Coppik, Jürgen

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Herausgeber:
Prof. Dr. Justus Haucap
Düsseldorfer Institut für Wettbewerbsökonomie (DICE)
Tel +49 (0) 211-81-15125, E-Mail haucap@dice.hhu.de

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Economic Fundamentals of IP Interconnection and Data Traffic Between Over-The-Top-Providers and Traditional Telecommunications Network Operators[1]

Jürgen Coppik[2]

June 2024

Contact

Prof Dr Jürgen Coppik, Königsallee 14, 40212 Düsseldorf,
Germany +49 (0)211 13866-341 | info@coppik.com

1 This report is based on an expert opinion commissioned by Meta Platforms, Inc. The original report was prepared in German. This English language version has been prepared for information purposes only. There may be differences between the original text and this translation – the original German text is definitive please consult the German text for full accuracy, precision and nuance (DICE Ordnungspolitische Perspektiven No. 116).

2 Professor of Economics at the Faculty of Economic Sciences at Heinrich Heine University Düsseldorf, Düsseldorf Institute for Competition Economics (DICE), Doctor of Law (Free University of Berlin) and independent management consultant in Düsseldorf.

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1. Initial situation and problem definition

1 In the telecommunications and internet sector, an intensive and controversial discussion has been going on for some time between large telecommunications providers on the one hand and application and content providers on the other. The fundamental question here is how the exchange of IP data traffic between the networks of these two provider groups should be organised commercially in view of the constantly increasing volumes of data traffic as a result of advancing digitalisation. This so-called IP interconnection of the networks and the corresponding data transport are a necessary prerequisite for end customers to be able to use services and content via the internet.

2 Some large European telecommunications network operators (most of them so-called incumbent operators, i.e. operators that have emerged from the former state monopolies) are demanding that the providers of content and services via the internet should contribute to the network costs of the telecommunications providers. One of the reasons given is that large content providers such as streaming services are responsible for the fact that data traffic volumes continue to increase from year to year and that the telecommunications networks must be continuously expanded to be able to handle these rising volumes. These network operators therefore conclude that the content providers should also contribute to the expansion costs incurred, namely in the form of remuneration paid to the network operators for transporting this content (for an overview of the network operators' positions, see for example Telefonica 2023, Fair share for network sustainability[3] and as to the current situation of the discussion, see the summary issued by the Scientific Service of the German Bundestag (*Wissenschaftlicher Dienst des Deutschen Bundestages*) dated 17 July 2023, ref. no. WD 5 – 3000 – 054/23[4]).

3 In technical terms, this concerns the accounting modalities for network interconnection and the exchange of IP data traffic. Network operators are in favour of the so-called Sending Party Network Pays principle (SPNP for short), i.e. the content providers are to pay remuneration to the network operators when they transfer traffic to them, and this traffic is then transported onwards by the network operators. They say that this is a "fair share" of the infrastructure costs incurred by the telecommunications network operators.

4 The European regulatory authorities do not share this view. They have clarified that data traffic is not caused by content providers, but rather by end users who demand services from both groups of providers – services and content from content providers on the one hand, internet access and data transport from telecommunications network operators on the other – and also pay the providers for these services. They also point out that the costs of

[3] Available at https://www.telefonica.com/en/wp-content/uploads/sites/5/2023/02/public-policy-Fair-share-for-network-sustainability.pdf

[4] Available at https://www.bundestag.de/resource/blob/962938/c67cfe0f93e93e35a9772887c5bd8ad6/WD-5-054-23-pdf-data.pdf

additional capacity are comparatively low (for a summary of the position, see BEREC, Body of European Regulators for Electronic Communications 2022, BEREC preliminary assessment of the underlying assumptions of payments from large CAPs to ISPs[5], hereinafter cited as BEREC 2022, and the BEREC statement on the consultation of the European Commission on the future of the electronic communications sector and its infrastructure of 19 May 2023, pp. 9 set seq.[6]). They therefore do not see any basis for an SPNP billing regime. This assessment is also shared by the competition authorities in Germany (see very clearly Monopoly Commission (*Monopolkommission*) 2023, Policy Brief, issue 12[7]).

5 The content and service providers point out that a "bill and keep" type of accounting principle would be more in line with the economic requirements, i.e. a mechanism under which each provider bills its own end customers for its services and no additional wholesale compensation payments are made between the providers. In the form of settlement-free peering, this is also the global standard for the interconnection of networks and the exchange of data traffic (see the study by WIK Consult for the German Federal Network Agency (*Bundesnetzagentur* – BNetzA), WIK Consult 2022, Wettbewerbsverhältnisse auf den Transit- und Peeringmärkten (Relations in competition on the transit and peering markets)[8], pp. 33 et seqq., hereinafter cited as WIK-Consult, and for a summary of the main arguments see Borggreen 2023, Network Usage Fees: Separating Fact From Fiction in the EU "Fair Share" Debate, with further references[9]).

6 Telekom Deutschland GmbH (TDG for short) and Edge Network Services Limited (EDGE) are currently in dispute before a German court over this issue of the applicable accounting principle, which is a key issue for both provider groups.

7 TDG is a wholly-owned subsidiary of Deutsche Telekom AG (DTAG) based in Bonn and, according to its own information, operates a global telecommunications infrastructure with a focus on Germany. EDGE is a wholly-owned subsidiary of Meta Platforms, Inc (Meta), based in Dublin, Ireland. DTAG and TDG are abbreviated uniformly as DT in this article for better

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5 Available at https://www.berec.europa.eu/en/document-categories/berec/opinions/berec-preliminary-assessment-of-the-underlying-assumptions-of-payments-from-large-caps-to-isps BEREC (Body of European Regulators for Electronic Communications) was founded in 2010 on the basis of an EU regulation that was revised in 2018. It is intended to bring about greater coordination of national regulatory practice by applying the European regulatory framework for electronic communications networks and services as uniformly as possible in order to promote the further development of the internal market in this area. BEREC's Board of Regulators is made up of representatives from 36 regulatory authorities (see Federal Network Agency (*Bundesnetzagentur*, "BNetzA", https://www.bundesnetzagentur.de/DE/Allgemeines/DieBundesnetzagentur/Internationales/Telekommunikation/BEREC/berec-node.html).

6 Available at https://www.berec.europa.eu/en/document-categories/berec/others/berec-input-to-the-ecs-exploratory-consultation-on-the-future-of-the-electronics-communications-sector-and-its-infrastructure

7 Available at https://www.monopolkommission.de/images/Policy_Brief/MK_Policy_Brief_12.pdf

8 Available at https://www.wik.org/veroeffentlichungen/veroeffentlichung/wettbewerbsverhaeltnisse-auf-den-transit-und-peeringmaerkten

9 Available at https://www.project-disco.org/european-union/011823-network-usage-fees-separating-fact-from-fiction-in-the-eu-fair-share-debate/

readability; Meta and its subsidiary EDGE are referred to collectively as Meta, unless a distinction is necessary in the relevant context.

8 Meta operates private electronic communications networks in Europe via EDGE. This is a backbone infrastructure that Meta has set up to connect its data centres and the distribution servers (also known as "points of presence", or PoPs for short) in most major European cities. This network infrastructure is used exclusively on a group-internal basis (i.e. by Meta) for the purpose of transmitting data content from the Meta family of apps (including Facebook, Instagram and WhatsApp) to end users who are customers of DT and other telecommunications network operators. This means that the content of Meta services accessed by internet users is collected from the data servers via this backbone network and delivered to the transfer points with the networks of the telecommunications network operators whose users have accessed the data in question. Telecommunications services for third parties are not offered.

9 In connection with this legal dispute, Meta commissioned Coppik Economics to discuss the economic basis of the business relationship between so-called "Over-The-Top" providers (hereinafter referred to as OTTs), in this case Meta, and telecommunications network operators (hereinafter referred to as TC network operators), in this case DT, and to derive conclusions for the disputed question of the commercial conditions to be applied.

10 This paper is an updated and revised version of this expert opinion and analyses the economic basis of IP interconnection and data traffic between content providers and telecommunications network operators in the context of the specific dispute between Meta and DT. This work focuses on analysing the available real market data and facts, rather than theoretical, abstract or fictitious model-based explanatory approaches. Furthermore, this study is limited to the economic aspects – legal aspects are not dealt with.

11 Having said this, the following should be clarified in advance for a better understanding of what follows.

12 The following terms and abbreviations are used:

- *Over-The-Top providers (OTT)* are providers such as Meta that offer their services and applications via the publicly accessible internet. This group of providers is sometimes also referred to in literature as *content and application providers* (*CAP*).

- *Telecommunications network operators* (*TC network operators* for short), on the other hand, are companies such as DT that provide telecommunications services via a network infrastructure. The telecommunications services (TC services) of internet access and data transport are particularly relevant in this context. In practice, these providers are often called *Internet Service Providers* (*ISPs*), as they offer end customers the internet access service. In the present context, this primarily concerns DT in its capacity as a TC network operator, although it also offers services and content *via* the internet.

- Accordingly, a distinction is made between TC services (internet access and data transport) and services and applications offered via the internet, in the present context e.g. Facebook, Instagram and WhatsApp, which are Meta products.

13 The data transport relevant here takes place via the networks of both parties:

- The end customer selects specific content on their end device, which they request via a service or an app. The end customer transmits this signal to their telecommunications provider via their internet connection.

- This request is transported through the network of the telecommunications provider to the network of the content provider whose content the end customer would like to have displayed on the device, be it a film, a photo, a text message, a shopping page, a search result, etc.

- The content provider accepts this request at the network interconnection point from the telecommunications provider into its own network and transports it onwards to its content servers, on which the content is stored.

- From there, the content provider transports the requested content in the form of IP data packages back through its network to the interconnection point with the network operator that made the data request.

- The operator receives the content requested by it, or rather its end customer, and delivers it through its network to the connection of the end customer in question, thereby providing exactly the service demanded by the end customer, which it contractually owes.

14 The end customer therefore utilises a combination of different services and products that lead to the desired result in combination only: it requests the use of the content provider's services and apps. This includes the provision of the relevant content. In order to be able to view this on their end device, the end customer needs access to the network of a telecommunications provider, which forwards their data requests to the content provider, then receives the requested data from the content provider and delivers the data to their end device at their location. Meta always transmits the data in the most network-efficient way, based on capacity availability, often as close to the end customer's location as the TC network operator allows.

15 This alone makes clear that the business relationship between OTTs and TC network operators involves complex economic interdependencies that have the characteristics of a symbiosis: both parties need each other in order to be able to provide the services and benefits

offered to their end customers. On the one hand, the highly frequented OTT services generate demand for internet connections and higher bandwidth, and these services provided by the TC providers to end customers in turn enable the use of the services offered by the OTT providers. This symbiosis is the essential characteristic of reciprocity in this exchange relationship.

16 This interdependency of the business models will therefore be a particular focus of the study, which is structured as follows:

- section 2 immediately below provides an initial categorisation of the positions held, particularly with regard to the type of data traffic in question;
- section 3 compares the business models of OTT providers and TC providers, analyses their respective value creation and how they benefit from each other;
- section 4 transfers the findings to the level of data transport and derives conclusions for the question as to which billing principle is to be applied;
- and finally, the results are summarised (section 5).

2. First categorisation of the positions represented: transport for a provider's own customers does not constitute transit

17 In order to categorise the traffic exchange between OTTs/CAPs and ISPs according to the nature of the business relationship, it is first necessary to consider what type of traffic is involved. A basic distinction must be made between transit traffic and peering traffic. Transit is usually understood to mean transport forwarding into the networks of third-party operators, while peering refers to the direct exchange of traffic between two (private) networks, which is delivered to its destination in the other network, i.e. terminated there.

18 In accordance with the illustration of the process set out in margin no. 13, the data traffic exchange process described here involves traffic that is retrieved at Meta by end customers out of DT's network and then delivered in DT's network to the very DT customers who retrieved the content in question. This is also confirmed by traffic analyses of Meta's network technology based on the IP addresses transmitted by DT. This shows that around 70% of traffic goes directly to end customers in TDG's networks, while the remaining 30% is delivered to end customers in other networks within the DTAG group. As a result, the traffic delivered by Meta at the request of DT customers remains entirely in DT's group-internal networks and is delivered there to the corresponding DT end customers. Due to this division of traffic, the term "transit" is not correct for the transport service offered here. As the term already expresses, "transit" is exclusively understood as traffic that is forwarded through a carrier network to networks of other operators, but not traffic that – as here – is intended for termination at end customers in the operator's own networks (cf. WIK-Consult, p. 31).

The traffic supplied by Meta to DT is therefore peering traffic and not a transit service.

19 Nevertheless, DT offers CAPs an interconnection service for such traffic exclusively as its so-called transit service, for which a transit fee is to be paid (cf. section 4.2.2 for details). It argues that the destination is determined by the interconnection partner itself through its action of providing the routing information. What IP address in which destination network the traffic is delivered to is therefore solely the decision of the CAP, it adds. This disregards the fact that the data content was requested by DT customers and can therefore only be delivered to them (cf. the "supply chain" of data traffic described in margin no. 13 above). It is therefore clear from the outset that this is traffic to DT's access networks, because requests from DT customers for very specific content of the relevant CAP, in this case Meta, are satisfied here. This content can only be delivered to the IP address from which the request originated. The interconnection partner therefore has no choice at all with regard to the destination address and thus the destination network.

20 However, only data transport that is not requested by the transit provider's own end customers but by end customers in other networks can be relevant for a transit service vis-à-vis Meta as the interconnection partner (cf. WIK-Consult, p. 31). Only for such traffic to third-party networks is a wholesale service actually provided to the interconnection partner. For traffic delivered to the TC network operator's own end customers, the operator is instead remunerated by its end customers (cf. WIK-Consult, p. 33 and section 3.2.2.3.). That is precisely the product it is selling them: internet access and also the transport of the desired traffic to and from the customer through the operator's network.

21 This means that the traffic in the case at hand is clearly peering traffic, i.e. traffic to DT's network covered by end customer rates, which is terminated at its own end customers and does not constitute a transit service provided to the CAP. This is the first key finding.

22 In contrast, demanding additional remuneration from interconnection partners, also and especially for the forwarding of traffic to an operator's own end customers, is referred to in literature as "hostage taking" (see the surveys prepared by Packet Clearing House analysts for the OECD at five-year intervals, most recently in 2021: Packet Clearing House 2021, 2021 Survey of internet Carrier Interconnection Agreements, pp. 14 et seq.[10]). This monetises the fact that these customers can only be reached through the network of the ISP in question. The CAP therefore has no choice but to pay the fees if it wants to serve the users connected to the ISP's network. In the case of DT, the largest network operator in Germany, these are over 61 million mobile customers, more than 23 million broadband connections and 3.4 million IP TV customers (see DTAG Unternehmenspräsentation 2024 (*DTAG 2024 Company Presentation*)[11], pp. 6 and 32). BEREC sees this as an exploitation of the termination monopoly and thus of the market power of the TC network operators/ISPs over CAPs (cf. BEREC

10 Available at https://www.pch.net/resources/Papers/
11 Available at https://www.telekom.com/de/konzern/konzern-profil/konzernprofil-624542

2022, p. 5). These relations are analysed in more detail in section 4.2.2.

23 The relative positions of the two interconnection partners when negotiating with each other also plays a role here: larger TC network operators will be able to enforce such charges more easily than smaller providers due to the larger number of customers. Conversely, it must be taken into account that customers of an ISP may not want to permanently make do without certain services, e.g. those offered by Meta or other large CAPs, and in the event that interconnection fails and these services are not available or no longer available in good quality, they would consider changing their ISP – or they would find a replacement for the services of the CAP in question. Which service is replaced first or more strongly – the internet connection provided by the ISP in question or the services/applications of the CAP – depends on the value attached to that service from the customer's perspective, the switching costs and the available substitutes. Ultimately, however, both sides would have to expect to lose customers if the business relationship were to fail, i.e. both have similar interests in the establishment and maintenance of the data exchange.

24 The economic background to the traffic exchange in the case at hand (section 3) and the remuneration principles that can be derived from it (section 4) are explained below.

3. Economic background and interdependence of the business models

25 The business models of Meta as an Over-The-Top (OTT) provider on the one hand and Deutsche Telekom as a TC network operator on the other are mutually dependent on each other. As an OTT, Meta offers its users content and services directly via the (publicly accessible) internet. In order to use these services and view the corresponding content, the customer requires access to the internet which they themselves must obtain. This creates demand from end customers for internet connections and traffic transport, which DT, as a leading TC network operator, serves by offering its products and telecommunications services via its network infrastructure. This means that the two business models – in their current form – are mutually dependent. This symbiotic relationship contributes significantly to the success of the internet economy (cf. Monopolies Commission, 9. Sektorgutachten Telekommunikation (*9th telecommunications sector report*), 2015, margin no. 157).

26 This results in the triangular structure depicted below:

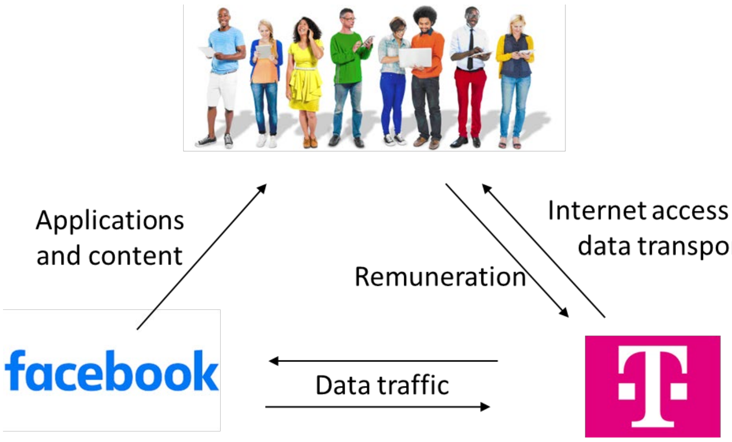

Figure 1: Triangular structure of the business relationships (source: own illustration, photo: amcooltech.com)

27 The symbiosis between the business models is quite profound: the services and content offered by OTTs are generating enormous demand for telecommunications services, enabling TC network operators to market state-of-the-art and highly profitable broadband internet connections, whether in mobile communications via 5G, in landline connections via fibre optics and DSL or via the upgraded cable network. Without the demand for high data volumes and sophisticated services such as video conferencing or streaming, there would also be significantly less demand for expensive high-bit-rate broadband connections with download rates of 250 Mbps, 500 Mbps or higher from TC network operators.

28 Conversely, by constantly expanding and modernising their networks, infrastructure providers are enabling the provision of ever more innovative and evolving OTT services, including live streaming, video calls and the rapid downloading of content, all in the highest possible quality. With their own commercial interest in providing high-quality TC services, they are simultaneously forming the basis for the OTT business model. Both provider groups taken together are the main drivers for the rapid digitalisation of society.

29 It should be emphasised that the TC network operator charges the end customer a fee for its services, while the use of the applications and services of the OTTs is in many cases free of charge (at least in the basic version), i.e. the user does not pay any financial compensation to the OTT. This is also the case here with the Meta family of apps. DT can therefore utilise for itself and the TC services it offers the entire end customers' willingness to pay that arises from the demand for Meta services, as the Meta services cost the user (and the ISP) nothing. They are largely financed by advertising. It is possible that the user's willingness to pay is reduced somewhat by the inclusion of advertising, as an ad-free service might be worth more to them, but the user's financial budget is not affected. It is also conceivable that advertising that is optimally tailored to the user's needs has a positive effect for the user and thus provides added value (which is usually also the aim of the advertiser, because advertising that is perceived as negative is not only useless, but damaging). If such advertising is successful,

this would further increase the user's willingness to pay instead of reducing it. This is the goal and key element of Meta's business model.

30 End customers can spend the amount that the use of the Meta apps (including advertising) would be worth to them for the TC network operator's internet access service instead, because that is the only expense they have to make. The network operator therefore not only benefits from the fact that OTT services generate demand for its TC services, they also generate additional willingness to pay, which it can utilise for itself – the TC services gain value in the eyes of end customers through the OTT content and applications that can be used with them.

31 Against the background of this obvious mutual benefit and the social significance of this interaction, the question in this context is also whether it appears economically justified for one side to also contribute to the costs of the other side of the market.

32 *Figure 1* above clearly shows the two-sided nature of the market from DT's perspective: on the one hand, it sells internet access and traffic transport to its end customers in return for remuneration; on the other hand, it has a business relationship with the CAP at the upstream wholesale level and demands payment also at that level for the transport of traffic to its end customers via its network infrastructure.

33 From this point of view, too, the question arises as to whether there is an economic reason for additional compensation at the wholesale level or whether the end customer has already compensated the network operator for the utilisation of its infrastructure, in this case the transport of the data retrieved by the end customer from the internet through DT's network to the end user's connection point. In the latter case, this would simply be a double payment – the system operator would be selling one and the same service twice.

34 After this brief outline of the problem, the most important aspects of the business models and their interaction are explained in more detail in sections 3.1 and 3.2 below. Section 4 then discusses the implications for the controversial level of data transport and draws conclusions regarding the question of appropriate remuneration.

3.1. Meta’s area of business and value creation

3.1.1 Basic features of the Meta business model

35 The business of Meta Platforms, Inc. can generally be categorised as that of an Over-The-Top provider. The basic characteristics of the business model pursued with the core services of Facebook and Instagram can be described as follows.

36 "Over the top" firstly expresses the fact that services are provided via the (publicly accessible) internet and, other than is the case for traditional service providers[12], not in a fixed compound structure together with a specific network infrastructure or technology. This delivery model includes content services such as video and music streaming, social networks, online video games, search engines, market platforms and much more (see Monopolies Commission, 12th telecommunications sector report, 2021, margin no. 151). Other services offered include, for example, Meta's short message service WhatsApp or various video telephony and conference services that enable individual or group communication.

37 OTT providers use the customer's existing internet access to offer their services. In many cases – including here (see below) – this is the only requirement that the customers must fulfil in economic terms, i.e. apart from legal requirements such as legal capacity, compliance with age requirements and terms of use, etc., if they wish to use the services: they need access to the internet, which they obtain themselves and independently from a TC network operator of their choice.

38 *Figure 2* below illustrates the market structure and its different levels.

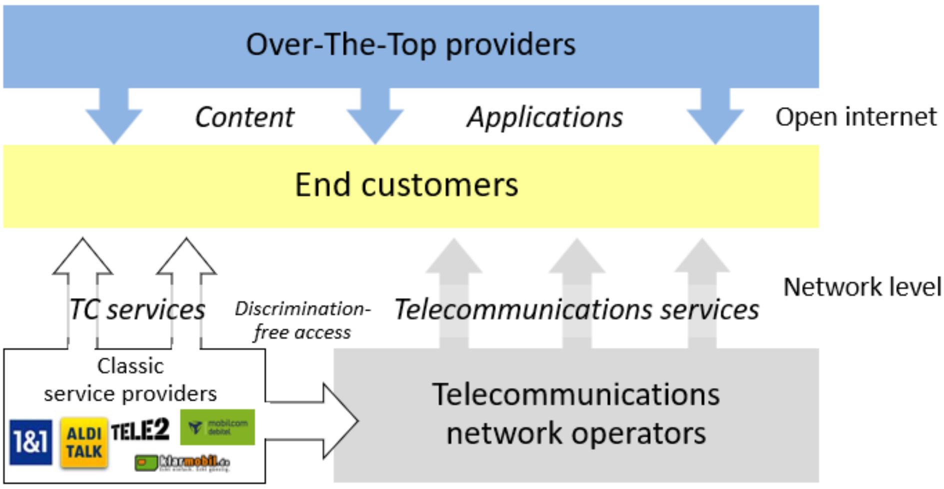

Figure 2: Schematic depiction of the market levels in telecommunications (source: own illustration)

39 The term OTT provider is broadly defined and largely congruent with the term content and application provider (CAP), which is also commonly used. The key feature is the offering of content and services via the (publicly accessible) internet and their provision independently of the internet access provider (cf. Monopolies Commission, 9th telecommunications sector report, 2015, margin no. 152).

12 Traditional service providers primarily market third-party telecommunications services for their own account and according to their own tiered pricing schedules via regulated access to the incumbent operators' telecommunications networks. They do not play a major role in the present context and are only mentioned here (and in *figure 2*) for the sake of completeness, as they are part of the market system.

40 Meta's business concept focuses on offering valuable and innovative services for interested users. The services are offered free of charge and financed via targeted advertising offers based on user interests, which are part of the service[13]. Meta competes with a large and rapidly growing number of other services offered on the internet, which also pursue the goal of offering innovative, differentiated services that are adapted to the constantly evolving needs of users.

41 The most important Meta services can be characterised as follows:

- **Facebook**: The Facebook service consists of the Facebook website plus a mobile app that enable users to network, share, discover and communicate with each other via mobile devices or PCs.
- **Instagram**: The Instagram service allows users to create photos or videos, edit them individually with various filter effects, share them with friends and followers in a photo post or send them directly to friends.
- **Messenger**: The Messenger service allows users to communicate with each other in a variety of ways, privately or for business, via a selection of different platforms and end devices, securely and seamlessly.
- **WhatsApp**: WhatsApp is a fast, simple and reliable communication service that allows users to send and receive various types of media content such as texts, photos, videos, documents and locations, as well as voice and video calls. A user's personal calls and messages are protected against misuse by means of end-to-end encryption. The service is used by people all over the world and enables worldwide communication.

42 At its core, Meta and its main services Facebook and Instagram aim at providing a personalised user experience in which all content, including advertising, is individually tailored to the user. The users, in turn, are aware that the services are exclusively ad-financed. In fact, advertising is an integral part of the personal user experience and Meta places great importance on users finding the adverts they are shown to be relevant and useful. This multi-level business model enables Meta to offer its services to users free of charge.

43 More than 30 million people in Germany regularly use Meta's Facebook and Instagram services. Even more people use messaging services offered by Meta (e.g. WhatsApp) as an important part of their daily lives.

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[13] Since November 2023, a paid ad-free version has also been offered due to an order from the European Data Protection Board (EDPB).

3.1.2 High demand for OTT services as a measure of high added value

44 In recent years, there has been a steady increase in demand for data transmission. An increase in demand always means that the product or service provides the customer with a high benefit, to which the customer reacts positively by increasing consumption. The increase in traffic volume is therefore a positive reaction of demand for services and content offered via the internet.

45 The development of data volumes transmitted in the fixed and mobile networks in Germany is presented below.

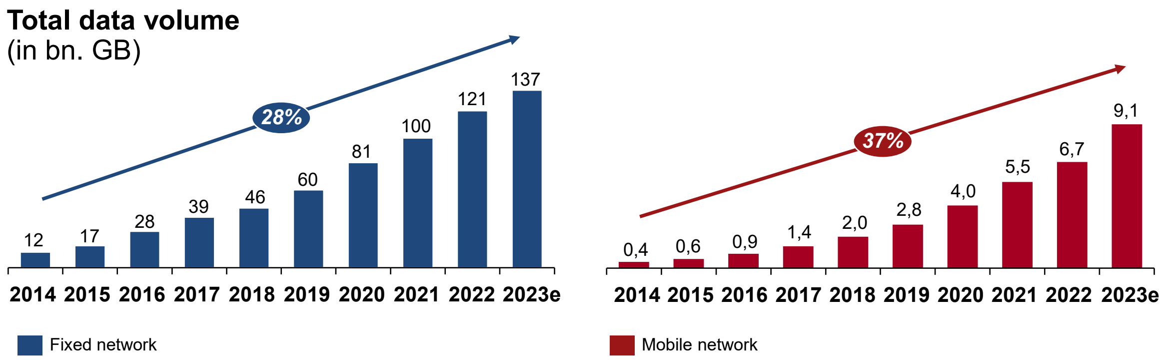

Figure 3: Development of data volumes in the landline broadband network and mobile communications in Germany (source: BNetzA, own illustration)

46 *Figure 3* shows that the volume of data transmission in Germany has shown a strong upward trend in recent years, both in the broadband landline network and via mobile devices. In the landline network, data volumes have risen by an average of 28% per year since 2014, and in mobile communications by as much as 37%, although the absolute volumes in mobile communications are significantly lower. There are currently signs of a slight reduction in the growth rate in the landline network.

47 A similar trend can also be seen in the development of the average amount of data that a user retrieves per month (see *figure 4* below).

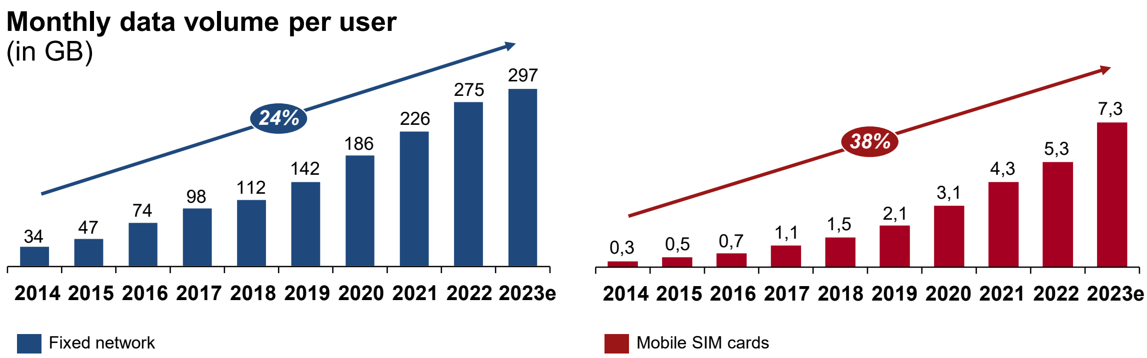

Figure 4: Development of data volume per user per month in landline and mobile communications in Germany (source: BNetzA, own illustration)

48 As a result, the average amount of data transferred per user per month in Germany has also increased significantly over the years, by an average of 24% per year in the landline network since 2014 and by 38% in mobile communications. It is therefore not only the total amount of data that is increasing, for example due to the ever-growing number of people using online services, but also the individual intensity of use.

49 Both trends indicate that end customers experience a high level of benefit from the underlying services. The services in question therefore offer people high added value (although this does not necessarily correlate directly with the volume of traffic generated by a particular service). Of course, this is only an abstract view based on aggregated market data and the conclusions drawn from it must remain correspondingly general and abstract. More precise statements would require the analysis of specific usage statistics for individual services, which would, however, exceed the scope of this study.

50 The following overviews show the services and apps that are most in demand internationally and that contribute to the volume growth accordingly.

	Category	Share
1	Video	49%
2	Social media	14%
3	File sharing	9%
4	Gaming	7%
5	TV	5%
6	Web apps	3%
7	Communication	2%
8	VPN	0.7%
9	Audio	0.5%
10	Conferencing	0.2%

	Service	Share
1	YouTube	15%
2	Netflix	15%
3	DAZN	7%
4	Tik Tok	6%
5	Facebook	6%
6	Operator content	5%
7	Playstation	5%
8	Instagram	5%
9	Disney+	4%
10	Amazon Prime	4%

Table 1/2: Share of total data traffic in 2023 by service category/service used in Europe (source: Sandvine, The Global Internet Phenomena Report, 2024[14], p. 22, own illustration)

51 *Table 1* shows that video content accounts for by far the largest share of internet data traffic.

[14] Available at https://www.sandvine.com/phenomena

In this context, it should be noted that the Meta apps are not primarily video streaming services (although it is possible to send videos through them, cf. margin no. 41 above) and are therefore not to be seen as main drivers of volume growth. As *Table 2* shows, Meta's Facebook and Instagram apps account for around 11% of international data traffic. The analysts at Sandvine especially emphasised (cf. Sandvine, op. cit., p. 20) that operator content in particular, i.e. the content offered by the TC network operators themselves and fed into the network (e.g. Magenta TV, see section 3.2.1) has recently increased significantly.

52 With regard to the market as a whole, it should be noted that the increase in traffic volumes represents a positive demand response, which generally indicates a high level of benefit from the services offered. First of all, this indicates that the market is functioning well and offers consumers a high level of satisfaction of their needs. A high level of benefit is usually accompanied by a corresponding willingness to pay, both for the content and services of the OTTs and for the broadband internet access required to use them. From the customer's point of view, only both together provide the benefit, so that the willingness to pay also relates to both.

53 This means that the increasing demand for consumption of content and services via the internet also leads to increasing demand for the necessary TC services. We will be taking a closer look at this connection in the following section.

3.1.3 Positive effects on demand for TC services

54 In the following, we will analyse the effects that the increased demand for OTT services (and, as a result, for data volumes) has on the demand for TC services, first in general (section 3.1.3.1.) and then, on the basis of current market figures, specifically in relation to TDG's business (section 3.1.3.2.).

3.1.3.1. Fundamental cause/effect relationship

55 As already outlined, the rising demand for OTT services is having a positive effect on demand for TC services. This relationship is easy to explain: a broadband or mobile phone connection in itself has no particular value for the customer. The technical connection to a network alone does not bring any added value for most people. This only arises through the utilisation possibilities associated with the connection to this network. In the case of TC networks, this was originally the possibility of communicating with other people via landline voice telephony, later mobile telephony was added, then the sending of short messages and photos. Today, it is also the internet with all its possibilities. However, a broadband internet connection with a high transmission speed is only needed if the customer – to put it bluntly – has a use for it, i.e. if relevant services and utilisation options are available that are of value to the customer and for which the expensive broadband connection can be used at all.

56 This is the plethora of innovative services and content now offered by OTTs. The growing

demand for such OTT services and the associated appetite for bandwidth and data volume therefore translates directly into sales of high-bit-rate landline and mobile telecommunications connections, as these are necessary for the full usability of OTT services and content and improve the user experience. *Table 1/2* (see margin no. 50 above) provides an overview of the most popular services and applications (or those that contribute most to the demand for data volume and thus broadband internet, see margin no. 50).

57 This connection is obvious and generally recognised. In its study for the Federal Network Agency, WIK has stated that the added value of OTTs requires connectivity (i.e. the technical connection to the internet), but that it is primarily derived from the content and services provided by the OTTs (cf. WIK-Consult, p. 55). The Monopolies Commission has stated that innovative OTT services and applications contribute to an increase in end customer demand for internet access and data volumes, from which the network operators benefit, and concluded that both provider groups are in a symbiotic relationship with each other (cf. Monopolies Commission, 9th sector report, 2015, margin no. 157). The International Telecommunication Union[15] (ITU) also stated in its workshop report on the economic impact of OTTs on national telecommunications markets that OTT applications help increase network operators' sales of internet connections by creating demand for them (see ITU-D Study Groups, Economic impact of OTTs on national telecommunication/ICT markets[16], 2021, p. 13). It stated that the demand for OTT services means that users are increasingly requesting broadband TC services and upgrading existing connections to higher transmission speeds and greater bandwidth (cf. ITU-D, op. cit., p. 8). Precisely these effects can also be seen in DT's business figures (see section 3.1.3.2 immediately below and section 3.2.2.3. further below). BEREC expresses the situation most clearly by attributing the commercial success of broadband technology to OTT services (cf. BEREC, BEREC's comments on the ETNO proposal for ITU/WCIT or similar initiatives along these lines[17], 2012, p. 3):

> *"Ultimately, it is the success of the CAPs […] which lies at the heart of the recent increases in demand for broadband access (i. e. for the ISPs very own access service)."*

3.1.3.2. DT benefits considerably from the increase in demand

58 This correlation can also be seen in the market development for broadband internet connections in Germany and, in particular, in DT's business figures. With the increasing demand for online services and content and, as a result, growing traffic volumes, TC network operators' sales figures for broadband connections and internet plans are also rising. The following

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15 The International Telecommunication Union (ITU) is the United Nations specialised agency for information and communication technologies (see ITU, https://www.itu.int/en/about/Pages/default.aspx).

16 Available at https://www.itu.int/dms_pub/itu-d/oth/07/23/D07230000030001PDFE.pdf

17 Available at https://berec.europa.eu/eng/document_register/subject_matter/berec/others/1076-berecs-comments-on-the-etno-proposal-for-ituwcit-or-similar-initiatives-along-these-lines

overview provided by Dialog Consult / VATM can serve as an illustrative example of this development (*figure 5*).

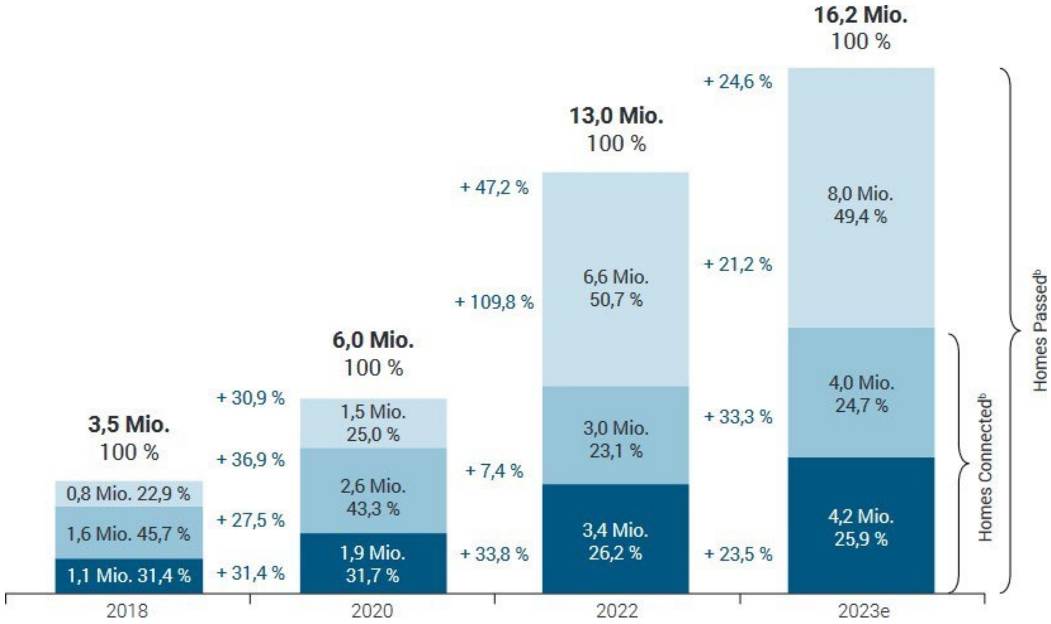

Figure 5: Development of rolled-out and marketed fibre optic connections in Germany (source and chart: Dialog Consult / VATM, 25. TK-Marktanalyse Deutschland 2023 (*25th TC market analysis Germany 2023*), p. 20[18])

59 The chart above shows the development of the rolled-out (total bar, so-called "Homes Passed") and marketed fibre optic connections, i.e. those already in active use (the bottom part of each bar marked in dark blue), as well as the installed but not yet actively used connections (middle part) in Germany. Both figures show a strong upward trend similar to the development of traffic volumes (see *figures 3* and *4* above, margin nos. 45 et seqq.).

60 Together with cable connections, fibre optic connections are the internet access technology currently enabling the highest possible transmission speed. *Figure 5* shows that these high-bit-rate connections are experiencing enormous growth rates. Previously, the Federal Network Agency had already stated in its 2020/21 activity report that the demand for particularly fast connections with bandwidths in the gigabit range was increasing significantly. The number of booked connections had already increased fivefold in 2020 (see BNetzA, Tätigkeitsbericht 2020/21 (*2020/21 Activity Report*), p. 55). This is clearly demonstrated by the development – demand for broadband internet connections is at an all-time high and continues to rise. The Federal Network Agency also states the reason for this, namely increased demand for data volumes as a result of broadband (OTT) services (cf. BNetzA, op. cit.). This proves the economic correlation described above in section 3.1.3.1. that is evident from this market data: the TC services business is growing in line with the online services business and the resulting demand for data transmission.

18 Available at https://www.vatm.de/wp-content/uploads/2023/11/Marktstudie-2023-V6.pdf

61 As the leading TC network operator in Germany, DT is benefiting in particular from this development in demand. The following is an excerpt from a recent DT investor presentation on the retail customer business in Germany (see *figure 6*). This shows that the number of DT broadband connections marketed (left chart) is also rising significantly, as is the average revenue (ARPA) that DT generates per broadband customer (centre chart). DT also assumes that this positive trend will continue and forecasts that its marketed broadband connections will more than double by 2024 (left chart). To this end, it has set a target annual growth rate (CAGR, statement on the far right).

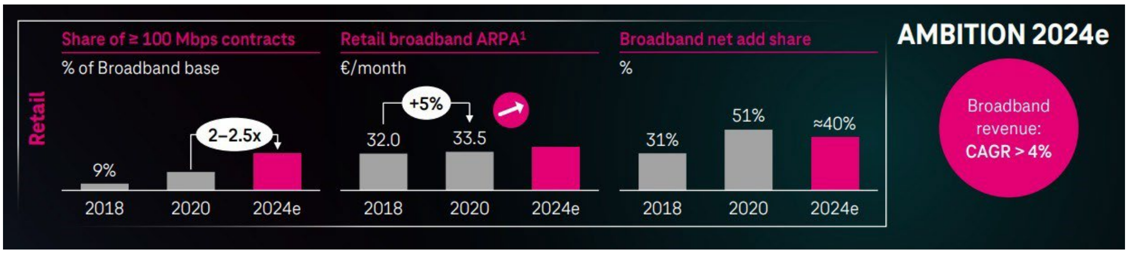

Figure 6: Development of DT broadband connections in Germany (source: Investor Relations Präsentation DT, Kapitalmarkttag (*DT Investor Relations presentation, Capital Markets Day*) 21/22 May 2021[19])

62 The symbiotic relationship between the business area of content and service providers via the internet on the one hand and that of sales of internet access and data transport via TC network infrastructure on the other is thus also clearly visible from current market figures: the more attractive the range of services and content offered online becomes and the more sophisticated the access products required for this need to be, the higher the corresponding sales of the TC network operator. In a way, OTTs with their own business activities fulfil the function of a "sales force" for network operators, because their attractive range of services is the best argument for a purchase of modern and high-quality TC services from the network operator.

63 So when DT complains that the traffic of the five largest content providers has multiplied since 2018, *figure 6* above (diagram on the left) already showed that the broadband connections marketed by DT correlate with this and show a similarly positive development. This trend also continued in the 2021 financial year, as can be seen in a chart from the results presentation (*figure 7* below). According to the presentation, DT gained between 84,000 and 121,000 broadband customers in each quarter:

[19] Available at https://www.telekom.com/en/investor-relations/publications/capital-markets-days/capital-markets-day-2021

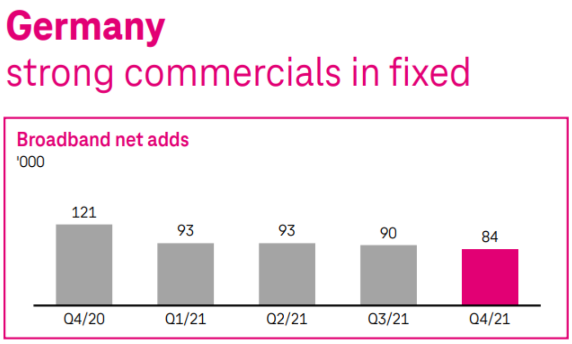

Figure 7: Net growth in broadband customers per quarter, extract from DT presentation of business results 2021[20], p. 21

64 In addition, the increase in the number of broadband customers was accompanied by growing revenues per customer, as can be seen in *figure 6* (margin no. 61 above, centre chart). The average broadband ARPA (average revenue per account) for retail customers rose by 5% between 2018 and 2020 and continues to rise. This means that not only is the number of customers increasing significantly, but also the amount of revenue per customer. These are therefore two developments that are extremely favourable to DT's business results and are largely caused by the increasing demand for content and services on the internet – precisely the circumstance that DT apparently wishes to present as a disadvantage and financial burden in the present context. However, this development in demand is actually leading to growing revenues and profits for DT (see also section 3.2.2.3.).

65 This development has since continued over the years that followed, as can be seen from the following summary of the KPIs (key performance indicators) for the landline segment in DT's current company presentation:

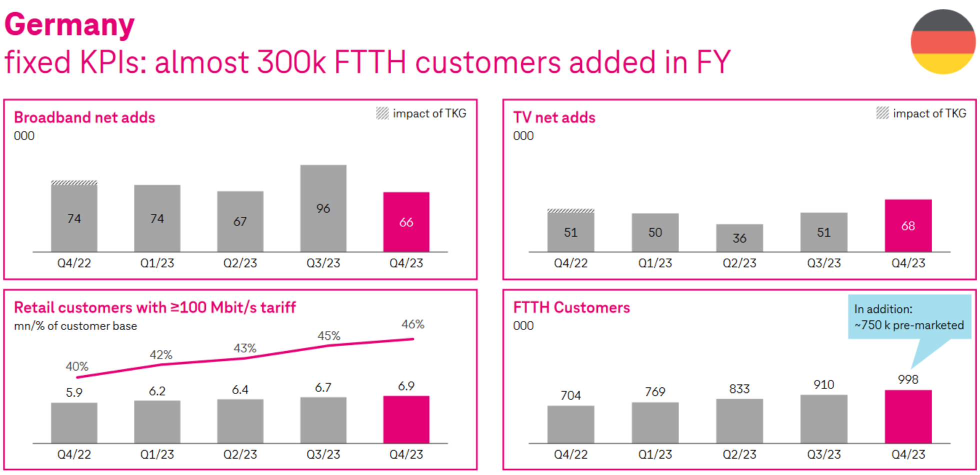

Figure 8: Excerpt from DT company presentation, Fixed KPIs for the 2023

20 Available at https://www.telekom.com/en/investor-relations/publications/financial-results#646260

financial year[21], p. 21

66 All KPIs for the landline broadband business area, which is primarily relevant here, show continuous strong growth.

3.2. Telekom Deutschland's area of business and value creation

67 This section provides a brief outline of DT's field of activity insofar as it relates to the present context (see section 3.2.1 immediately below). The focus is then on the question of how (and by whom) the costs of data transport are to be borne. This is to be seen in connection with the general demand of TC network operators for OTTs to contribute to the costs of the TC network infrastructure, which is therefore also outlined in the necessary brevity (cf. section 3.2.2.).

3.2.1 Basic features of Telekom Deutschland's business model

68 With its business model, Deutsche Telekom can generally be categorised as a TC network operator; it describes itself as a leading digital telecommunications provider. With around 248 million mobile communications customers, 26 million landlines and 22 million broadband lines, it is one of the world's leading integrated telecommunications companies (see DTAG Konzernprofil (*group profile*)[22]).

69 Historically, DTAG emerged from the former state monopoly provider Deutsche Bundespost, whose network infrastructure it has taken over. When the second German postal reform (Postreform II) came into force on 1 January 1995, the public-law company Deutsche Bundespost Telekom became the stock corporation Deutsche Telekom AG.

70 TDG is a subsidiary of DTAG and, according to its own information, operates *inter alia* a nationwide network infrastructure on the basis of which it offers mobile and landline broadband end-customer services. It also provides internet data transport services via its IP backbone and transport services in access networks to third-party companies that do not have their own network infrastructure or only have a partial network infrastructure.

71 Even today, TDG is still the unrivalled market leader in many areas. This applies in particular, for example, to the landline broadband internet access relevant here, where the DSL technology, which is based on the former monopoly infrastructure, accounts for the vast majority of the market segment with a share of 69% (see BNetzA, Jahresbericht 2021 (*2021 Annual Report*), p. 51). Almost all marketed DSL connections are provided in various forms via the TDG network, as the following breakdown provided by the Federal Network Agency shows (cf. *figure 9*).

21 Available at https://www.telekom.com/en/investor-relations/publications/financial-results/financial-results-2023#1058182

22 Available at https://www.telekom.com/de/konzern/konzern-profil/konzernprofil-624542

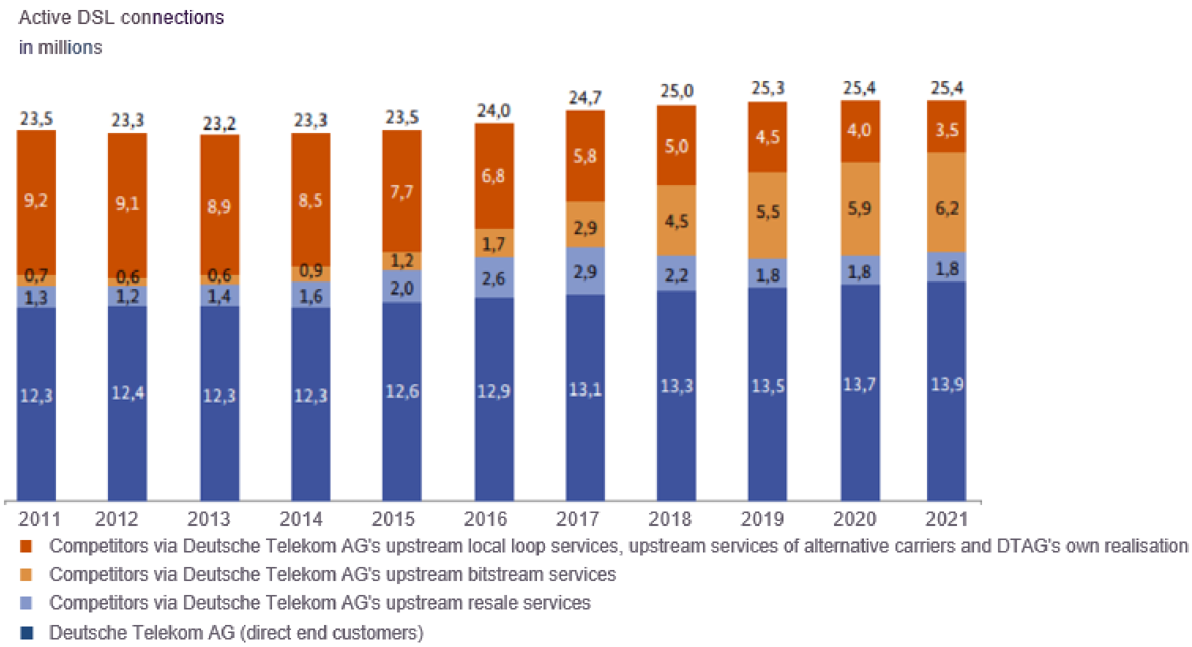

Figure 9: Active DSL connections by type of provision (source: BNetzA, 2021 Annual Report, p. 54)

72 In 2021, DT served the majority of DSL end customers (13.9 million) directly via its own sales organisation, while the remaining 11.5 million were largely served via wholesale products in which the alternative provider purchases network access in various variants from DT at wholesale level. Only very few of the DSL-based connections are provided completely independently by alternative network operators without using DT's network (included in the top orange bar segment in *figure 9* above and not quantified by the Federal Network Agency).

73 It should also be emphasised that DT is not only active in the infrastructure business, but also in the content business, for example with its extensive MagentaTV internet TV offering. It is marketed both in combination with DT's internet access plans but also independently of it. These include over 180 TV channels, numerous services from third-party providers such as Disney+, Netflix and RTL+, a so-called "Megathek" (mega (multimedia) centre) with free films, series, shows and documentaries available for download, all accessible via various end devices and in several streams in parallel (see Telekom website[23]).

74 *Figure 10* below provides an overview of DT's MagentaTV offerings.

[23] Available at https://www.telekom.de/unterhaltung/serien-und-filme#tarif-table-magenta-tv

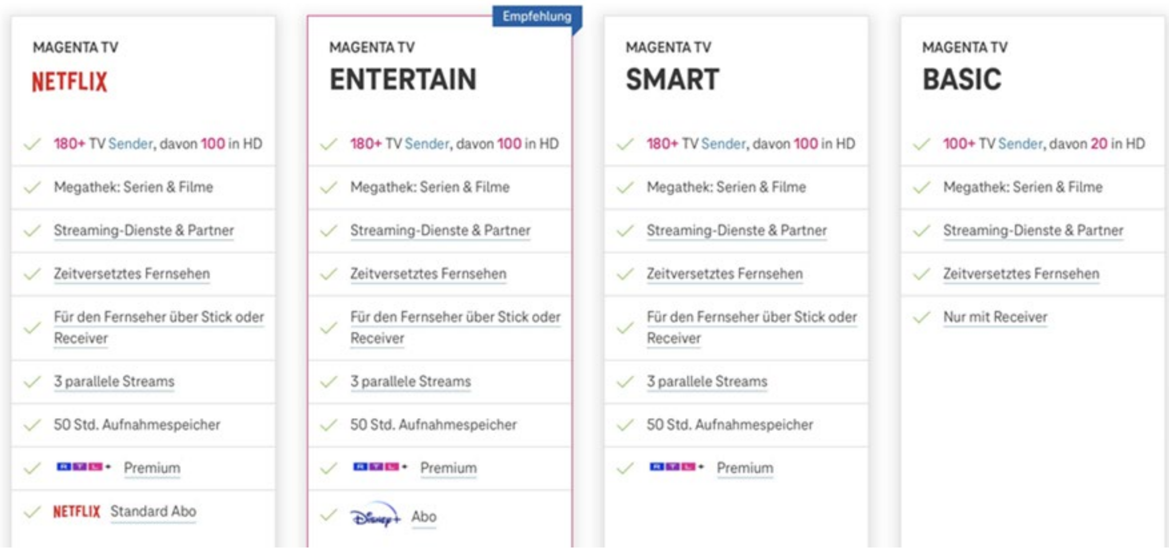

Figure 10: Overview of DT's TV streaming offer (source: www.telekom.de[24])

75 As already shown in *table 1* above (margin no. 50), video streaming is by far the biggest contributor to traffic growth (sometimes referred to as a "video tsunami", see Sandvine, The Global Internet Phenomena Report January 2022, p.7). Video streaming services such as MagentaTV are therefore primarily responsible for data growth. By its very nature, the MagentaTV service is significantly more traffic-intensive than the Meta apps Facebook and Instagram, which are the main focus here. These enable the use of a variety of different media formats, which are on average far less data-intensive than the streaming of long video formats like in the case of MagentaTV, however.

76 In this way, DT itself contributes to the growth in traffic volumes – which makes sense from both a commercial and macroeconomic perspective, because, as discussed (see section 3.1.2.), these are revealed consumer preferences, i.e. expressed consumer benefits, which the market participants aim to serve. If the market participant is successful in doing so, its own business will also flourish, as is the case with DT (see sections 3.1.3.2 and 3.2.2.3.). It should therefore be made clear once again that the growth in traffic volumes is fundamentally a positive reaction of the demand, which normally leads to correspondingly positive business developments for the providers concerned, both OTT and TC providers. DT is capitalising on this in both business areas, i.e. in the provision of TC services and online content.

3.2.2 Traffic volume development and costs of network expansion

77 A key point in the discussion between OTT providers and network operators was and is the fact that the high and constantly increasing demand – especially, but not only – for OTT ser-

24 Available at https://www.telekom.de/magenta-tv/tarife-und-optionen/magenta-tv-mit-internet-festnetz?ActiveTabID=entertain#magenta-tv-preis-tabellen

vices places high demands on the telecommunications infrastructure via which these services are provided. Not only must capacities continue to be expanded and adapted to the increasing traffic volumes, the networks must also be upgraded technologically in order to account for the constantly evolving functionalities of IP-based services and enable a high-quality service, providing a pleasant "user experience".

78 While the original problem was the so-called "leechers" – a relatively small proportion of internet users who downloaded very large amounts of data and thus "clogged up" the lines – live services have now become an even greater challenge.

79 In the past, for example, if a film was downloaded from the internet overnight and watched the next day, this simply represented a large amount of data that had to be transported, but this transport is hardly time-critical. However, if the same film or sporting event is streamed live, i.e. if the user does not want to wait for the download but wants to watch the film or event immediately and in real time, the data transfer must also take place in real time. This places considerably higher demands on the network capacity to be made available, because for a pleasant experience watching a film or event, sufficient transmission speeds and thus bandwidth must be provided over the entire time, so that the user – in the best case – does not experience any lags ("loading symbols") and the picture and sound quality is optimal (synchronous transmission of audio and video, high resolution, no "pixels" on the screen, etc.).

80 This discussion was originally held under the heading of "net neutrality". In essence, the question was whether the network operator may discriminate against traffic, i.e. whether it may react to download volumes that are too high by reducing the bandwidth made available for individual users or services and thus the transmission speed, and in return prioritise other services, e.g. real-time services. The main fear was that the network operator could favour its own services for commercial reasons and, in return, put offers from third-party providers – such as OTTs – at a disadvantage. As a result, the question of the extent to which such capacity management is permitted was regulated by the European Commission's Net Neutrality Regulation 2015/2120. According thereto, providers of internet access services must treat all traffic equally. Exceptions for objectively necessary and non-discriminatory traffic management are permitted under clearly defined conditions. The Federal Network Agency regularly publishes reports on compliance with the regulation[25].

81 After this was clarified, the discussion is now focussing primarily on who should bear the costs of the network expansion necessary to ensure that all traffic can be handled equally at all times. The established telecommunications companies criticise the fact that OTT content services in particular "cause" high investment costs for network operators due to their large data transport requirements without bearing any part of these costs. Furthermore, OTTs

[25] Details can be found at https://www.bundesnetzagentur.de/DE/Fachthemen/Digitalisierung/Netzneutralitaet/start.html

could replace traditional communications services with the communications services they offer, but would not be subject to the same rules of telecommunications regulation – there would be no "level playing field" (see Monopolies Commission, Sondergutachten Telekommunikation, Telekommunikation 2021: Wettbewerb im Umbruch (*Special report on telecommunications, telecommunications 2021: radical changes in competition*), 12th sector report, 2021, p. 67).

82 The publicly voiced demand of the TC network operators for cost sharing must be seen in connection with this position of the network operators. In the following, we will address the issue of cost allocation insofar as it is relevant to the business relationship in question or helpful for understanding the economic context.

83 For this purpose, the development of investment costs is presented first (section 3.2.2.1.), followed by the position of DT (section 3.2.2.2.). The author then comments on this (section 3.2.2.3.).

3.2.2.1. Development of investments

84 As presented above, the increasing demand for data traffic (among other things) makes a continued network expansion and thus investments in the TC network infrastructure necessary. Additionally, there are of course other reasons for investments, such as modernising the network and implementing new transmission technologies. The copper pair wires in TDG's access network area were, for example, laid during the time of the state monopoly. In addition, societal and political objectives such as the digital agenda play a role, in the course of which TC network operators are being compelled to expand and upgrade their networks. Examples of this that have been much discussed in public include the upgrade or, as it were, conversion of the local access network to fibre optic technology and the coverage of remaining white spots in mobile networks. The investments shown below therefore have several causes, not just traffic volume growth.

85 The following overview shows the development of investments in tangible fixed assets in the telecommunications market in Germany over the last ten years.

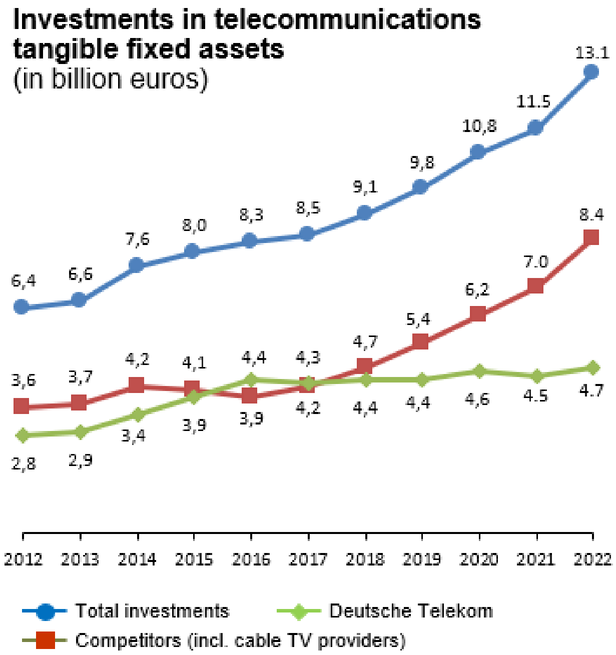

Figure 11: Investments in TC tangible fixed assets in Germany (source: BNetzA, Jahresbericht (*Annual Report*) 2022, p. 10, own illustration)

86 However, it is of course not only traditional TC network operators that incur investment costs (cf. in detail BEREC 2023, BEREC's Response to the Exploratory Consultation, pp. 9 et seq.). OTTs/CAPs must also invest in the development of apps, service offerings and content, for example, in order to be able to provide an attractive offering and survive in the intense online competition. In some cases, these are also quite substantial amounts. Netflix plans to invest EUR 500 million in German content alone by 2023 (see WIK-Consult, p. 56). Netflix spent a total of US$ 12 billion on content in 2020 (see WIK-Consult, p. 62). In addition, there is OTTs'/CAPs' own infrastructure, e.g. content servers and clouds, hosting, development of more efficient video streaming technology, etc.

87 However, investments are not only being made in the creation and processing of content; the large OTTs in particular are also building up their own network infrastructure (see BEREC, Draft BEREC Report on the entry of large content and application providers into the markets for electronic communications networks and services[26], pp. 8 et seq., with further references), on the one hand to make themselves more independent and on the other hand to bring the data as close as possible to the end customer (such as Meta's network infrastructure via which data from servers all over the world is delivered to the agreed transfer points with DT). According to WIK, OTTs are making "massive investments in the delivery infrastructure". Netflix is in turn cited as an example with US$ 10 billion alone in the last 10 years (see

[26] Available at https://www.berec.europa.eu/en/document-categories/berec/reports/draft-berec-report on-the-entry-of-large-content-and-application-providers-into-the-markets-for-electronic-communications-networks-and-services

WIK Consult, p. 62, as well as the study by Analysys Mason, The impact of tech companies' network investment on the economics of broadband ISPs[27], pp. 16 et seqq., for further details).

88 Just as the provision of services for end users is ultimately carried out jointly by OTTs and TC network operators, the investment costs necessary for this are by no means borne solely by one party, either. Rather, each side looks after its business area and makes the investments necessary for that. These are significant on both sides of the market, not just among the established TC network operators.

89 Last but not least, it is to be pointed out that both sides, and here in particular the TC network operators, naturally make their investments in their own interest in realising profits. On both sides of the market, the investments made in each case lead to considerable revenues via the relevant end customer business, in other words "they pay off". DT's infrastructure business in particular is highly profitable (see section 3.1.3.2. and section 3.2.2.3. below). If this were not the case, the TC network operators would not make the investments at all, following the common business calculus of profit maximisation. The question of cost coverage is thereby basically already answered.

3.2.2.2. Position of DT

90 Nevertheless, DT bases its position in favour of a CPNP regime on increasing traffic volumes. Almost the entire Meta data traffic for end customers of the DTAG Group in Germany is stated to be handled via the IP backbones of DT (*and Meta*). It is stated that this allows DT end users to access Meta services and allows Meta to display adverts. It is stated that Meta is "responsible" for around 10% of all data traffic transported by DT. The service YouTube is named publicly as a further example: It generated the most data traffic in DT's mobile network, averaging 357 terabytes per day in 2021, which equated to an increase of 96% compared to the previous year (see Kopf 2022, How sustainable is unlimited data growth on the internet?[28]). A free peering agreement, on the other hand, was opposed above all by the fact that the exchanged traffic did not exhibit any balanced relationship to each other.

91 However, as DT does not dispute, the data traffic taken over from Meta's network is traffic for DT's own customers that was retrieved by them on the internet and is now being transported using the DT network to the Group's own connections of these end customers in Germany, i.e. precisely that for which these end customers pay for with their plans. This initially does not give the impression that this is about a service of DT for Meta, but rather for its own end customers.

27 Available at https://www.analysysmason.com/contentassets/b891ca583e084468baa0b829ced38799/main-report-infra-investment-2022.pdf

28 Available at https://www.telekom.com/en/company/management-unplugged/details/how-sustainable-is-unlimited-data-growth-on-the-internet-644368

92 This is because, on the side of Meta, a data transport is of course likewise carried out. The content retrieved by DT customers is brought through Meta's IP backbone network up to the transfer point with DT's IP backbone. Each side takes over the traffic transport incurred at it. In principle, this also includes the costs of this data traffic.

93 When DT now demands a fee from Meta for the processing of the traffic on its side, i.e. for the delivery of the traffic via its network to its own end customers, this in substance means nothing other than an assumption of its costs for this service. This demand thus constitutes the endeavour of a bearing by Meta of part of the costs of the DT infrastructure and is to therefore be seen in the context of this central point of discussion between TC network operators and OTTs.

94 In line with this, DT recently published two studies[29] that are to likewise point in the same direction of an assumption of network costs by OTTs: a cost study in which Frontier Economics estimates incremental costs (so-called Long Run Incremental Cost, LRIC for short) that are to be attributable to OTT traffic and a socio-economic welfare study commissioned by the European Telecommunications Network Operators' Association (ETNO).

95 The informative power of the Frontier paper, which is only a few pages long, is limited *per se* to the extent that it remains unclear how these costs were modelled in detail. When it comes to the calculation of incremental costs, two factors in particular are of central importance from a methodological perspective: *firstly,* how the increment is precisely defined and *secondly,* how the fixed and overhead costs are allocated that account for the vast majority of the costs in a network economy such as telecommunications. Neither becomes transparent from the Frontier study, which seems more like a short communication of results. Furthermore, the exact depreciation method plays an important role, which likewise is not explained in detail. In addition to a precise presentation of the method used, the underlying data and the calculations carried out would additionally have to be disclosed in order for the results to be comprehensible (see BKartA, Standards für ökonomische Gutachten (*Standards for economical expert opinions*), 2010, pp. 7 et seqq.).

96 Instead, it is merely stated that in view of the scope of the study's subject matter and the time frame available the study is based merely on a "simple approach" with which the "indicative costs" are to be stated (cf. Frontier study, p. 8 in conjunction with p. 3). Overall, the results are neither comprehensible nor reliable. This is also seen in the considerable limitations that Frontier itself gives to consider when interpreting its results (see Frontier study, p. 9).

97 With regard to the costs of the capacity expansion in IP backbone networks, which is the main subject here, BEREC finds (cf. BEREC 2022, p. 9):

29 Available at https://www.telekom.com/en/blog/group/article/why-internet-companies-should-pay-for-their-data-traffic-1003714

*"[…] the **cost of increasing backbone capacity** can be considered **very low**, in particular when **compared to the cost of building access networks and** therefore the **total network cost**."*

The considerably more cost-intensive access networks, on the other hand, are largely not traffic-dependent, but are dimensioned according to the number of connected customers (cf. BEREC 2022, p. 8). This suggests that the share of network costs actually affected by the increasing data traffic volume and thus to be attributed to a correctly defined increment is significantly lower than shown in Frontier's "simple approach".

98 Furthermore, there is no investigation of any kind into who has economically caused the traffic the incremental costs of which are to be estimated and to which side of the market it is to thus be attributed – the network operator's business relationship with its end customers or with the interconnection partner who merely delivers the data that the end customers retrieve on the internet. However, this would be the first prerequisite when from the cost estimates calculated – in a manner that is unclear in detail and that cannot be verified – a demand vis-à-vis OTTs to bear part of these costs is to apparently be derived by the commissioning network operators. However, Frontier does not come to such a conclusion in its paper either.

99 A purely cost-based analysis likewise fails to take into account the fact that the rising demand for OTT services – as already presented (cf. section 3.1.3.) – at the same time leads to rising earnings at the TC network operators that would have to be taken into account in an analysis of the effects of OTT traffic growth on TC network operators. Incremental costs would therefore have to be set against incremental earnings. Only then would it be possible to assess whether TC network operators are incurring any economic disadvantage at all or whether they are rather benefiting from this development. Due to the symbiotic relationship between the two business models, the latter is more likely to be the case (see section 3.1.3.1. above). This applies at any rate to DT, as can be shown using its business figures (see sections 3.1.3.2. and 3.2.2.3.).

100 The Axon study, which is partly based on Frontier's cost estimate, criticises an "unfair" distribution of the socio-economic benefits of the internet economy between OTT providers and TC network operators. Here, too, the focus is decisively on an allegedly "unjust" allocation of the costs of network operation – i.e. of the specific costs of one side of the market – (see Axon study, p. 17).

101 Put simply, in this respect it is plainly about the "apportionment of the cake", i.e. the profit that can be made with the internet business. This study is therefore to be categorised more to the area of lobbying: The state is to intervene and to see to a (re)distribution of profits that cannot be achieved on the market in competition on the merits.

102 Judging this is a matter for lawmakers and is therefore irrelevant to private interconnection

agreements, as is also seen from the core argumentation put forward by Axon. According to Axon, the "root of the [alleged] problem" lies primarily in two aspects (see Axon study, p. 17):

(1) Unequal negotiating power of the two sides of the market

(2) Unequal regulatory treatment of OTTs and TC network operators

103 It is not to be assumed that Meta, for example, has superior negotiating power vis-à-vis the former state monopolist and market leader DT. Insofar as DT cites Meta's alleged market power in connection with the negotiations, it is to be noted that this alleged buyer power is countered by DT's termination monopoly (see WIK-Consult, pp. 57 and 75 et seq., also BEREC, Report on IP-Interconnection practices in the Context of Net Neutrality, 2017, p. 4, and explained in detail in section 4.2.2). This applies in any case as far as traffic to DT's own end customers is concerned, as this can only be delivered via DT's network. That is the case here. Since DT as the leading telecommunications provider in Germany in many areas, including landline and broadband connections, continues to have high market shares and customer numbers (see BNetzA, 2020/21 Activity Report, pp. 25 et seq.), it cannot be assumed that Meta is in a superior negotiating position vis-à-vis DT.

104 The second point relates to the determination of the regulatory framework conditions. This is the task of lawmakers and therefore has no relevance here. The key aspects from Axon's perspective thus play no role in the present context, which consequently also applies to the conclusions drawn in the study from that.

105 Overall, it is to be determined that a perspective focussing primarily on costs cannot adequately reflect the effects of the increasing demand for OTT services and data traffic on the business of TC network operators.

3.2.2.3. Opinion and classification

106 As far as the relevant aspects of the business relationship between Meta and DT on which this study is based are concerned, the subject of the traffic volume growth and of the associated network expansion costs is to be classified as follows.

107 From the outset, it is to first be made clear that it is not the OTT, in this case Meta, that causes the traffic volume but the end customers by them retrieving data from the internet (cf. WIK-Consult, p. 33). The OTT merely meets this demand of the end customers for applications and content, while the TC provider meets the demand for the telecommunications services necessary for that – that is the respective businesses of the two parties.

108 For the purpose of requesting the content and using the OTT applications, the shared end customer of the OTT and the TC provider uses the internet access and data transport of its TC provider with whom it has entered into a relevant fee-based contract, i.e. it pays the TC

network operator for this.

109 Below, relevant landline packages offered by DT in the online shop are depicted by way of example:

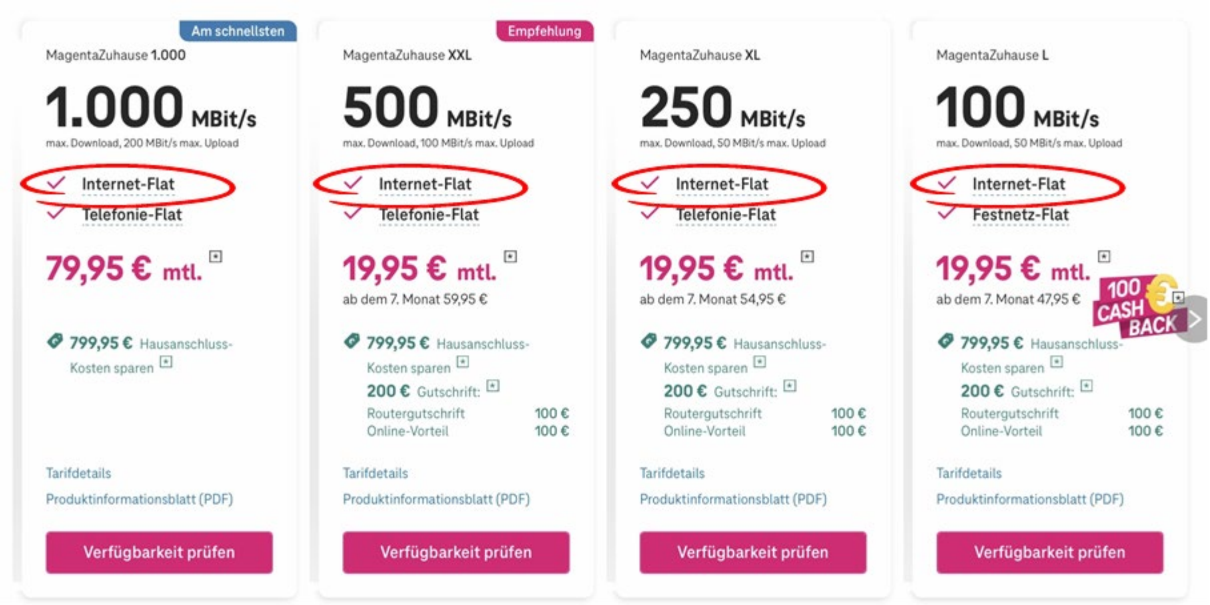

Figure 12: Overview of broadband packages for internet access of Telekom Deutschland (source: website of Deutsche Telekom, retrieved on 23 April 2024, emphasis added)

110 As can easily be seen in *figure 12*, all internet plans are offered as flat rates, i.e. without a volume limit. The MagentaZuhause service description states the following in this regard (see MagentaZuhause service description, margin no. 1[30], emphasis removed):

> *"Telekom Deutschland GmbH [...] provides to the customer within the framework of the existing technical and operational possibilities MagentaZuhause and Zuhause Sofort with a landline connection for internet, telephony and, if applicable, entertainment services."*

111 From the product description it is not evident that from this performance promise certain parts of DT's network infrastructure – for example the IP backbone concerned here – were to be excluded from the use. This would also be surprising because the IP network is required for an IP-based connection and the internet flat rate plan that, necessary by logic, must include the delivery and dispatch of the relevant data traffic. Rather, it is therefore to be assumed that this is of course included within the stated "framework of the existing technical and operational possibilities".

112 The end customer consequently pays with all the packages shown above as examples for their internet access and data traffic via DT's network infrastructure in an unlimited amount. The situation is similar in the case of the DT mobile communications plans: data usage is also

30 Available at https://www.telekom.de/dlp/agb/pdf/51671.pdf (retrieved on 23/04/2024).

included there, albeit with volume limits in some cases. This means that mobile communications users' consumption is already limited by rate plan and can therefore also contribute to traffic volume growth only to a limited extent.

113 These DT end customer packages correspond to the complementary OTT business model in which the end customer sees to the internet access and bears the costs for this, including the transit of the data through their provider's network up to their own connection. The OTT is responsible for delivering the data up to the interconnection point with the customer's TC network operator. This is also where the term Over-The-Top provider comes from: Their services are offered via the open internet, and this offering is based on the end customer's existing internet access, i.e. above the network infrastructure level.

114 As seen, the high level of acceptance of the services and content offered by OTTs is creating a high demand for relevant internet access and data volumes (see section 3.1.3.). Since the end user services of the Meta family of apps in particular are (in the vast majority of cases) used free of charge (cf. margin nos. 40 et seqq.), the TC network operator can almost absorb customers' entire willingness to pay associated with that for its TC services. Apart from the customer's attention for advertising, these services "cost" nothing. The customer's financial budget is hence available in full to pay for the internet connection (including data transport) and can be absorbed by the TC provider for this purpose. In other words: The TC network operator not only receives what its TC services are worth to the customer, but also what the OTT services, in this case the Meta family of apps, are worth to the customer.

115 This contributes to quite substantial turnover and profits at TC network operators, as can be shown using DT's business figures from recent years (see *Table 3* below).

	2023	2022	2021	2020	2019
Revenue	25,19	24,51	24,05	23,78	21,89
EBIT	6,07	7,01	4,96	4,09	4,06
EBIT-Margin (%)	24,1	28,6	20,6	17,2	18,6

Table 3: Business results in billions of euros, operating segment Germany (source: DT annual reports, own illustration)

116 From *Table 3* it is recognisable that DT's infrastructure business in Germany is highly profitable. The business figures for the (entire) operating segment Germany reported in the annual reports are shown. Both total turnover and operating result have developed very positively in recent years. The absolute figures are at a very high level, with EBIT (Earnings Before Interest and Taxes) being somewhat more than EUR 4 billion in 2019 and 2020, around EUR 5 billion in the 2021 financial year, EUR 7 billion in 2022 and over EUR 6 billion in 2023. This is

underlined by the equally high EBIT margin, which rose from 18.6% in 2019 to almost 29% in 2022 and now 24% in the recently ended financial year of 2023. In this respect it is to be considered that depreciation and amortisation are already deducted from the EBIT profit figure, i.e. not only are all costs for investments in the network infrastructure (including the controversial costs for capacity expansions) covered, but high profits are also generated. Here, too, it is clearly shown that the growth in data traffic complained about by the ISPs – at any rate in the case of DT – is accompanied by a considerable increase in the (operating) operating result, in other words the company profit. In view of such figures, there can be nothing of the sort when it comes to a cost coverage problem as the ISPs' demand for the CAPs to bear an additional part of the costs might suggest.

117 If then, as DT states, in its IP backbone at peak times a large part of the data traffic is attributable to the services of the major content providers such as Netflix, Google, Amazon and Meta, this not only means that this generates on the side of DT costs to a certain extent for the traffic transport[31], but that these service providers also contribute quite significantly to DT's turnover and profits. In the end, in the present case, this is about traffic for DT end customers who for that traffic use and pay for a DT internet plan and thus contribute to the highly profitable business result shown above. This also shows: the demand for OTT traffic leads to demand for TC services and the network operator benefits from this.

118 Furthermore, the following is to be borne in mind: the traffic volume development is about the usage behaviour of DT's own customers. Should the usage characteristics of end customers lead to "too much" data traffic such that, for instance, costs could no longer be covered, DT from a business perspective would have the option at any time to adjust its end customer rate plans accordingly and either – as for example in mobile communications, which however is likely due primarily to the high costs of the air interface and less to the IP backbone – introduce a volume limitation or raise the price.

119 The end customer price would also be the right starting point for efficient demand management because via this – to put it simply – demand and supply of OTT and TC services equalise in equal measure. Should the costs exceed the revenues, the rates must be adjusted. If they then exceed the customers' willingness to pay, the use automatically declines.

120 However, neither the DT business figures nor the design of the internet plans predominantly as flat-rate plans indicate that the end customer revenues were resulting in an undercoverage of costs. On the contrary, DT itself is actively trying to hoist customers to even higher usage levels ("upselling"), as can be seen in the following excerpt from an investor relations presentation:

[31] The costs for the provision of capacity in IP backbone networks are relatively low and only account for a small part of the total costs of the network, cf. margin no. 97.

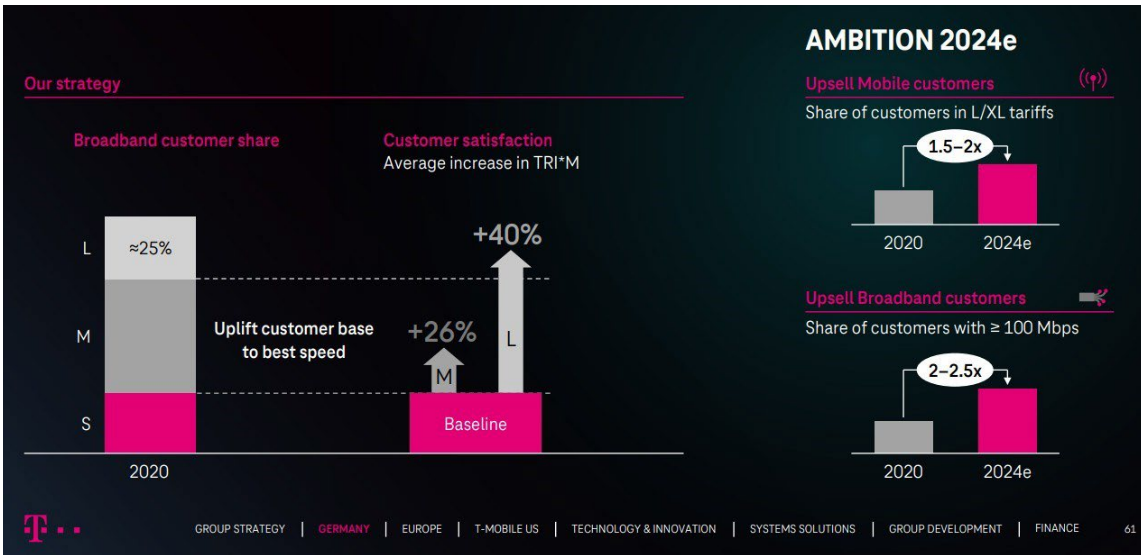

Figure 13: Upselling Targets DT (Source: Presentation DT for the Capital Market Day 20/21 May 2021[32])

121 *Figure 13* shows that DT is endeavouring both in the broadband landline network and in mobile communications to migrate many customers if possible into plans with high bandwidth or, as it were, higher download volumes in mobile communications. Higher bandwidth means faster data transmission, which generally leads to more data traffic. This allows the conclusion that these plans, although more usage-intensive, yield higher earnings for DT. This also proves that high usage goes hand in hand with a high willingness to pay and that the plans with the "best speed", as stated in the shown DT chart on the left, are at the same time also the most profitable. Otherwise, the obvious efforts to hoist customers onto these plans would hardly make sense from a commercial point of view.

122 The demand for data volume generated by the OTT services helps in the marketing of transmission speed, the upselling to the larger internet plans and the generation of the associated profits. Connections with higher transmission speeds in turn improve the usability and user experience of the OTT services – here too, the business models of both sides of the market promote and complement each other.

123 In light of the foregoing, it is to be determined that the additional demand for the OTTs to bear part of the costs of network operation constitutes, from an economic perspective, overall rather a demand for an (additional, cf. Table 3 above) profit transfer from one, the OTT business area, to the other, that of the TC network operators, i.e. for a share in the profits of the business partner. There is no basis for this from a competition economics perspective, especially in view of the fact that both parties, as explained at length in the previous sections, benefit already very much reciprocally from each other anyway.

[32] Available at https://www.telekom.com/de/investor-relations/finanzpublikationen/kapitalmarkttage

124 Where the network operator already absorbs the end customer's entire willingness to pay – which is decisively generated by the OTT offering of content and applications – for itself and provides the infrastructure services primarily in its own interest, namely to generate considerable profits – which are promoted, not hindered, by the OTT services – it is not evident why, beyond that, the other side of the market is to be obliged to also additionally bear part of the costs of this provision of services in order to further increase the profits of the network operator.

125 There is no recognisable economic basis for such a redistribution. This is a purely economic conflict of interest that can be equalised exclusively via negotiation and through agreement between the parties.

126 After presenting and classifying the economic background to the business relationship between Meta and DT, we turn in section 4 below to the question of what conclusions can be drawn from this for the relationship between performance and consideration in the exchange of data between CAPs and ISPs.

4. Transferring the findings to the level of data transport

127 With regard to the level of network interconnection upstream of the end-customer business and the data exchange contentious here with end-customer-side networks, i.e. the wholesale level, it is to first be remembered that the data transport in the present case is by no means handled by DT alone. Rather, each party handles the transport on its network side: Meta receives from DT content queries from DT's end customers, forwards them to the corresponding Meta data servers, retrieves the requested content there and delivers it to the transfer point with DT. In its network, DT in turn handles the onward transport of the data retrieved by its customers to their end devices (cf. section 3.2.2.3).

128 The performance contributions of both sides correspond to the benefits that both parties derive from the reciprocal data transfer in that this is not only the basis for their respective business areas, but also highly beneficial for same (see section 3.1.3.2. with regard to DT). They likewise comply with the obligations that both parties have respectively entered into vis-à-vis their end customers: Meta offers and provides its users with services and content via the internet; DT sells internet access and the associated delivery and dispatch of data by means of its network infrastructure for its customers.

129 In such a scenario, there is no obvious reason *per se* why one party should bear part of the costs of the other – each party is as a rule responsible for its own sphere of business (see section 3.2.2.3.). Rather, the following conclusions regarding the appropriate billing principle are derived from the analyses and considerations of the preceding section 3.

4.1. Free peering as the applicable billing principle

130 The explanations thus far have made it clear that settlement-free peering in principle corresponds to the nature of the business relationship between the two provider groups ISPs and CAPs. This is a form of the bill & keep (B&K) approach, in which both parties bill their respective services to their end customers without any further payments taking place between them at wholesale level. As shown, there is no economic reason for this either – on the contrary, both parties benefit greatly from the exchange of data between their networks.

131 This is explained in detail below for the dispute between DT and Meta examined specifically here.

4.1.1 Bill & keep as the market standard

132 IP interconnection has traditionally been based as a rule on a bill & keep approach, and this remains the case without change today (see WIK Consult, p. 33). This can be confirmed in the present case by a comparative analysis using Meta's interconnection agreements in Europe. Meta maintains in all European countries with almost all major network operators interconnections for the purpose of exchanging data in exactly the same way as in the present case. In total, there are several thousand IP interconnection agreements, most of them by way of a "handshake agreement". The entirety of Meta's interconnections for IP data transfer and the conditions agreed therein can thus reflect the European market for IP interconnection very well[33].

133 Of Meta's interconnection partners in Europe, only two network operators charge fees for data exchange, one of which is TDG. In all other cases, commercially customary free peering has been agreed. This comprehensive European comparative analysis shows that settlement-free peering is the absolutely predominant industry standard for the type of traffic exchange at issue here. This common practice corresponds with the economic interactions between OTTs and network operators described in detail in this paper, in the context of which IP interconnection is to be seen.

134 This comparative analysis and the finding evident from it of free peering as a market standard, primarily by way of the "handshake agreement", is confirmed by several market studies that have been prepared on behalf of public institutions in recent years, such as WIK on behalf of the Federal Network Agency (cf. WIK Consult, p. 49), the regular studies by Packet Clearing House for the OECD (see PCH 2021, p. 4) and, more recently, the European Parliamentary Research Service (see European Parliamentary Research Service, EPRS 2023, Network cost contribution debate[34], with further references).

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33 The details regarding the business relationships with the interconnection partners were available at the expert opinion commissioning on which this report is based and have been comprehensively analysed as part of the expert evaluation. For reasons of confidentiality, they are not publicly disclosed here.

34 Available at https://www.europarl.europa.eu/RegData/etudes/ATAG/2023/745710/EPRS_ATA(2023)745710_EN.pdf

135 PCH also describe how it came to be in the historical development that originally written agreements that formally provided for the exchange relationship at the wholesale level between the interconnection partners became informal handshake agreements: generally, the written agreements had been given a time limitation and after a certain point following their expiry were no longer renewed as both parties had recognised for themselves the nature of the business relationship and the reciprocal advantageousness of the data exchange. As a result, 99.998% of the more than 15 million interconnections analysed by PCH worldwide are now informal handshake agreements without a definition of a service relationship (see PCH 2021, op. cit.).

4.1.2 Bill & keep corresponds to the nature of the business relationship

136 A B&K approach for the data exchange in question here can be based primarily on the following considerations.

137 *Firstly*, the two business areas complement each other practically symbiotically and both sides benefit via their end-customer business – as explained at length in the previous sections – quite considerably from the data exchange at network level. In this respect, each side in principle takes care of its business sphere: it bears the costs incurred for its business and keeps the earnings received for itself. This is the fundamental principle of B&K. Here it is to be assumed that all costs are thereby (more than) covered. An additional bearing by one side of the market, in this case Meta, of part of the costs of the other side, in this case DT, would therefore be more akin to a profit transfer than to cost coverage.

138 *Secondly*, the traffic transfer takes place at the instigation of DT customers and is already adequately remunerated via their end-customer rates – as DT's business results show, including a considerable profit portion (cf. margin nos. 115 et seqq.). There is no apparent cost coverage problem in the case of the capacity expansion of the networks (cf. section 3.2.2.3 above).

139 *Thirdly*, OTT content and services have the effect of a "sales force" for TC services. Precisely DT's usage-intensive rates are obviously the most profitable. OTT offerings in particular contribute to their marketing as they generate the demand for broadband internet connections among customers in the first place (see section 3.1.3.1.). DT is already benefiting quite considerably from this without incurring any costs for it (see section 3.1.3.2.).

140 *Fourthly*, in the present case, the services of the Meta family of apps are in principle free of charge for the user. DT can also therefore via its end-customer rates even absorb for itself users' additional willingness to pay for the Meta apps.

141 In view of these circumstances, there is no apparent economic basis for any payment in excess of this by the CAP to the ISP.

142 Therefore, if the relation of the business relationship between Meta and DT in the present

case is examined in its entirety, the economic conditions for a B&K are clearly present. This is at the same time the traditional payment principle for IP interconnection, i.e. the terminating network operator usually receives no payment at wholesale level for the delivery of traffic to its end customers, but covers its costs via its own end customer rate plans (cf. BEREC, BEREC's comments on the ETNO proposal for ITU/WCIT or similar initiatives along these lines, 2012, p. 3). This is precisely the scenario here.

143 Already in 2012, BEREC emphasised in its clear rejection of efforts to switch to an SPNP regime on the part of TC network operators (readily referred to by BEREC as internet access providers) both the economic nexus between the two sides of the market and the considerable advantages that the B&K billing principle brings for all market participants, not only the two provider groups but also for end users in particular (cf. BEREC 2012, op. cit., pp. 3 et seq., emphasis added):

> *"Finally, it is worth pointing out, […] that the request for the data flow usually stems <u>not</u> from the CAP but from the retail Internet access provider's <u>own customer</u> (who 'pulls' content provided by the CAP, and from whom the ISP is already deriving revenues). Ultimately it is the success of the CAPs (from whom ETNO[35] wishes to extract additional revenues) which lies at the heart of the recent increases in demand for broadband access (i. e. for the ISP's very own access services)."*
>
> *"**This model*** [B&K] ***has enabled a high level of innovation, growth in Internet connectivity**, and the **development of a vast array of content and applications,** to the **ultimate benefit of the end user**. Attempts to undermine it could put these benefits at risk."*

144 This favourable development has since continued in all respects, particularly also with regard to the ISP business area, as shown here using the example of DT, as discussed in section 3.2.2.3.

145 It follows from all of the above that free peering is not only the billing principle appropriate to the economic relationship of the parties, but also the billing principle to be preferred from a general economic perspective for the type of traffic exchange at issue here.

4.2. The requirements for application of the Sending Party Network Pays (SPNP) principle are not met

146 In contrast, DT would like to perform billing with remuneration for the capacity it provides at the interconnection point in accordance with the Sending Party Network Pays (SPNP) principle. According thereto, the interconnection partner is to pay for the traffic transported via DT's network infrastructure to its end customers. However, the requirements for application

[35] European Telecommunications Network Operators' Association.

of an SPNP are not met, as will be discussed below.

4.2.1 No transit fees for termination traffic to the ISP's own end customers

147 In CPNP (Calling Party Network Pays) regimes, such as those common in the field of call termination (cf. WIK Consult, p. 34), the costs of call termination are allocated to the caller as the party initiating the call. Here, however, the situation is exactly contrary: The traffic transport is initiated on the part of the receiving network in that the ISP customer queries the relevant content on the internet by mouse click or touchscreen and thereby at the same time commissions the ISP via the contract existing with the customer to collect this content from the relevant provider, in this case from the Meta network, and deliver it to the customer. The traffic is therefore transported at the instigation of the ISP customer, of DT in this case, and not of Meta.

148 Even the causation principle, as the decisive criterion in the determination of the fee regime, therefore is an argument in favour of billing via the DT end customers as they cause the traffic and not the interconnection partner. At the network level, a B&K approach is applied in such scenarios (cf. WIK-Consult, p. 33, likewise explicitly BEREC 2012, BEREC's comments on the ETNO proposal for ITU/WCIT or similar initiatives along these lines, p. 3).

149 Furthermore, in the present case, the end customer already remunerates DT for the data transport service provided via the DT network infrastructure under their end customer rate plan (see section 3.2.2.3. above). The question as to the billing principle to be applied is thus *de facto* answered, as DT *is* paid for the utilisation of its network by its own end customer: the traffic transport is not only caused by the DT end customer but is also carried out on their account. As already discussed, there is no economic reason for an additional, i.e. double payment on the part of the network interconnection partner.

150 It follows from this that remuneration might be conceivable in the present case at most if DT were to provide an additional service of monetary value to Meta, i.e. if the transport services were not covered under the end customer rate plans, but would normally be remunerated by the interconnection partner at network level, i.e. if they were transit services in third-party networks.

151 But that is not the case: The traffic volume in question here is delivered exclusively to DT's own customers. This transport of data is thus carried out in the customer's own affair and in substance is peering (see section 2 above), even if DT apparently wants to force the contractual partners to accept it technically (and above all commercially) in a form that includes transit – but which is not even demanded or used, either, by the relevant companies.

152 Peering generally takes place "on one's own behalf"; at most, there could be an economic reason for compensation for transit services into other networks (cf. WIK-Consult, p. 46). However, such services are not being provided here by DT, or, as it were, only in the case of

a negligibly small portion of the traffic.

4.2.2 SPNP as a means of exploiting the termination monopoly

153 BEREC has already long regarded efforts by network operators to abolish B&K as the attempt to transfer market power from their termination monopoly to the negotiating position vis-à-vis OTTs/CAPs (cf. BEREC 2012, op. cit., p. 1) in order to generate additional revenues that cannot be realised in competition on the merits. DT's endeavours in the present debate are to also be interpreted in this light.

154 This is designed specifically as follows. DT offers two different types of interconnection for data traffic:

(1) **Free peering** is made possible by DT only within the framework of a strict "peering policy" and is, among other things, limited to an (approximately) symmetrical traffic ratio of 1.8 to 1 incoming to outgoing. Only in that volume is capacity held available at the interconnection points (also referred to as interconnects or ports) by DT. Where the interconnection partner delivers more traffic, "the ports overflow" and "clog", i.e. the relevant services and content of the CAP are disrupted for the end customer. DT is the only network operator in Germany that demands such an (approximately) symmetrical traffic ratio for peering traffic from its interconnection partners (cf. the comparative analysis in section 4.3).

(2) A fee-based **transit service** from DT: Only here may asymmetric traffic be fed in and only in this variant is it guaranteed that sufficient transmission capacity for the data transport will be provided by DT such that its end customers can receive the services and content (which they themselves have requested via their DT internet access) without impairment and in high quality. Likewise covered in this interconnection variant is a transit of data traffic into third-party networks (global internet connectivity, if you like), but this is neither required nor provided here (see section 2 above).

155 Content providers are reliant on the end-to-end data transport (see section 1, margin no. 13 above) not being hindered by artificially created bottlenecks, such as DT's peering policy (see (1) above). Otherwise, the product has no value – a streaming service is useless if a film, a sport or music event is constantly interrupted by the loading screen. Something similar applies to long loading times of websites or posts on social media. The ISP therefore with the transmission capacity on its end set up or, however, limited at the interconnection point has a means of exerting pressure on the CAP in the form of a "quality lever" with which it can, under certain circumstances, quite significantly impair the value of the CAP product for end customers. As a result, large CAPs are forced to choose variant (2) "Transit Service" and must pay a fee for transport into third-party networks on all peering traffic to

DT end customers, even though such transport is not provided at all.

156 This is because the demand of an approximately symmetrical ratio of incoming and outgoing traffic into the ISP's network made (only) by DT for free peering of course cannot be met by large CAPs: to them, as a rule merely the short signals with the requests of the ISP customers for the data content of the relevant CAP are sent out of the ISP's network, whereupon the CAP in return delivers the requested data and content – films, videos, photos, music, social media posts, etc. – which naturally have a much larger volume than the request emitted previously. The latter usually consists merely of "clicking on" or selecting the relevant content.

157 A large CAP such as Meta therefore only has the option of delivering the requested content to DT via the paid access, which DT incorrectly refers to as a "transit service". It also has no possibility of delivering the content retrieved by DT customers to the end customer via another network, that is because even if the end customer had several connections, the request was made from a very specific IP address, in this case located in DT's network, meaning that the content retrieved from there can only be delivered to this address. The CAP hence has no choice; the traffic reaches its destination address only through DT's network. This is the ISP's termination monopoly.

158 DT exploits this situation and steers the CAP traffic via the stipulations in its peering policy and the generated capacity bottlenecks in the case of free peering into the fee-based access variant "Transit Service" – although, *firstly*, the traffic delivery to its end customers is an original performance obligation of DT towards them, *secondly*, a transit service is not provided to the CAP at all and *thirdly*, DT's business already significantly benefits from the services offered by the CAPs, in particular the demand generated thereby for broadband internet connections (cf. section 3.2.2.3).

159 Such a business practice is also known as "hostage taking" because the end customer is held hostage in the ISP's network, so to speak, and the CAP can only reach them with its services – "trigger" them, so to speak – if they pay a fee for it (see PCH 2021, pp. 14 et seq. for details). In this way, the ISP's termination monopoly is monetized: although no service is rendered to the CAP (see section 4.2.1 above), a payment is generated.

4.3. National benchmark analysis: traffic symmetry not a criterion

160 It also follows from the examination made thus far that a balanced traffic result is not an essential criterion here. The traffic result is only relevant if the business relationship is limited to the level of the network interconnection and of the data exchange and the advantageousness of the exchange for both sides on which the application of the B&K principle is based must consequently stem from the balance of these traffic flows.

161 In the present case, however, the reciprocal promotion of the mutually complementary end-

customer business is the basis of the B&K, for which the traffic exchange at the upstream network level is a necessary prerequisite. In this respect, each party as a rule covers the costs incurred on its side via their respective end customer business models and retains the earnings it receives from this. This separation is also appropriate because, in the end, it is about the delivery of traffic to DT end customers that they themselves have caused under their end customer contract with DT.

162 Accordingly, regularly no specific traffic ratio is required in the case of peering agreements, either, as the ratio of incoming and outgoing traffic has no informative power about the value associated with the exchange of data traffic (see Analysys Mason, IP interconnection on the internet: a white paper[36], 2020, p. 8).

163 The following table of WIK on behalf of the Federal Network Agency lists the peering policies of the most important TC network operators and CAPs in Germany. The table states for each provider whether an interconnection requires multiple transfer points, a specific ratio of incoming and outgoing traffic and a written contract.

	Company	Multiple transfer points	Traffic symmetry	Written contract
1	Akamai Technologies	No	No	No
2	Limelight Networks Global	Yes (USA)	No	No
3	NetCologne	No	No	No
4	Telefónica Deutschland	Preferred	No	No
5	Deutsche Telekom	Yes (international)	Yes	Yes
6	IONOS	Preferred	No	k. A.
7	Vodafone Deutschland	Preferred	No	Yes
8	EWETel	Preferred	No	No
9	Netflix	No	No	No
10	Lumen AS3356	Yes (international)	No	Yes
11	1&1 Versatel Deutschland	Yes (EU)	No	No
12	Facebook / Meta	No	No	No

36 Available at https://www.analysysmason.com/consulting-redirect/reports/ip-interconnection-korea-white-paper/

	Company	Multiple transfer points	Traffic symmetry	Written contract
13	Dailymotion	Preferred	No	No
14	Zattoo	No	No	No
15	STRATO	No	No	No
16	M-Net	No	No	No
17	Amazon.com	Preferred	No	No
18	Hetzner Online	No	No	No
19	Amazon IVS/Twicht	Preferred	No	No
20	Tele Columbus	No	No	No
21	Deutsche Glasfaser	No	No	No
22	Trivago	No	No	No
23	Zalando	No	No	No
24	rtl2fernsehen	No	No	No
25	Facebook AS63293	No	No	N/A
26	Akamai Direct Connect	Preferred	No	Yes
27	Sky Deutschland	No	No	No

Table 4: Overview of peering policies of large TC network operators/ISPs and CAPs in Germany (source: WIK-Consult, Table 2-6, p. 48, own illustration, emphasis added)

164 It is immediately apparent from *Table 4* that DT is the only company that wants to see a (largely) balanced traffic ratio as a prerequisite for peering. It is thus making a demand that is completely alien to the market and that can rather be seen as a pretended argument for collecting for free peering a transit fee that is not justified on the merits.

5. Conclusions

165 This study analysed the economic basis of the business relationship between so-called "Over-The-Top" providers (OTTs for short) and telecommunications network operators using the exchange of data taking place between Meta and DT and drew conclusions for the controversial question of the commercial terms and conditions to be applied.

166 As a result, there is no recognisable economic basis for an obligation to pay remuneration from any point of view:

- The business models of the parties involved are characterised by a symbiotic relationship. Both sides benefit considerably from the exchange of traffic at network level in their respective end customer businesses; in particular, Meta's end customer offering benefits DT's business with TC services (see section 3.1.3.2. above for details). It is therefore not about a data transport service for Meta, but rather in DT's own interest in the exercise and further promotion of its end customer business. This reciprocal benefiting corresponds to the accounting principle of bill & keep, i.e. settlement-free peering.
- Conversely, the prerequisites for Sending Party Network Pays, i.e. paid data transport for Meta, are not met: the traffic is caused by DT end customers, not by the interconnection partner, and is also delivered to them, for which the end customers remunerate DT under their internet rate plans (cf. section 3.2.2.3. above). The question of the billing principle to be applied is thus already answered in purely factual terms: the traffic transport is caused by the DT end customer and is carried out for their account. Any additional compensation of the interconnection partner Meta would be a double payment for the same service.
- A transit service going beyond this is not provided. In this respect, this is about a *falsa demonstratio*: the service is declared by DT as a transit. On the merits, however, this is about peering because the traffic is terminated in DT's own network and not – which would be constitutive for a transit – forwarded by DT into networks of other operators. This also proves that this is not about a service for Meta, but rather in DT's own affair.

167 These findings are confirmed through a European comparative analysis that shows that such traffic is treated as free peering across the industry (see section 4.1.1.).

168 In this respect, traffic symmetry plays no role in the context at issue here because this is not the basis for the application of bill & keep here. Rather, the latter follows from the symbiotic relationship between the end customer business models that cause the exchange of data at the upstream network level and from which both sides thus benefit.

169 As a result, DT also stands alone with its demand for traffic symmetry: a national comparison of the most important network operators and CAPs in Germany shows that a specific ratio of incoming and outgoing traffic is not a relevant criterion for peering agreements (cf. section 4.3.).

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Heinrich-Heine-Universität Düsseldorf

Düsseldorfer Institut für Wettbewerbsökonomie (DICE)

Universitätsstraße 1, 40225 Düsseldorf

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