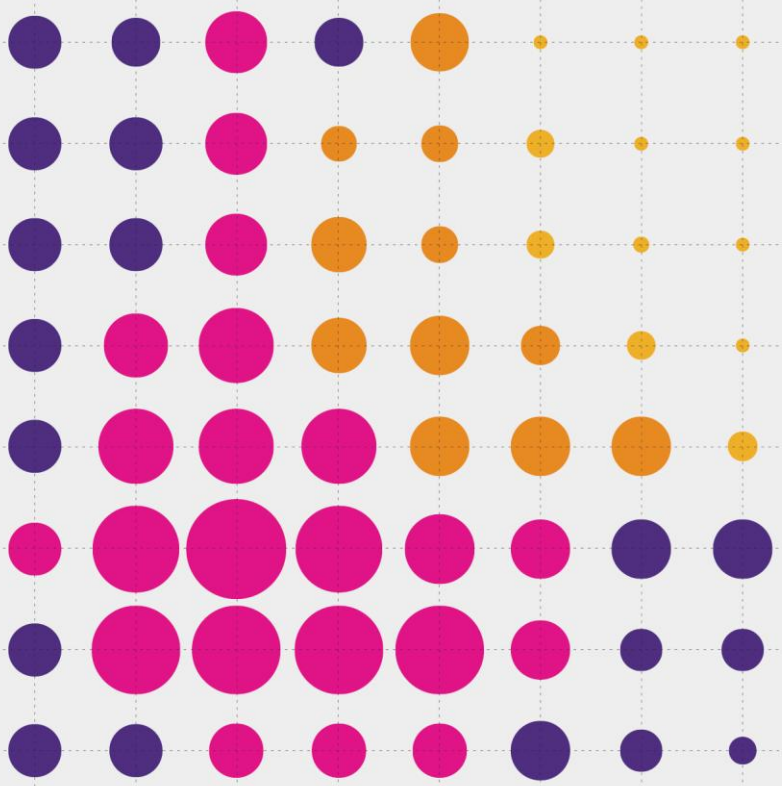

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Plum offers strategy, policy and regulatory advice on telecoms, spectrum, online and audio-visual media issues. We draw on economics and engineering, our knowledge of the sector and our clients' understanding and perspective to shape and respond to convergence.

About this study

This study for the Computer & Communications Industry Association (CCIA Europe) examines the notion of dispute resolution in the context of IP interconnection, focusing on competition in the market, current approaches to disagreements and disputes, and the likely consequences of a dispute resolution mechanism in this space.

This study is an independent report funded by the Computer & Communications Industry Association (CCIA Europe). The opinions offered herein are purely those of the author and do not necessarily represent the views of CCIA Europe.

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Summary

IP (Internet Protocol) interconnection has enabled efficient traffic exchange since the dawn of the Internet. It has evolved over time to minimise the costs to networks of exchanging Internet traffic between users and delivering requested content and services, while ensuring universal reachability between every Internet user. It exists in principally two flavours: peering - which is between networks, predominantly settlement free and informal – and transit – a paid service which connects networks to the entire Internet.

This ecosystem is particularly vibrant in Europe, with some of the largest Internet Exchange Points (IXPs) in the world present in our region[1] - these European cities are not just regional but global hubs for connectivity, datacentres and Internet traffic exchange - and with a wide choice of transit providers, with IP transit prices on par with the most attractive in the world[2]. All evidence points to a healthy and competitive IP interconnection market as pointed out by BEREC in its 2024 report on the IP interconnection ecosystem[3]. In fact, it is worth noting that when delivering traffic requested by an end user, there are plenty of substitutable routing options. The only segment of the route where there is no choice is when such traffic reaches the user's Internet Service Provider (ISP).

Despite this clear evidence and the lack of friction in the IP interconnection market, the European Commission is considering changes to EU legislation. These changes, pushed by a small number of large European incumbent telecom operators, would result in dispute resolution mechanisms to be applied to IP interconnection, either by reclassifying participants in the Internet ecosystem as public electronic communications networks or by introducing specific arrangements for IP interconnection.

There are millions of peering connections in Europe[4], not to mention other modes of IP interconnection. In this context, there have been less than a dozen disagreements noted between networks in the last decade, only a handful of which have required external resolution.

There are very few disputes in the IP interconnection space for the following key reasons:

- The mutually beneficial nature of settlement free peering agreements, reducing costs to both networks, improving quality of experience for end users, and increasing Internet reliability and resilience;
- The existence of abundant alternatives for networks who decide they do not wish to peer; and
- The efficiency of existing contractual law, competition rules and open internet rules when it comes to resolving disagreements.

All in all, in recent years, out of millions of interconnection relationships in Europe, we count only one dispute resolved by a regulatory authority (in Switzerland). The other handful of disagreements, in France, Germany, Italy or elsewhere that were not resolved between the participants, were concluded through existing contractual law, open internet regulations or competition law provisions.

Regulated dispute resolution and arbitration mechanisms are principally used to force open monopolies, and in the voice interconnection space, apply to simple one to one relationships between networks. IP interconnection, however, is multi-path, dynamic, and offers plenty of alternatives for traffic routing and exchange in real time. It

[1] According to the Euro-IX IXP database, Frankfurt is #2 in the world, Amsterdam is #3, and London is #4 by number of connected networks.
[2] IP transit prices at Telegeography, 2024
[3] BEREC Report on the IP Interconnection ecosystem, 2024
[4] DE-CIX – one Internet Exchange in Europe – has 1,000 members. Not every member will peer with every other member, but if they did, the number of relationships would be 1000 × 999 ÷ 2 = 499,500. There are at least two other IXPs of comparable size in the EU (AMS-IX and France-IX, and dozens more of smaller size. As another point of reference, see footnote 8, PCH analysed 15 million peering connections worldwide, which means there are more than a million in Europe.

is hard to imagine how a dispute resolution body would be able to decide on and impose one solution out of many technical options, or could force the flow of traffic through a particular link.

Mandated dispute resolution mechanisms would incentivise some large ISPs to trigger disputes as a means to earn fees to deliver traffic requested by their customers. By multiplying disputes, and counting on the precedent setting dimension of dispute resolution, they hope for the new norm in Europe to become paid peering if enough cases go their way. Already, there are a few cases where large vertically integrated ISPs – against the spirit of the Open Internet Regulation – are leveraging their significant captive subscriber base to strongarm other networks, including Content and Application Providers (CAPs) and Content Delivery Networks (CDNs) to pay to deliver traffic demanded by the ISP's end users. Introduction of forced peering mandates through dispute resolution, as recently suggested by the Commission[5], could only reinforce that leverage, since indirect traffic exchange via transit would no longer be an alternative.

All the above would lead to network fees becoming the norm in Europe, not only in violation of net neutrality and industry norms, but with dire consequences.

- Some networks would likely radically change their peering policies, de-peering inside the European Union to interconnect outside the jurisdiction (for example in London). This would increase the cost of traffic delivery, as well as degrade the quality of experience for all EU end users. The precedent of South Korea's attempts at legislating for "network fees" has seen this approach play out, with its negative consequences.

- The whole Internet ecosystem would suffer from network fees, except for large ISPs. Large incumbent telecom operators are already in a position to leverage their "termination monopoly" of traffic delivery to their broadband subscribers to strongarm other networks into negotiating paid peering. Smaller ISPs have less leverage and would face increased costs for traffic delivery, and thus would not benefit, and would be disadvantaged in comparison to their larger competitors, harming competition in the Internet access market.

The broader consequences on the European digital economy would be significant.

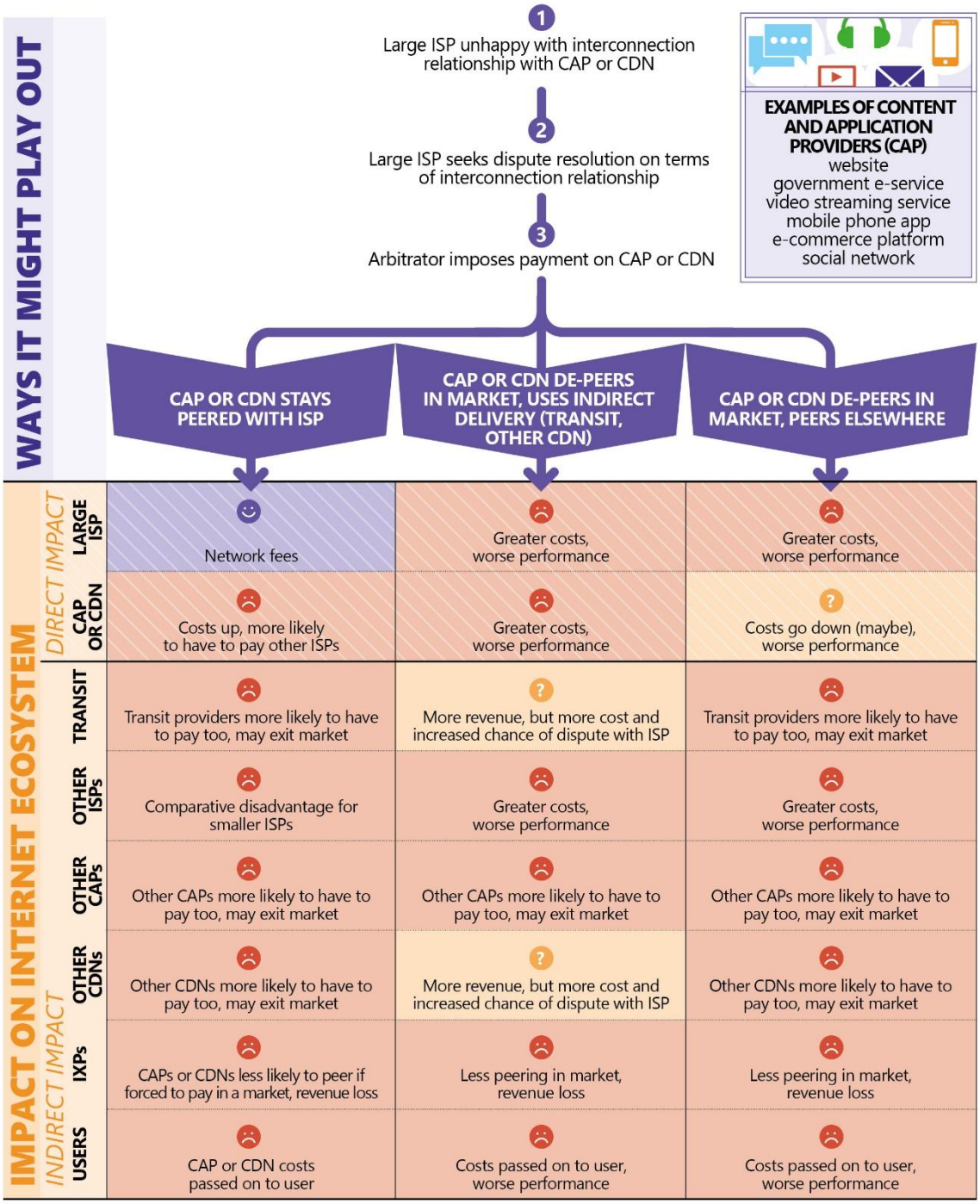
- **The entire digital ecosystem would be impacted by these levies on traffic**. For example, European websites, apps, cloud services, and broadcasters would either pay higher prices for their Internet connectivity, or experience degraded service quality, likely both.

- **The price of online services would increase across the entire value chain**, leading to slower adoption of innovative services, particularly in the B2B space where cloud and other productivity services would cost more for a potentially lower quality. European SMEs in sectors such as manufacturing, healthcare or the financial sector, would all face higher costs to use cloud services: for example, hospitals relying on cloud-based telemedicine and health records would face higher costs and possibly degraded service due to traffic levies, resulting in lagging video consultations and slower data access, ultimately affecting patient care. Considering digitisation of businesses in Europe is lagging already[6], this would be a step in the wrong direction. Furthermore, adoption of innovative technologies such as AI would be slowed down significantly.

- **The functioning of the entire Internet would be harmed**: where interconnection decisions now are made on the basis of technical quality, reliability, resilience and cost considerations, the burden of regulated dispute resolution would lead to slow, high-friction negotiations, and encourage sub-optimal network architectures, designed to avoid regulated network fees.

[5] EY Questionnaire for the survey on the EECC and the Digital Single Market (2025) Q20
[6] According to the Digital Economy and Society Index, 2024, less than 60% of SMEs (10-249 employees) have at least a basic level of digital intensity

Figure 1: Consequences of adverse IP interconnection dispute resolution decisions



It should be apparent that dispute resolution in IP interconnect is not only unnecessary, considering the effectiveness of the current market, but can only lead to a less efficient, more fragmented and less innovative digital Europe, precisely the opposite of the European Commission's goals.

1 Introduction

The Internet is made up of many independent networks, but all these networks need to connect to each other for the Internet to function – IP interconnection is the various ways that different Internet networks connect and communicate with each other.

There are two types of interconnection – transit, which is a paid service providing a network with connectivity to the whole of the Internet; and secondly peering, which is a mutually beneficial arrangement between two networks to just exchange traffic between each other and their customers, and in almost all cases is done without any payment, nor contract.

Thanks to IP interconnection, all networks making up the Internet – be they Internet service providers, or networks hosting websites, gaming app providers, message boards, audio or video streaming providers – have the opportunity to control their costs by deciding how and with whom they interconnect.

As such, IP interconnection is fundamentally different from the legacy interconnection mechanisms of the telecommunications sector for voice and SMS, which are normally organised around a "Sending Party Network Pays" philosophy. There, the operator whose network delivers the call or SMS to its destination charges a wholesale fee to the network from which the call originates. Given the fact that the destination telecoms network operator holds de-facto monopoly control over all calls or SMS reaching their end users, significant regulatory intervention has been needed to reduce excessive wholesale charges being applied by said operators. Regulated wholesale charges apply today, and these represent a specific per minute or per SMS transaction cost.

By contrast, IP interconnection is dynamic and supports real time multi-path connections, routing traffic through multiple possible routes to deliver a wide range of content and services, that are requested by users, and delivered to them over their ISP. As a result, everyone who relies on the Internet—whether for personal use or commercial activities—benefits from a stable and generally low-cost foundation.

Unlike other industries, such as cable TV, Internet content and access exist independently, and there is no necessity for payment from one to the other for users to access a particular service, or for that service to be able to reach any Internet user.

Figure 1.1: A primer on IP interconnection

The term "IP interconnection", as explained above, encompasses a range of possible relationships between two parties. One type of relationship is transit, a clear customer-supplier relationship, where the customer is paying the supplier for access to essentially the whole Internet. Another is peering, where the two parties exchange traffic destined for each other's networks, almost always for no fee, and often with no agreement at all. Neither party would consider itself the "customer" of the other in this case. There are also possible relationship types that sit somewhere in between these two – for example the rare case of "paid peering", where one party pays to peer with the other's network. Different in name but similar in character is a transit service which is only effectively used to exchange traffic with the peer network – this is often sold by large vertically integrated ISPs as the only effective way for the rest of the Internet to reach users on their network with reasonable quality of experience.

A number of empirical analyses of the IP interconnection market in Europe have shown that it is highly competitive and benefits all players in the value chain in significantly reducing their costs. Europe has probably the most dynamic IP interconnection market worldwide: European Internet Exchange Points (IXPs) are amongst the largest in the world (e.g. AMS-IX, LINX, DE-CIX, etc). The most recent foundational study in this respect is the

third BEREC Report on the IP interconnection ecosystem (2024) which not only states that the market does not display signs of market failure but even concludes: "*BEREC considers that the IP-IC ecosystem is still driven by functioning market dynamics and by the cooperative behaviour of market players. Despite this, BEREC is aware that a few IP-IC disputes have occurred since 2017, and BEREC's workshops also revealed similar insights. BEREC notes that stakeholders typically did not call for regulation but suggested monitoring and a case-by-case assessment.*"[7] Previous iterations in 2012 and 2017 had concluded much the same. The market driven success of IP interconnection – as again confirmed by BEREC's analysis – is illustrated by the fact that the vast majority – 99.998% - of peering relationships are forged informally, rather than being based on contractual stipulations[8].

Despite the technical consensus that the IP interconnection market functions well, and the low number of disputes, the European Commission floated the idea in its 2024 White Paper on "How to master Europe's digital infrastructure needs?" that the scope of the European Electronic Communications Code (EECC or "the Code") could be broadened, effectively resulting in dispute resolution mechanisms being applicable not only to public electronic communications networks and services (ECN/ECS) as defined today, but also to IP interconnection. Some national regulatory authorities have expressed similar views, in particular AGCOM in Italy who are considering reclassifying Content Delivery Networks (CDNs) as public ECNs[9]. Since the Code has its own arbitration mechanism – originally designed to break open monopolies and counter misuses of significant market power – this could then be applied to IP interconnection.

Given that

- the European Commission's White Paper "How to master Europe's digital infrastructure needs?"[10] refers to the potential introduction of a dispute resolution mechanism,
- the Commission's recent Call for Evidence[11] indicates the possibility of "*empowerment of NRAs/BEREC in creating effective cooperation/a level playing field [in IP interconnection]*", and
- specific stakeholders (primarily large ISPs) call for a Final Offer Arbitration system to be introduced in IP interconnection[12],

this report examines the notion of dispute resolution in the context of IP interconnection. It is structured in three parts.

1. First, we examine IP interconnection disagreements and the small number of recorded disputes, analysing how they all were resolved, concluding that the existing set of tools in the regulatory arsenal in Europe are working effectively;
2. Second, we analyse dispute resolution mechanisms and conclude that not only would they be inadequate to address IP interconnection disagreements, they would be very hard to apply to such dynamic exchanges of data;
3. Third, we explore the potential impacts that a mandated dispute resolution mechanism would have on IP interconnection and conclude that it would inevitably lead to network fees, with damaging consequences to the digital economy in Europe, and probably the economy as a whole.

[7] BEREC (2024), ibid
[8] Packet Clearing House, 2021 Peering Survey
[9] Avvio del procedimento istruttorio e della consultazione pubblica per la ricognizione delle condizioni di applicabilità del regime di autorizzazione generale previsto dal codice alle Content Delivery Network
[10] European Commission: How to master Europe's digital infrastructure needs (2024)
[11] European Commission: Call for Evidence, 2025
[12] Strengthening Europe's digital infrastructure to enable our digital future, Telefonica (2023)

2 Dynamics in the IP interconnection ecosystem

The Internet is a collection of thousands of different networks that are all run separately and autonomously. These networks need to interconnect in order that every endpoint on the Internet can reach every other. Networks may offer complementary services – for example a network hosting a banking app may serve customers on a mobile access network – or they may compete – such as two ISPs in the same market, or two cloud providers. Regardless, these networks need to interconnect, directly or indirectly, for the Internet to work.

Two IP networks may not agree on how or even whether they should interconnect but, unlike interconnection relationships in legacy voice and SMS, there are many different ways that data may flow between IP networks. Disagreement usually means that a different solution is explored, and does not imply irreconcilable conflict and any disagreements are not usually visible to users. In this section, we distinguish *disagreements* from *disputes*, which are a form of escalation in which a resolution other than an amicable "agree to disagree" is sought, possibly involving some form of third party (courts, authorities, etc).

To explain why disputes are so rare, it's key to understand better how IP interconnection works.

2.1 How IP interconnection works

There are effectively two types of IP interconnection available between Internet network operators – transit and peering.

Transit is a paid connection between [a] and [b], [a] being a customer network seeking access to the whole Internet, and [b] being an upstream provider, who delivers [a] with access to the whole Internet. Transit is effectively the wholesale version of what a consumer buys from an ISP – it is a connection to the entire Internet. The upstream provider takes on the responsibility of carrying [a]'s traffic to and from essentially any point on the Internet. [a] pays [b] for the connection to the Internet, regardless of the flow of traffic.

Given that no one network has universal reach, this requires the transit provider to themselves either purchase transit, or to establish peering with multiple other networks, usually a combination of both. Almost every network needs to buy transit, otherwise they can't reach every other network on the Internet – the only exception is a few networks at the top of the transit "tree" – Tier 1 providers.

Peering is a direct connection between one network and another network, where those two networks only exchange traffic with each other (not the rest of the Internet), and their downstream customers. Peering doesn't give a network access to the whole Internet, so is a connectivity optimisation and is not required to run a network. Transit, however, is required: if a network cannot provide access to the whole of the Internet, that network is not able to offer Internet access services to their end users. This means that

Figure 2.1: About Tier 1 Networks

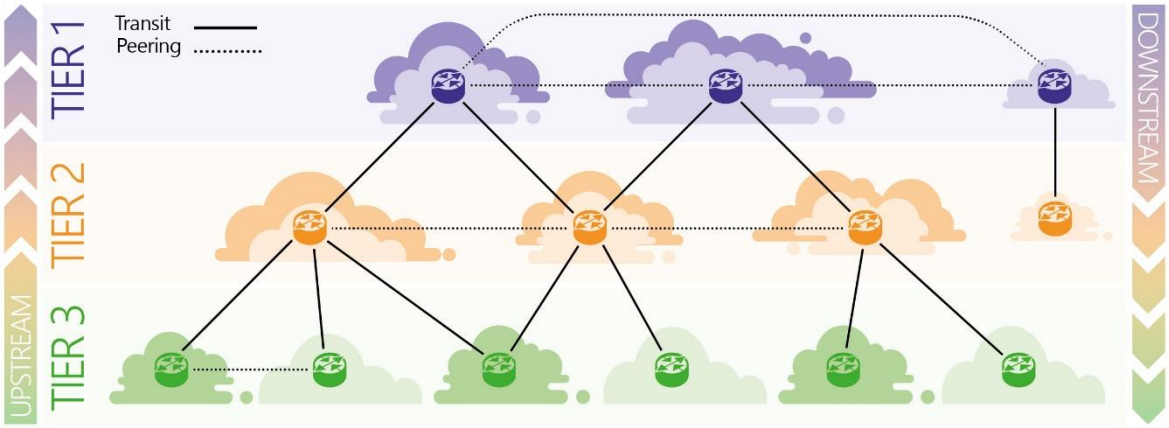
A network that does not purchase transit and utilises only settlement-free peering to other Tier 1 networks, is known as a "Tier 1" network, of which there are around a dozen worldwide. Tier 1 providers typically have global reach and extensive international networks.

Tier 1 networks are a mix of primarily wholesale carriers, who sell transit to smaller networks – for example Arelion and GTT – and a few large ISP networks with a large number of access customers – for example NTT, Telefonica and Deutsche Telekom.

Tier 1 networks must maintain a "full mesh" of peering with every other Tier 1 network in order to be able to reach the whole of the Internet.

even if one network doesn't have a direct peering relationship with another, a content provider network for example, the two networks can still communicate, using the transit providers between the two networks.

Figure 2.2: Internet network hierarchy and relationships



Because peering is optional and based on two networks agreeing that interconnecting is mutually beneficial, it has almost always been free of charge – known as "settlement free". This applies regardless of traffic flow or volume. Peering can either be "private", a bilateral arrangement over a direct fibre connection between two networks, or "public", over an Internet Exchange Point (IXP), where many networks connect once to a shared fabric run by the IXP, and can then reach and – if they so wish – peer with every other party on the Internet Exchange. For example, the AMS-IX Internet Exchange Point in Amsterdam has over 800 connected networks[13].

Peering can provide benefits in terms of reduced costs for both parties (traffic between them no longer has to use paid transit connectivity), improved performance for the two networks' end users due to the more direct connection between them, and greater reliability and resilience due to the more predictable routing of traffic.

In addition – in contrast to voice and SMS interconnect where agreements are typically commercial and have required extensive regulation to prevent abuse – IP peering has such well understood operational and technical norms that, according to a 2021 worldwide study, 99.998%[14] of peering arrangements are concluded without any contracts or paperwork.

Of the remaining 0.002%, the vast majority are formalised agreements with symmetric terms – that is, the parties still agreed to peer settlement-free, but they required a formalised contract.

It is possible to pay for peering in certain circumstances, but it is exceedingly rare. Typically, two networks will either work through their requirements with their desired peer network so they can establish settlement-free interconnections, or they will not peer at all.

Out of the 15 million peering arrangements that were analysed in the 2021 study, only 57 were found to have "asymmetric terms", and while the terms were not disclosed in the survey, was assumed to mean there was payment for peering. This amounts to 0.0004% of all peering arrangements, and only 0.2% of those formalised in a contract.

In the case of IP transit, Europe is blessed with a competitive wholesale IP transit market, with network operators having a wide choice of transit providers, and transit prices that are among the lowest in the world[15].

[13] AMS-IX
[14] Packet Clearing House, 2021 Peering Survey
[15] Telegeography – IP Transit Price Erosion: Significant Regional Differences Remain – October 2024

Furthermore, Europe has perhaps the richest peering interconnection ecosystem of any region in the world, with peering occurring in hundreds of datacentre facilities across the continent, and with dozens of Internet Exchange Points (IXPs), including three of the largest IXPs in the world in Frankfurt, Amsterdam, and London. A conservative estimate puts the number of peering connections in Europe in the millions.

European IXPs and the broader interconnectivity ecosystems around them are global hubs, attracting networks and investment from the Middle East, Asia, Africa, and the Americas. For example, Equinix invested $103m in their most recent Frankfurt facility, FR13, and the recent Pakistan and East Africa Connecting Europe (PEACE) cable, which lands in Marseille, a growing interconnection hub, was invested in by Singtel, Telecom Egypt, PCCW, and others. Telegeography ranks Frankfurt as the most connected city in the world in their Market Connectivity Score[16], with Amsterdam fourth and Paris ninth. Successful Internet Exchanges are evidence of a vibrant investment environment for data and connectivity infrastructure, and the network effects that they offer drive a virtuous circle of ever greater investment.

This is a European success story.

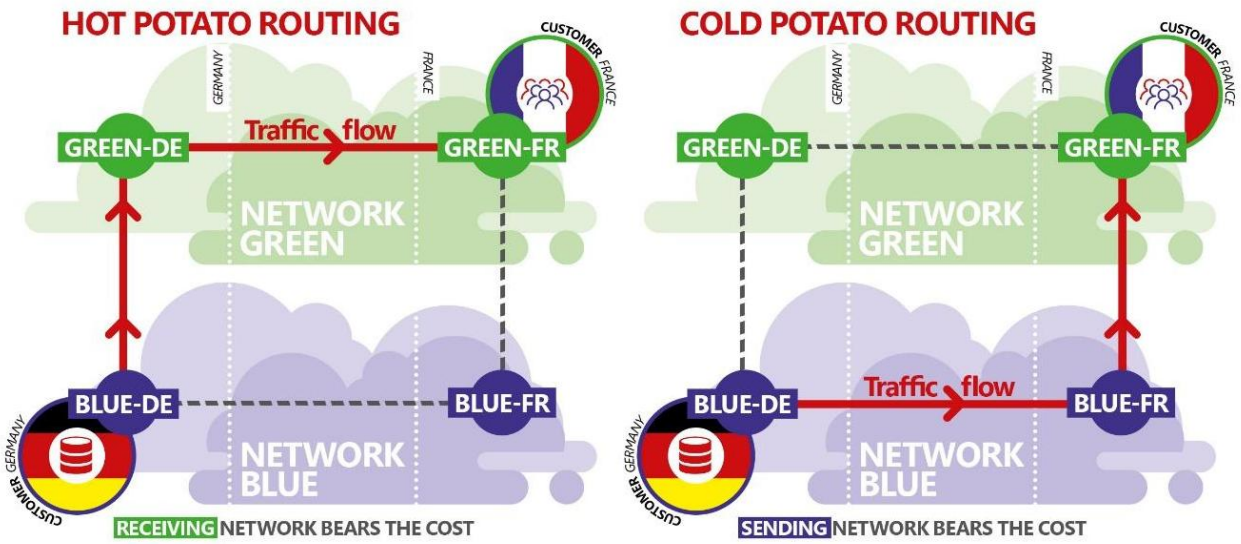
2.2 Peering is optional and mutually beneficial

A key tenet of peering is that, unless you are one of a dozen "Tier 1" providers (see box above), it is optional. There is no obligation on either side to peer, continue an existing peering, or to exchange traffic over a particular link.

The types and nature of peering relationships have developed over time. In the early days of the Internet, traffic was exchanged between networks on a "hot potato" basis – that is, if two networks had multiple points of interconnection, traffic on network [a] that was destined for network [b] would be handed off to the network [b] as close to its origin (for example a web server) as possible, pushing the cost for delivering such traffic onto network [b]. In the early days of the Internet, networks would also have a mix of content (e.g. web hosting) and access ISP customers, which resulted in a broadly balanced mix of "inbound" and "outbound" traffic. This resulted in networks developing complex peering policies so that they could ensure that they only peered with other networks of a similar size and cost basis, and that expensive long-distance traffic flows were roughly balanced, which meant that costs and benefits were roughly balanced.

[16] Telegeography – Market Connectivity Scores Q2 2025

Figure 2.3: Evolution of routing from "hot potato" to "cold potato"



Over time, very large access networks with tens of millions of customers (colloquially known as "eyeballs") emerged, with very little content hosting. Large content and application providers (CAPs) also emerged with large amounts of hosted content on their own networks, and few if any access customers. In addition, Content Delivery Networks (CDNs) were developed to optimise the delivery of Internet traffic further (see Figure 2.4 below).

In this new environment, and whether or not one network sends more traffic than it receives, there can still be mutual benefit in two parties peering. Peering avoids costs for both parties in transit fees, improves performance for their shared users, and increases the resilience and reliability of the connection between their two networks.

Helping this are new traffic delivery algorithms used by large CAPs and CDNs that use "cold potato" routing – meaning traffic destined for a user on a particular network now stays on the CAP or CDN's network for as long as possible, before it is handed off to the destination network as close to the user as possible. This approach reduces costs of traffic delivery for the receiving network.

CDNs have enabled the delivery of content even more efficiently, by deploying servers within access networks themselves, or on networks connected to Internet Exchange Points.

A CAP or CDN may bring the traffic demanded by an ISP's customer up to 99% of the way to the user – bearing the cost of that traffic delivery itself (or, in the case of commercial CDNs, paid for by their content customer) – leaving the ISP to deliver the traffic the last few miles over their access network.

In Europe, the vast majority of Internet traffic demanded by ISP customers is delivered from such CDN platforms located very close to users, and in the case of CDNs inside ISP networks, may never even traverse the entirety of the ISPs network, nor use transit (which costs the ISP money) or peering connections. Together, investments in networks, peering, and CDN deployment saves ISPs in the region of $5-6.4 billion dollars per year, according to a study by Analysys Mason[17].

For every new interconnection, and every time an existing interconnection arrangement is reviewed, there will be discussion between the two parties as to how to come to a consensus on the best approach, considering the benefits that each party will receive from the interconnection arrangement.

[17] The impact of tech companies' network investment on the economics of broadband ISPs by Analysys Mason (2022)

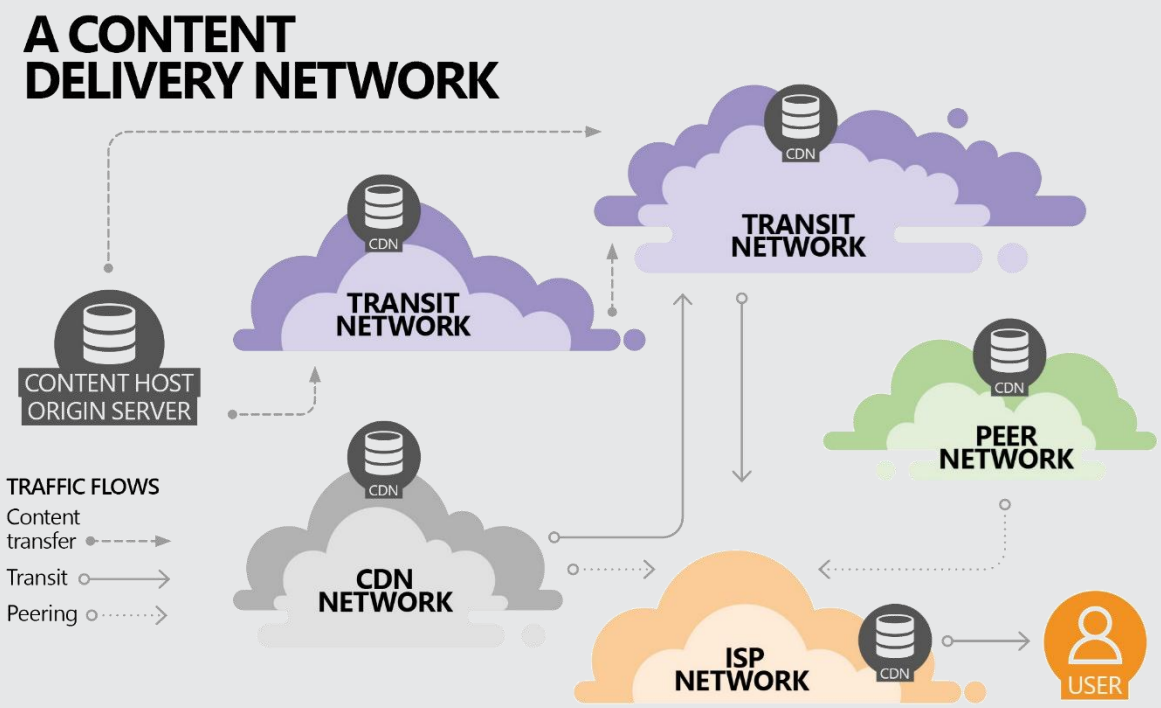
Figure 2.4: What is a content delivery network (CDN)?

A Content Delivery Network (CDN) is a distributed set of servers that aim to cache content closer to users, reducing costs for content providers and ISPs, and improving performance and scalability for services both big and small. CDN servers can be deployed within ISP networks, within third party networks, in a network run by a content provider or by a CDN provider themselves.

A CDN, despite having the word "network" in the name, is not an electronic communications network in the traditional telecoms sense. It is a set of systems that may be spread across a number of networks and that together optimise the performance and efficiency of networks, by acting as an intermediary between content and user, caching that content closer to the user.

The networks that CDN servers are located on may use IP interconnection – peering and transit – to reach the networks they are exchanging traffic with – but the CDN platform itself runs at a higher layer in the Internet stack.

Content Delivery Networks run by companies such as Akamai and Cloudflare offer services to businesses large and small. As an example, millions of websites use Cloudflare, which offers a free tier of service for small websites. Large content providers such as Google and Netflix have developed and deployed their own CDNs, and some content providers use a mix of their own and commercial CDN platforms.



2.3 Why are there few IP interconnection disputes?

IP interconnection arose and matured in fundamentally different circumstances to those of voice interconnection.

Voice interconnect was originally agreed between national monopolies, regulated by the International Telecommunications Union, a United Nations agency, and had a "Sending Party Network Pays" basis and mindset, with interconnection agreements negotiated by commercial teams based on how much revenue it would bring in or cost. The originating telecoms operator for a voice call charged their customer for a call, and then passed a proportion of this fee on to the network they were interconnected to, and so on, until the call (and a proportion of the charge to the caller) reached the destination network.

Given the "termination monopoly" that a telecom operator has over its customer – there is only one way to reach an end user, and that is through their telecom provider – this approach required strong regulatory intervention to support market liberalisation, stop discrimination and excessive pricing, and prevent incumbent, formerly state-owned enterprises from dominating the market. This resulted in price reductions in voice calls, mandated by regulation[18]. This adversarial, commercial-driven approach led to many voice and SMS interconnection disputes and the frequent involvement of regulators in resolving them.

By contrast, IP interconnection has developed with the expectation of either "settlement free" peering due to the mutual benefits accrued or, in the case of IP transit, the norm is payment to the "upstream" network regardless of the net direction of traffic flow.

In particular, peering developed a "settlement-free" culture due to:

1. **Mutual dependence and mutual benefits** accrued to both parties – this took the form of improved performance for mutual users and reduced costs for both sides. This reflects the symbiotic relationship between content and access (irrespective of traffic "balance"), because it provides value to both parties.

2. **Market dynamics** – rather than government dictating market structure and dynamics – the use of transit (and a choice of transit providers) as an alternative to peering reflects the fact that a peering relationship is illustrative of an optimisation of the connectivity relationship rather than a requirement, unlike in voice interconnection.

3. **Industry culture** – "handshake" agreements are the norm, involving Internet community norms and peering coordinators who are technical personnel seeking to optimise their networks, and who do not form part of a telecommunications operator's sales force.

2.4 Self-resolving disagreements

The examples below provide evidence that disagreements have led to disputes only in a limited number of cases:

1. A disagreement between two network operators in Finland in 2014 was resolved after traffic was re-routed through Sweden, resulting in quality degradation for their mutual customers. After a while, the initial status quo was restored by the parties involved.[19]

2. There have been a number of disagreements over the years between Deutsche Telekom and actors such as Hertzner, Deutsches Forschungsnetz (German Research Network), and others. The T-Mobile Netherlands case is of particular interest: in 2019, Deutsche Telekom owned T-Mobile NL decided to cut all existing peering links in the Netherlands to route all traffic via Deutsche Telekom's network in Germany. As a result of the poor interconnectivity that Deutsche Telekom maintains to the rest of the Internet[20] customers on T-Mobile NL had poor quality access to many services or websites. After a few

[18] Commission Delegated Regulation (EU) 2021/654
[19] Refer to 2022 WIK report for BNetzA p.74. (2019)
[20] See Cogent vs DT (2015) and Beschwerde gegen die Deutsche Telekom wegen Verletzung der Netzneutralität im Namen von Telekom-Kunden (2025)

days of quality issues, and a consumer and political outcry (including questions being raised in the Dutch Parliament), T-Mobile re-established their peering links in the Netherlands[21].

3. In Italy, Telecom Italia de-peered most networks in 2013[22], and offered only paid peering. Telecom Italia was at the time a vertically integrated telecom operator, with its own wholesale arm, "Sparkle", a "Tier 1" provider[23]. Sparkle was the only transit provider of the Telecom Italia domestic network. In 1996, after buying a large ISP, Telecom Italia was mandated to peer with Italian ISPs for the next 10 years by the national competition authority[24]. Telecom Italia then connected to a number of Italian Internet Exchange Points, and exchanged traffic with other Italian networks including smaller ISPs, web hosts, and Italian businesses. In July 2013, Telecom Italia de-peered most of these networks and started offering a paid peering product called "IP Look". The Internet ecosystem in Italy continued to grow and flourish despite Telecom Italia's lack of participation. This example shows that even in the case of a large network de-peering others, traffic continues to flow (albeit, sub-optimally), and regulatory intervention is not necessary.

Even though there are few interconnection disputes overall (and that reports from BEREC[25], WIK[26] and others repeatedly have to refer to the same few disputes), those that are occurring derive from a small number of actors. The most recent BEREC report on IP Interconnect, highlighted that *"according to BEREC's stakeholder workshops, most disputes stem from vertically integrated IAS[27] providers attempting to leverage their termination monopoly into the transit/peering market and to introduce (higher) fees for IP-IC directly from CAPs*."

In Europe, vertically integrated ISPs are a few large access networks, who, as well as having millions of access network "eyeball" customers, also run wholesale IP network businesses[28]. These vertically integrated providers may also be "Tier 1" providers. In this position, they have only peering relationships, either with other Tier 1 networks, or with CAPs and CDNs – the latter possibly pressured to pay the ISP to reach the vertically integrated ISPs' customers. If the CAP or CDN does not pay for a direct interconnection to the ISP, and tries to use another Tier 1 provider, there is likely to be insufficient interconnection capacity from the other Tier 1 to reach the vertically integrated ISPs users, as this capacity is restricted by the vertically integrated ISP through restrictive peering policies. This issue has been identified by BEREC in their recent report[29].

In Europe, there are five vertically integrated, Tier 1, ISPs: Deutsche Telekom, Orange (OpenTransit), Telefonica (Telxius), Telecom Italia (Sparkle), and Liberty Global.

Not all of these have been involved in public interconnection disputes. However, in the comparable position experienced in the US, the FCC recognised there were two factors that drove the ability for large ISPs to charge paid peering for access to their customers:

- the number of customers (and the greater the number of customers, the more that can be charged on a per-subscriber basis) and
- control over interconnection capacity[30], which is assisted by ISPs being vertically integrated or "Tier 1".

[21] T-Mobile NL routed all internet traffic through Germany and broke the Internet for small firms (2019)
[22] TI depeers most Italian networks (2013)
[23] This is no longer the case as Telecom Italia sold its fixed infrastructure arm (Fibercop) in 2024 and is expected to complete the sale of Sparkle by the end of 2025.
[24] See "An Introduction to Peering in Italy" - Marco d'Itri (2014)
[25] BEREC, ibid (2024)
[26] WIK, ibid (2022)
[27] BEREC refers to IAS – "Internet Access Service" [providers]. This report uses the more common term ISP – Internet Service Provider.
[28] BEREC defines "Vertically Integrated with Tier 1 transit providers" as: "In particular, some companies/networks provide transit services (by means of another specific subsidiary or just through a different department within the same company) in addition to networks providing retail [ISP services]".
[29] BEREC, ibid (2024), p29
[30] The FCC noted that "Our economic analysis suggests that the ability of a BIAS provider to charge for access to subscribers increases with the number of subscribers; the greater the number of subscribers, the more the BIAS provider can charge on a per-subscriber basis", (FCC, 2016,

Ironically, these five European providers, by virtue of their size and vertical integration, are already the most likely to be getting paid by some other parts of the Internet to deliver traffic to their users – for example it is known, from the Deutsche Telekom-Meta dispute (see 2.5.2 below), that Meta was paying DT until recently for delivery of traffic demanded by DT customers. Yet, paradoxically, these telecoms companies have been advocating for the European Commission to introduce regulations to force dispute resolution onto the otherwise well-functioning IP interconnection market[31] – this is presumably because they feel they are not being paid enough. Smaller telecoms operators do not appear to be interested in such regulation, in some cases actively arguing against it[32].

2.5 Analysis of IP Interconnect disputes

While examples of genuine disputes regarding IP interconnection are relatively rare in the EU, the genesis of those disputes, and the manner in which most of them have been resolved, suggests that existing mechanisms typically resolve most issues, rather than requiring the intervention of a sector-specific regulator or arbitrator. There are essentially four mechanisms under which such disputes have been settled.

2.5.1 Consumer protection and Open Internet

- In France, in 2013, a complaint was lodged by a consumer association to the effect that Free's customers were not getting adequate speed access to YouTube and other Internet resources at peak times, due to congestion on Free's connections to the rest of the Internet. The sector-specific regulator, Arcep, determined that it was Free's responsibility to provision their network adequately for traffic demanded by their customers, and declined to get involved in the specifics of the relationships between Free, Youtube and other parties. Technically, neither party had lodged this as a dispute since the complaint came from consumer associations.[33]

- The ongoing complaint lodged recently with BNetzA regarding Deutsche Telekom's (DT) practice of restricting access to its network, so that other networks have no option but to negotiate and pay DT directly to deliver content demanded by DT customers. This case has the potential to further clarify the importance attached by consumers to the existing regime for IP interconnect.[34]

2.5.2 Contract Law

- In Germany, Deutsche Telekom has been involved from 2021 onwards in a contractual dispute with Meta. Meta was paying DT for delivery of traffic to DT users. DT had extracted payment from Meta and others by limiting its capacity to other wholesale networks on the Internet, such that the only way to get reasonable quality of delivery to DT customers was to negotiate with, and pay, DT directly. Meta's agreement with DT came to the end of its term, and despite negotiations between the parties, they could not agree on terms to continue the relationship. The two parties maintained the technical interconnection, exchanging traffic, while these negotiations continued, despite there being no contractual relationship. DT eventually went to court to claim that by maintaining the connections, Meta had implicitly accepted DT's last offer. The court agreed with DT, although Meta has appealed that

Charter/TWC Merger Order, paragraph 115). Furthermore, the FCC noted that "The success of a BIAS provider charging paid peering depends on the two factors: the number of subscribers (or "eyeballs") that the BIAS provider serves (and thus the portion of an edge provider's business that those BIAS subscribers represent) and the BIAS providers' control over interconnection capacity into its network." (FCC, 2016, Charter/TWC Merger Order, paragraph 100); ("BIAS" stands for "broadband Internet access service", i.e., ISP service, and an "edge provider" is a CAP, content and application provider).

[31] ETNO response to BEREC consultation on IP-Interconnect (p9) (2024)

[32] MVNO Europe Statement (2023)

[33] Arcep (2013)

[34] Refer to consumer and civil society complaint (2025)

decision. In the meantime, Meta switched off the interconnections and is now delivering traffic to DT via third party transit providers.[35]

2.5.3 Competition Law

- In 2012, Cogent, as a wholesale transit provider, had MegaUpload, a large content provider at the time, as a customer, and was attempting to increase its interconnection capacity with Orange in France to deliver MegaUpload traffic demanded by Orange subscribers. Orange was seeking payment from Cogent for this, and Cogent made an official complaint to the French Competition Authority[36] regarding this demand for payment. Ultimately, the Competition Authority ruled that Orange was within its rights to seek payment for such interconnection (but did not say that Cogent must accept it). The authority did not opine on what level of payment that should be. Orange was also instructed it should be clearer on its internal transfer pricing between Orange and OpenTransit, its wholesale arm, as its supplier in its vertically integrated business model. This example shows that such disputes can be handled within the remit of existing powers exercised by competition authorities.

2.5.4 Telecommunications regulatory authority dispute resolution

- In Switzerland, over the period 2012-2025, - the small provider Init7 has engaged in a long-running dispute with the fixed network incumbent Swisscom. This dispute was resolved in December 2024 by a Decision of the Swiss telecoms regulator ComCom, to the effect that Swisscom must peer for free.[37] As an interesting aside, ComCom took the view (although not being a Competition Authority) that Swisscom's actions were part of a broader collaborative effort with Deutsche Telekom to work together to seek to extract payment from other networks on the Internet for delivering traffic demanded by Swisscom and Deutsche Telekom customers. Note that while not within the EU framework, this decision is in line with existing regulatory arbitration powers in the EECC as in this case, the dispute was between two public electronic communications networks.

As stated above, Open Internet Rules, contractual law and competition law have successfully tackled all disputes that emerged in the last decade.

The Swiss ComCom approach is in complete agreement with the approach adopted by BEREC in its Report on IP interconnection. Most importantly, ComCom has concluded that:

1. the ratio between incoming and outgoing traffic is of no relevance in determining the "cost" of interconnection; and

2. the costs incurred in the IP interconnection process by a fixed incumbent are already covered by the broadband subscriptions of its end users.

Considering that peering interconnections in the EU number in the millions, it is ironic that the one case that resulted in a regulator arbitrating an IP interconnection dispute took place not in the EU, and resulted in the incumbent's network fees being cancelled by the arbitration.

In summary, IP interconnection disputes are rare, and tend to be resolved by the market or other existing mechanisms. The resolution of disputes by a regulatory authority, an arbitrator, or a court, are even rarer.

[35] Refer to Meta – Why we're having to end our direct peering relationship with Deutsche Telekom (2024) and DT - Meta is not above the law (2024)
[36] Autorité de la Concurrence (2012)
[37] Refer to Init7 Press Release on this decision (2024)

Furthermore, these examples show that the Commission's proposals to intervene on all IP interconnection are overreach – all of these examples relate to peering, or even more specifically, attempts by third parties to deliver content and services demanded by an ISPs' customers to that ISPs network, not to other forms of IP interconnection, such as transit.

3 Dispute resolution mechanisms are not needed and would be near impossible to implement

3.1 Mandated dispute settlement is a questionable tool for IP interconnection

Given the lack of widespread disputes regarding IP interconnection and the existing range of mechanisms already used to successfully address such disputes, it is questionable whether it is necessary to mandate some form of dispute settlement or arbitration proceedings to resolve such issues. Introducing such a regime would encourage network operators that are keen to extract payments to identify "disputes", potentially using the threat of regulatory intervention as a negotiating tactic, rather than resolve disagreements in the normal course of negotiation, or making different arrangements to reach one another's networks.

Even insofar as a dispute regarding IP interconnection might be considered to be genuine, it is questionable whether existing dispute settlement mechanisms could provide a blueprint for dispute resolution. It is therefore necessary to succinctly examine the function and relevance of dispute resolution measures. Their purposes can be classified as follows:

- **Commercial arbitration** regimes are based on the confidential resolution of disputes regarding contracts between the contracting parties, where the terms of the arbitration mechanism have been agreed in advance by those parties.
- **Foreign investment** arbitral regimes seek to redress significant shifts in public policy or actions of the host nation prompted by a conflict of interest at the expense of a foreign investor, which undermine the value of its investment decision.
- **Statutory arbitration** regimes seek to resolve differences between parties in an ongoing adversarial relationship which, given the nature of the interests or rights at stake, are often resolved by the application of a Final Offer Arbitration (FOA) mechanism which is designed to incentivize both parties to make reasonable offers.
- **Sector-specific tribunals**, such as those in the telecommunications sector, often exercise dispute resolution powers where strict legal obligations have been imposed under a legal instrument and are further amplified under other regulatory measures that provide the arbitrator with detailed technical and policy guidance.
- Arbitration mechanisms agreed by the parties to resolve disputes arising from disagreements about the scope of behavioural commitments offered in **merger review proceedings** by the notifying parties, which might also affect third parties.

In the IP interconnection context, these regimes exhibit significant shortcomings as regards their ability to deliver appropriate outcomes, as can be identified in the following:

1. Because IP interconnection is resolved amicably in the vast majority of cases, the **types of legal triggers** that one would expect as the basis for the initiation of an arbitration procedure are absent. Thus, there is no market failure to address, nor is there any unequal bargaining power to redress, as the party triggering a "dispute" will usually be an incumbent network operator.
2. Arbitration is usually predicated on the existence of an **adversarial relationship** which is likely to recur often because of the nature of the parties and the market affected. However, IP interconnection relationships bring together **complementary commercial interests** which mutually benefit all parties.

3. Because IP interconnection can take a myriad of forms, it is questionable whether it is susceptible to the sort of **sector-specific dispute settlement** that one finds in the telecommunications sector. On the contrary, the value of precedents will be negligible because of the diversity of relationships, which occur today in the complete absence of regulatory guidance. Moreover, the existing Open Internet Regulation[38] offers network operators ample means to manage traffic while the Init7-Swisscom decision confirms that a mismatch between incoming and outgoing traffic does *not* provide a sound basis for intervention.

4. There is no "fairness" rationale which can be accommodated by a dispute settlement process, as some type of adversarial situation inevitably serves as the trigger for the initiation of such a process, rather than the complementarity that underpins the current IP interconnection environment. European policymakers have already assessed in the recent past the appropriateness of two policy options whose rationale was said to be driven by concerns about "fairness", namely: the "Sending Network Party Pays" principle; and the "Fair Share" debate. Given that both of these initiatives have been rejected by European policymakers[39], it would be perverse to introduce a policy under the cover of "fairness" that would introduce very similar measures, as this would be the inevitable result of network operators 'gaming' the generation of a "dispute".

3.2 Dispute resolution is an inadequate fit for IP interconnection

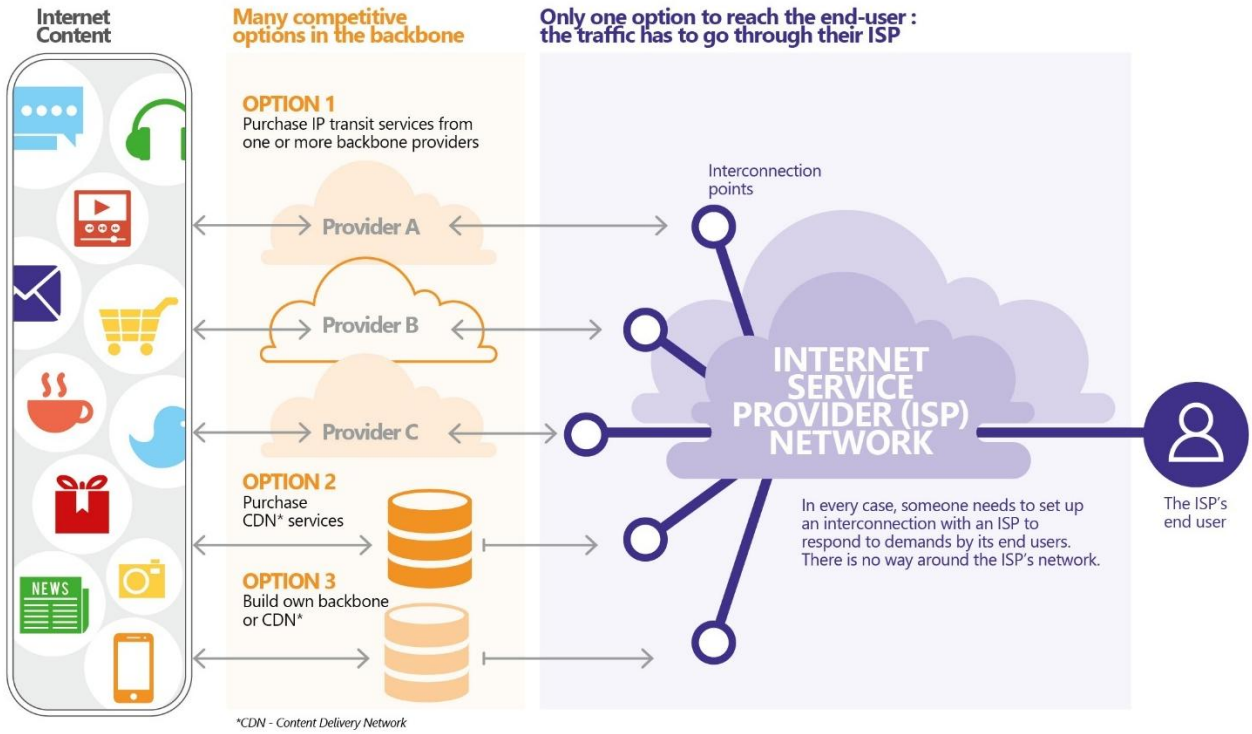
CAPs and commercial CDNs have many options for delivering traffic demanded by end users, which can vary based on involved parties, as well as technical and commercial considerations.

Figure 3.1 illustrates the many ways in which traffic outside of the ISP's access network can be routed.

The only point at which there is only a single option is the ISP's termination monopoly to their users. The Open Internet Regulation (OIR) is supposed to cover the behaviour of ISPs to ensure that different services are not discriminated against while traversing the ISPs network to the user. Using the OIR to ensure that ISPs do not discriminate between services at the point of IP interconnection is already within the remit of the OIR, according to BEREC[40], but to date it has not yet been used.

[38] Regulation (EU) 2015/2120
[39] See Council Conclusions on Conclusions on the White Paper "How to master Europe's digital infrastructure needs?" (2024) as well as BEREC, ibid (2024) and Political Intelligence assessment of responses to White Paper consultation (2024).
[40] BEREC, ibid (2024) Section 8

Figure 3.1: Degrees of competition in different parts of the Internet interconnection ecosystem



An arbitrator can presumably only rule on a bilateral dispute which is brought to them, which will concern only a commercial relationship entered into between two parties. Based on the few recent disputes, including those cited earlier, this is likely to be to arbitrate on the terms of a peering relationship between a large incumbent ISP, and a third party attempting to deliver content and services traffic demanded by that ISP's customers – this could be a CAP themselves, a commercial CDN, or a transit provider.

As explained earlier, given that peering is optional, it is unclear how an arbitrator could consider all the available options for delivering this traffic that does not involve a direct relationship between these two parties, which are all valid ways for exchange of traffic between the parties. An arbitrator's terms of reference would presumably only concern the direct interconnection relationship dispute, not any of the third-party routes that are possible for exchange of traffic.

Furthermore, even just considering the relationship between the two parties in dispute, it is unclear how an arbitrator would be able to decide where to land in their decision.

For example, interconnection negotiations involve reaching agreement over which cities and even which specific buildings the connections will take place, the mix of peering and CDN deployment and the exact CDN architecture, technical modalities of connection, the mix of capacities in different locations to suit the capabilities of both sides' networks, and many more criteria. These discussions often extend down to who pays for which cables between adjacent racks in a building, what standard of fibre optic cables are used and the exact configuration of the technical Border Gateway Protocol that is used to enable the two networks to establish a connection between each other. Different decisions here can significantly affect a number of variables such as costs for each party, user quality of experience, technical feasibility, environmental impact, and more. It is highly unclear how an arbitrator would be able to weigh the different factors involved.

Similarly, it has been suggested that certain large telecom operators could use dispute resolution to try and force CAPs to use the telecom operator's own cloud or Content Delivery Network platforms, in an effort to grow

these areas of their business. Again, it is unclear how an arbitrator could weigh the pros and cons of using one cloud or CDN platform over another. Some CAPs use certain CDNs because they have certain specific features, or are particularly efficient for the type of traffic that relates to the CAP's service. If a CAP has declined to use a telecom operator's service it is presumably for sound economic and technical reasons, and arbitration should not be used to attempt to overturn this.

It is also unclear how a dispute resolution decision could be binding. In the face of an adverse decision, one party may simply withdraw their network (or, at worst, the service entirely) from a market. This has already happened in South Korea where, as a result of laws attempting to enforce "network fees", a significant amount of peering for the Korean market occurs via network presence in Japan[41]. The result is that South Korean ISPs now have higher costs due to such content (and any interconnections to it) being further away from their users. Furthermore, in the case of the video game streaming platform Twitch[42], they entirely stopped serving South Korean users, contributing to the fragmentation of the Internet.

It is also unclear how an arbitrator could force traffic to use any particular interconnections. Traffic routing on the Internet is necessarily dynamic for resilience and reliability reasons. Establishing an interconnect link does not mean that traffic will flow over it – any number of traffic engineering decisions determined in real time on the basis of programmed conditions by either of the parties concerned can affect traffic routing. As part of trying to establish an enforceable dispute resolution decision, an arbitrator would therefore have to make traffic routing decisions. This will inevitably make the Internet brittle and unreliable.

Finally, it is unclear how an arbitrator would ensure 'fairness' between decisions. Currently, the market decides whether an interconnection makes sense for the two parties, given their respective costs and benefits. If there is a dispute resolution, it now becomes the arbitrator's decision.

It is challenging to see how an arbitrator could adequately consider all the trade-offs that are considered by the two parties deciding whether and how to interconnect. Fundamentally, as BEREC recognises[43] "*the decision whether to peer or to buy transit is a matter of network planning and cost optimization, as transit causes opex costs for conveying traffic but saves capex investments in one's own network infrastructure and hence saves operating costs while simultaneously assuring an appropriate performance level*." An arbitration on a peering dispute is therefore making network planning and operating expenditure ("opex") vs capital expenditure ("capex") decisions for one and possibly both networks concerned.

Furthermore, the current culture and norms of IP interconnection that tend toward agreement by the market, and that encourage Internet stability and resilience, will fall apart, as grievances are likely to be raised if one or other party thinks they can get better terms from an arbitrator in a certain jurisdiction than their current agreement. The dangers of forum-shopping in such a dispute resolution environment are very real. An access provider may approach an arbitrator in one country known to be favourable to access providers to seek better terms. By the same token, a content provider may go to an arbitrator in another country known to be favourable to internet ecosystem dynamics and end-user interests, in particular if they are currently paying a large ISP for access to customers, in an attempt to reduce or remove such payments.

[41] Myths surrounding usage fees: South Korea, CCIA, 2024
[42] An Update On Twitch In Korea – December 2023
[43] BEREC – An assessment of IP interconnection in the context of Net Neutrality p23 (2012)

4 Mandating dispute resolution on IP interconnection inevitably leads to network fees

4.1 Enforced IP interconnection through dispute resolution is effectively a network fee

Large European telecom operators' demands for dispute resolution will inevitably lead to the imposition of "network fees" charged on the rest of the Internet to deliver traffic demanded by these ISPs' customers. This will unfold in the following ways:

- Through repeated disputes with CAPs and CDNs, large ISPs will try to establish precedents of network fees being mandated for peering;
- Even if dispute resolutions end up "in the middle" between settlement free peering and a mandated paid peering link, this will still mean mandated network fees; and
- The issues will be compounded if the European Commission, as it seems to be considering[44], enables the mandating of peering as part of dispute resolution. In this scenario, the freedom for players to establish interconnection in the most effective way will be all but gone from the European internet ecosystem.

Another key issue is how such dispute resolutions will work for a critical form of IP interconnection: transit connections. Payment for IP transit has always been to the upstream network providing access to the whole Internet regardless of traffic direction and volume. If through dispute resolutions it becomes normalised that "more inbound traffic means that the party receiving such traffic gets paid", then inevitably large ISPs will want this to apply to transit connections. This reverses the current payment flow – ISPs would now be getting paid for their connectivity to the global Internet, as long as more traffic flows towards them than flows out to the wider Internet, as it typically does. The more traffic an ISPs customers would demand, the more the ISP would get paid from the rest of the Internet. ISPs would have an incentive to artificially generate inbound traffic.

Small and medium sized content providers are more likely to use transit to reach ISP networks than the largest content providers, as they do not have their own large global networks and therefore the ability to establish widespread peering. A dispute resolution regime that negatively affects transit will harm SMEs more than the largest content providers.

The natural conclusion of this is Internet traffic would tend towards *de facto* a "Sending Party Network Pays" regime, as used in the making of voice telephony calls and SMS. The use of this regime for the Internet has been rejected by the vast majority of Internet stakeholders multiple times – that is, when ETNO suggested the idea at the ITU WCIT in Dubai in 2012, when they resurrected the idea in 2022[45], and when the European Commission suggested such a proposal in its "exploratory consultation" of 2023.

The adoption of such a regime would undermine the proper functioning of the Internet. It would effectively introduce network usage fees on top of existing payments end users make for Internet access, in essence a 'double dipping' new revenue stream for large ISPs.

[44] Item in Q20 of the EY Questionnaire for the survey on the EECC and the Digital Single Market: "Amendment of Art. 61 EECC to empower NRAs to impose IP interconnection obligations under certain conditions". (2025)
[45] AXON: Europe's internet ecosystem: socio-economic benefits of a fairer balance between tech giants and telecom operators (2022)

This in turn would impact every entity running a website, a message board, a text chat system, a chatbot and audio/video streaming application, an online game, etc. and anything else on the Internet. They would all be required to pay ISPs, either directly or indirectly (via transit providers or CDNs), to reach end users. This puts these ISPs in a gatekeeper position to decide what content their customers can access at what price, and fundamentally breaks the Open Internet.

4.2 A messy version of network fees

As set out above, the introduction of a dispute settlement mechanism(s) is neither needed nor desirable – by any stretch of the imagination. It is likely to result in outpayments to the largest telecom network operators, without any guarantee on improved outcomes for any players in the ecosystem other than possibly a few very large ISPs.

The introduction of such a mechanism would institutionalise and give legitimacy to the identified anticompetitive practices of certain telecom operators, already leveraging their termination monopoly to extract fees from CAPs, CDNs and smaller networks, to their benefit and to the detriment of consumers and Europe's connectivity. Such undesirable practices are reported both in the latest BEREC report from 2024[46], as well as by the recent consumers[47] and NGOs complaint in Germany.[48], and were identified by the Swiss ComCom in the Init7-Swisscom dispute.

In a model where national regulators are responsible for dispute settlement, the results would be very messy. This would inevitably lead to uneven decisions across Europe with some NRAs deciding in favour of free peering and others aiming to enforce paid peering. This would encourage networks to interconnect further away from users where they can get more favourable regulatory decisions, with immediate negative consequences on quality of experience for end users. This would effectively be the end of 'cold potato' routing decisions, and the cost to carry traffic to and within a country could again be the responsibility of the terminating network. As described earlier, this has already occurred in South Korea, leading to worse quality of experience for users, and higher prices.

A model in which the European Commission sets up an EU level regulator with the powers to arbitrate might seem an attractive counter to this, but would result in the same (if not worse) consequences: the imposition of network fees, but at European level. Each decision would become European in scope through a form of precedent-setting which would effectively – unless all decisions went towards settlement-free peering – create a basis for a form of network fees.

A similar scenario to the above could then play out on a European level, with some networks refusing to peer within the European Union and instead moving out to neighbouring interconnection hubs, most likely London or Zurich – especially given the ComCom decision in the Init7-Swisscom case. This would lead to a similar deterioration in user quality of experience and an increase in costs for ISP networks as in the case of withdrawal from national networks, but on a much bigger scale. Such a move would also damage the virtuous circle of investment in broader communication and datacentre infrastructure that has driven the growth of thriving Internet interconnection hubs all over Europe, damaging a European success story.

This would degrade quality of service across Europe for end users with no financial or other benefit to any of the parties involved.

[46] BEREC, ibid (2024) p31
[47] Submission to the Federal Network Agency (2025)
[48] Consumer and NGO complaint (2025)

4.3 Consequences on the Internet ecosystem's players

The consequences to the various players in the Internet ecosystem of such an implementation would be many.

Based on traditional game theory modelling, we anticipate various possible responses to the imposition of network fees through dispute resolution. CAPs and commercial CDNs may have slightly different responses, and bearing in mind that not all networks will have the same ability to react.

- A CAP or CDN could decide to stay peered with the ISP and accept the increased cost of peering: there would be no service degradation, but prices would be likely to increase for online services to end users (consumers and businesses) as these additional costs are passed on. Other networks in the ecosystem (other CAPs, CDNs, and transit providers) would likely be the next targets for disputes from ISPs;

- a CAP or CDN could terminate peering relationships in the market where it has had an adverse decision, and use transit or another CDN to reach the ISPs end users: this would increase cost for both CAP/CDN and the ISP, and make the transit or other CDN provider now carrying the CAP/CDN's traffic the next target for dispute, in addition to other CAPs and CDNs. The additional costs for the CAP or CDN are likely to be passed on to users;

- a CAP or CDN could terminate peering relationships in the market where it has had an adverse decision (assuming arbitration does not mandate peering), but stay open to peering outside of the arbitrator's jurisdiction: this would increase cost for ISPs – now having to haul traffic from further away for delivery to their users – and degrade quality of experience for end users. Further disputes may be generated by the ISP with other CAPs or CDNs, leading others to exit the market too. The additional costs for the ISP are, once again, likely to be passed on to users.

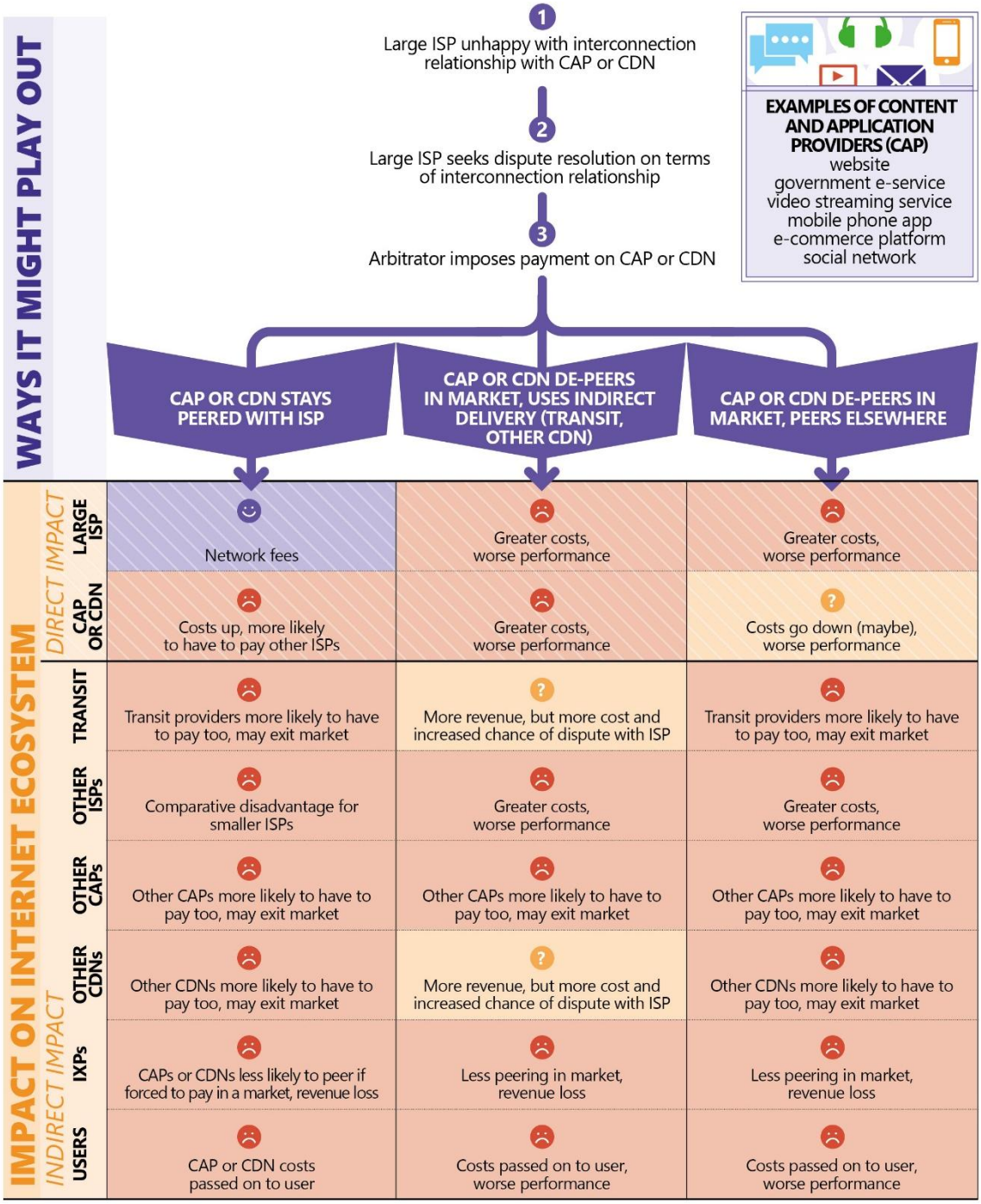
Assuming dispute resolution was in place, the likely outcome would be a mix of scenarios materialising in parallel, depending on the reactions of CAPs and CDNs.

Figure 4.1 expands on these scenarios, particularly for the broader ecosystem players (transit providers, IXPs, smaller ISPs, other CAPs and CDNs, etc). Some of these responses have been seen (and documented) in South Korea[49] when network fees were introduced. Some CAPs decided to peer outside of South Korea, some even exited the market commercially altogether[50] because they could no longer make a profit. Overall, quality of experience degraded considerably, and neither ISPs nor end users benefited.

It is important to note that the "CAPs" referred to in this section are not just a few large content providers. Every content and application provider, large or small, that attempts to deliver traffic to ISPs will be affected by these proposals. This includes national broadcasters seeking to shift to IP traffic delivery to free up spectrum for 5G and 6G, European SMEs looking to grow their businesses online, new digital startups and more. The effect of network fees is to entrench large established players, both on the content and access side, who will inevitably be able to negotiate better terms between themselves than smaller participants.

[49] WIK for BNetzA – Competitive conditions in transit and peering markets section 2.2.1 (2022)
[50] Twitch, ibid (2023)

Figure 4.1: Impact of arbitration on Internet players



Note that only one scenario is financially beneficial to ISPs, and even then, only to the largest ISPs. Smaller ISPs may incur more costs than new revenues from network fees, and would in any case earn comparatively less due to the smaller size of their own access network customer base, leaving them at a comparative disadvantage and damaging competition in access network markets.

The South Korean example[51] also demonstrates that mandating interconnection terms leads to second order problems, requiring further legislation to try and remedy the issues created. This creates a highly regulated

[51] CCIA (2024), ibid

situation in a market that today has no market failure and in a European policy environment which is otherwise championing the virtues of less- not more- regulation.

There are further second order effects too. Shifting from peering to transit or other CDN delivery of traffic will result in further disputes due to large ISPs seeking payment also from transit and other CDN providers. If these decisions get arbitrated poorly, transit providers and commercial CDNs would become the *de facto* ISPs' network fee collectors, resulting in increased costs for any entity offering services on the internet, no matter how small. This is already happening today to some extent, as companies attempting to buy transit are being presented with limiting conditions or additional costs to deliver more than a token amount of traffic to some Tier 1 ISPs[52].

The implementation of poor arbitration decisions on a broader scale will push up the price of transit and adversely affect small ISPs and content providers more, as they are comparatively heavier users of transit[53].

[52] See Cogent vs DT (2015) and Beschwerde gegen die Deutsche Telekom wegen Verletzung der Netzneutralität im Namen von Telekom-Kunden (2025)
[53] BEREC (2024), ibid, p8; small ISPs use transit for 45% of their traffic, which is the highest proportion of all types of interconnection, and the highest percentage of all the ISP sizes.

5 Conclusions

Relationships between access networks and content providers are not confrontational but are rather synergistic: end users pay access providers for Internet connectivity, and content providers depend on those access networks to reach the same users. Both have built sound, but different, business models on those bases. Generally, the cost to carry traffic demanded by users is borne by the content providers over most of the distance from the content source, and by the access providers for the final, local delivery. CAPs and CDNs are constantly investing to improve the efficiency of content delivery to access networks through network investment, better content distribution, compression of audio and video streams and other means.

The tiny number of disputes on IP interconnection in Europe, especially in light of the millions of peering arrangements (not to mention other means of content delivery) should make this a non-issue in Europe. The only reason that this is being discussed at policy levels is that a few large ISPs hope to leverage the termination monopoly they have over their large customer base to extract revenue from the rest of the Internet. Considerations about IP interconnection dispute resolution do not aim to solve a market failure, they aim to open a new revenue stream for a few very powerful ISPs, who would effectively be paid twice for the same operation.

Due to the precedent setting value of dispute resolutions and the way these mechanisms work, introducing network fees through dispute settlement in IP interconnection will have deleterious effects on the entire digital economy.

Not only would it mechanically create more disputes—where today, most disagreements are resolved amicably, including by setting up alternative routes—but it would also drive up costs for nearly all players in the value chain, possibly excluding the large ISPs initiating these disputes.

This shift would likely degrade quality of experience for end users across Europe, fragment the European digital market, and reduce Europe's attractiveness as a global hub for IP interconnection.

These consequences would have broader effects on the European economy. More expensive access and online services will slow down the digitisation of businesses, and ensure that the pace of innovation adoption in Europe lags behind that of the US and China. Ironically, this is the opposite of the European Commission’s stated goals in establishing digital policies.

IP interconnection is not a broken market in search of a dispute resolution mechanism. Not only are there only a very small number of disputes, but the few that happened have all been adequately resolved with existing regulatory tools. The much-needed clarification put forward by BEREC regarding the applicability of Open Internet Regulation in its 2024 report further reinforces that arsenal of tools, and no further intervention is needed to ensure the smooth and efficient functioning of IP interconnection.

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