Comments on the ERG consultation on IP-interconnection

Deutsche Telekom welcomes the opportunity to comment on the ERG consultation on IP interconnection. With the development and implementation of IP-based Networks, particularly Next Generation Networks (NGNs), IP-interconnection becomes an increasingly important issue.

Basically, Deutsche Telekom is of the opinion that NGNs will significantly reduce barriers to entry and thus will further enhance competitive pressures, especially on already competitive core network markets. Therefore, we are deeply worried about regulator's tendencies to extend regulation towards future NGN environments without any prior assessment whether the Three-Criteria-Test will be fulfilled and whether regulation will be justified altogether.

The implementation of IP-based NGNs is still at the beginning and the pace of roll-out varies amongst EU Member States as well as outside the EU. The build-up of NGN is driven by commercial, technical and market circumstances and the final network architecture is still uncertain today. Due to this uncertainty any regulatory intervention would risk to hamper innovation and investment in these new technologies.

1. Next Generation Networks (NGNs) and the Internet will coexist

As mentioned in the consultation document, there will be most likely different kinds of parallel IP-based networks in the future: on the one hand managed Next Generation Networks (NGN), which will assure comparable quality of service, security and features as today's PSTN. On the other hand the unmanaged public Internet as known today. Hence, there will be two different kinds of IP-interconnection: managed and unmanaged. In the case of VoIP-Services this leads to the distinction of Voice over NGN (VoNGN) and Voice over Internet (VoInternet or Internet telephony).

The ongoing discussion in Germany about IP-interconnection concerns the interconnection between two NGNs. However, this does not mean that the public Internet and its well-established interconnection arrangements cease to be valid. To the contrary, NGN-interconnection and today's Internet interconnection arrangements are going to exist in parallel for the foreseeable future. It is misconceived to think about a convergence of the interconnection regime of the public internet towards an interconnection regime of NGNs or vice versa. Next to discussing interconnection between NGNs, it seems to be important to analyse the competitive interaction of these parallel interconnection schemes.

As already mentioned the development of NGNs is still at an early stage and therefore any statement about future network structure and architecture made today must necessarily be tentative.

2. IP-interconnection should meet several objectives

Any IP-interconnection arrangement has to meet the following objectives:

- to give incentives for investments
- to foster competition
- to give incentives for efficient network usage
- to minimize transaction costs
- to avoid regulatory induced arbitrage

These objectives would best be achieved by market negotiations.

Any discussion on IP-interconnection should also differentiate between IP-Interconnection in an All-IP-World and IP-interconnection in a migration period with parallel existing networks (e.g. PSTN and NGN).

3. Charging principles for IP-interconnection

Within the discussion on IP-interconnection and as mentioned in the consultation paper two principles are mainly discussed: the Calling Party's Network Pays-principle as today's PSTN interconnection approach and Bill & Keep.

3.1 Calling Party's Network Pays – today's well-established interconnection approach

Calling Party's Network Pays (CPNP) means that the network operator of the caller pays for the whole interconnection service or for the network usage in the other networks respectively. On the retail market the corresponding Calling Party Pays-principle (CPP) means that the calling party fully pays the costs of the call.

In the economic literature, CPP is seen as being economically efficient since the caller usually has the greater benefit from the call.[1] He takes the initiative to speak to a special person at a special point of time whereas the called party has not the same freedom of choice. In the literature it is also stated that the called party benefits from the call, too, but to a lower extend than the caller. Following the efficient Ramsey-pricing-principle it is economically efficient that the caller bears the whole costs of the call. Moreover the caller also causes the costs as he can avoid those costs by choosing not to call. If the called party also had to pay when he is called analogue to the Receiving Party Pays-principle (RPP), the called party only could avoid these costs by not accepting the call. The question then arises what is the value of a telephone access if the caller is worried accepting a call to avoid costs.

Due to the fact that network usage is always paid for the CPNP-principle has the advantage, that network operators can recoup their costs. This gives the necessary in-

[1] See e.g. Wright, Julian (2003), „Bill and Keep as the Efficient Interconnection Regime?", Review of Network Economics, Vol. 1, Issue 1, March 2002.

centives for investments especially in higher network quality. Furthermore the transaction costs of implementation are low because it is well known and the billing systems already exist. Moreover CPNP induces efficient network usage as every network operator has the incentive to route the traffic as long as possible in his own network. CPNP also minimizes the SPIT-problem (SPIT = Spam over internet telephony) as the diffusion of SPIT would be very expensive.

3.2 Bill & Keep: an optimal principle for IP-Interconnection?

Bill & Keep, when obliged by the regulator, has a lot of shortcomings. First of all, it is important to keep in mind that Bill & Keep in the Internet is the result of private negotiations without any regulatory intervention.

Bill & Keep in the Internet does not mean interconnection for free

The often mentioned link between Bill & Keep and the public Internet is not appropriate. Bill & Keep is only one of several forms of interconnection billing schemes used by Internet providers. Even today, internet interconnection arrangements and network usage are not for free but interconnection and network utilization is generally being paid for by the respective network operators.

In so-called peering arrangements, Bill & Keep is the efficient result of the negotiations of two network operators which regard each others traffic as symmetric. Hence, Bill & Keep is more akin to a barter arrangement under equal partners. To the contrary, unequal or non-symmetric networks typically lead to an IP-Transit arrangement.

If companies do not peer, they usually enter provider-customer relationships and pay for traffic on a monthly basis, using capacity based charging, similar to standard leased line pricing. As an alternative, carriers can connect to internet exchanges, in which payment relates to the number of ports used (and therefore is also capacity based). Payment then is not made to an interconnected party, but to the internet exchange instead. Other companies prefer to negotiate interconnection agreements bilaterally rather than connect to such a multilateral platform. Multiple interconnection schemes have suited the internet well, without any obligation to interconnect. Interconnection schemes continue to evolve as the internet develops.

Hence, the interconnection arrangements of the Internet do not automatically imply free Bill & Keep interconnections. Only between two symmetric or equal networks Bill & Keep as a barter arrangement can be the voluntarily negotiated result.

Regulatory obliged Bill & Keep would induce market distortions

A regulatory obliged Bill & Keep-approach would inevitably induce market distortions especially in the case of asymmetries. If symmetry is not fulfilled in a Bill & Keep-relationship, larger networks are disadvantaged because they bear higher network costs than small networks, which is the case if the market structure – for example in the fixed telephone sector – is very heterogeneous. There are various network operators with different network sizes and network costs. The same holds true for the mobile sector. Regulatory obliged Bill & Keep would therefore lead to massive market distortions.

Some proponents of Bill & Keep argue that the costs could be recovered by the implementation of the Receiving-Party-Pays-principle on the retail market by charging the own end-customers. However, the CPP-principle is well known by European consumers and it seems unrealistic to force them into a new and unfamiliar pricing principle.

Regulatory obliged Bill & Keep would induce technical inefficiencies

Further problems of Bill & Keep are routing inefficiencies, the so-called hot potato-routing. Bill & Keep results in incentives for network operators to hand over the traffic to another network as soon as possible because usage is for free and transport over distance is not compensated. This leads to a classical free rider problem.

As mentioned in the consultation document, it is thought that this problem could be solved by network enlargement of smaller network operators. As also mentioned in the consultation document the network enlargement of smaller networks would however lead to inefficient investments which in turn induce economic inefficiencies due to the need to recoup these costs by higher retail prices.

To avoid such inefficient investments the consultation document proposes to raise the amount of points of interconnection. Besides the fact that in no country the final NGN network architecture is known today, regulatory determined and obliged amount and locations of the points of interconnection would lead to an artificial network structure which – especially in the context of NGN – definitely does not mean to be a technical or economical efficient network structure. This would lead to higher costs and thus to higher retail prices.

Regulatory obliged Bill & Keep will not minimize transaction costs

Bill & Keep would not lead to a significant minimization of transaction costs. The existing billing systems will further be necessary for billing the traffic to specific service numbers (e.g. freephone numbers or premium rate services). Additionally, the traffic amount which is exchanged between the networks within a Bill & Keep-arrangement needs to be measured and monitored.

In the current German debate the main argument of the proponents of Bill & Keep is that Bill & Keep would solve an alleged termination monopoly problem and would therefore minimize transaction costs in the context of the regulatory process. However, that would only be true when the interconnection approach is market driven and set solely by negotiations between market players. Otherwise, high transaction costs arise in the context of the regulatory process, e.g. to determine the amount and location of the points of interconnection.

In the context of the proposed Dual Regime it is also unclear how to handle the traffic of network operators who have not realized the maximum amount of points of interconnection set by the NRA. It seems adequate that those operators pay for network usage because they would not fulfil the precondition for attending the Bill & Keep-system within the Dual Regime. However, in doing so, the transaction costs would massively increase: besides monitoring traffic volume and billing the traffic to special service numbers, the traffic has to be additionally separated in respect to such net-

work operators which would not be interconnected at the maximum amount of points of interconnection.

Regulatory obliged Bill & Keep would lead to an arbitrage problem

From an international perspective the aforementioned problems will even increase, leading to great arbitrage problems and further distorting competition. The same holds true when only the European countries will adapt Bill & Keep and other countries in the world will continue CPNP as IP-interconnection approach.

Regulatory obliged Bill & Keep would lead to adverse selection

Regulatory obliged Bill & Keep would also lead to adverse selection in the context of quality of service. As network operators would not get paid for the network usage, higher costs for better quality of service could not be recovered. Hence, the incentive to invest in better quality declines.

Bill & Keep would foster the SPIT-Problem

Bill & Keep fosters the problem of SPIT (Spam over internet telephony) because the diffusion of a great amount of traffic would be nearly costless. Some argue that this problem could be solved by techniques like SPAM-filters, but in contrast to SPAM a SPIT-call cannot be filtered out by some key words in advance. The content of the call does not become known until the called party accepts the call. Moreover, the main problem of SPIT is not only the content of the call but the telephone ringing at every day and night time.

4. Principles for interconnection during migration

As the discussion about IP-Interconnection shows, the IP-Interconnection during the migration period has to meet the following principles in order to avoid arbitrage and to give incentives to invest in the network migration at all:

- Implementation of the same kind of interconnection regime in parallel networks (e.g. CPNP in both PSTN and NGN)
- Uniform pricing level of the interconnection services.

As CPNP is well-established for the PSTN and for the mobile networks, it would hardly be possible to change this scheme without massive transaction costs and implementation problems. Overall, it seems therefore to be the best solution to apply the CPNP logic to IP-based NGN-interconnection, at least for voice services.

5. Conclusions

As the implementation of IP-based NGNs is still at the beginning and the final network architecture is still uncertain, it is too early to determine *the* future charging principle for IP-interconnection. Due to this uncertainty any regulatory intervention would risk to hamper innovation and investment in these new technologies.

Besides, the discussion on IP-interconnection shows that NGNs and the Internet will most likely coexist in the future. Hence there are going to be two kinds of parallel interconnection schemes between IP-based networks: interconnection between managed NGNs and interconnection between the unmanaged public Internet.

Any IP-interconnection arrangement has to meet the following objectives: to give incentives for investments, to foster competition, to give incentives for efficient network usage, to minimize transaction costs as well as to avoid regulatory induced arbitrage. These objectives would best be achieved by market negotiations.
Today's well-established CPNP-interconnection approach and CPP-principle on the retail market in the PSTN and the mobile networks also accomplish these objectives.

Besides, Bill & Keep as one of today's charging principles for interconnection in the Internet is the efficient outcome of private negotiations without any regulatory intervention of two network operators when they regard each other as symmetric. As a market outcome, Bill & Keep will also meet these objectives.

In contrast a regulatory obliged Bill & Keep-regime would have a lot of shortcomings. It induces market distortions, inefficient investments as well as technical inefficiencies. Bill & Keep would not automatically minimize transaction costs. On the contrary a regulatory obliged hybrid Bill & Keep approach like the proposed Dual Regime will actually induce higher transaction costs as today's CPNP-principle. Such a Bill & Keep will also lead to a great arbitrage problem with distortion of competition especially if it is adapted only in few countries. Furthermore it induces an adverse selection problem in context of quality of service and fosters the SPAM- and SPIT-problem.

It can be summarized that Bill & Keep could be an efficient outcome of market negotiations under certain circumstances. However, as regulatory obliged interconnection principle it would induce inefficient distortions.

With respect to the migration period the discussion shows that the same kind of interconnection approach has to be implemented in parallel networks with a uniform pricing level to avoid arbitrage and to stimulate investments and network migration. As CPNP is well-established for the PSTN and for the mobile networks, it would hardly be possible to change this scheme without massive transaction costs and implementation problems. Overall, it seems therefore to be the best solution to apply the CPNP logic to IP-based NGN-interconnection, at least for voice services.