



Interconnection TRAI <interconnection.trai@gmail.com>

Comments on the Consultation Paper (No. 17/2016) dated August 5, 2016 on review of Interconnection Usage Charges

1 message

Dua Consulting.com <dua@duaconsulting.com>

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To: interconnection.trai@gmail.com

Cc: "B. K. Syngal" <syngal@duaconsulting.com>, Gunjan Malviya <gunjan@duaassociates.com>

Mr. Arvind Kumar

Advisor

(Broadband and Policy Analysis)

Telecom Regulatory Authority of India

Mahanagar Doorsanchar Bhawan

Jawaharlal Nehru Marg

New Delhi

Dear Mr. Arvind Kumar,

Enclosed please find our submissions on the consultation paper on review of the Interconnection Usage Charges.

- No Jingoism by an operator in the name of the consumer, technology etc, but strict commercial principles.
- This argument of industry debt is no argument. Industry debt is neither a barometer of the health of industry nor a reason enough to justify continuation of Termination charge Perhaps look at studied rationale (revenue neutrality) of diminishing termination charge but not eliminating entirely until reasonable parity is reached.
- Undertake imminent, upward revision of International Termination Charge to reduce the skew between incoming and outgoing traffic. It would benefit standalone ILDOs.
- We have also observed that if there is no TC under CPP regime, there is RPP. By doing so it inculcates a discipline, obligation and regimentation not to abuse the recipients networks by frivolous activities; and
- Initiate studies for termination charge in environment of VoLTE/IP networks.

We are also attaching two reports, which may be read as a part of our submissions. One report is observations of FCC on BAK and second from France telecomm justifying Termination Charge.

We hope that our submissions would form part of the consultative process.

With best personal regards and Season's Greetings.

B. K. Syngal

Senior Principal

Dua Consulting Pvt. Ltd.

301-303, Tolstoy House

15, Tolstoy Marg







New Delhi 110 001

Phone: +91 11 23359347

Mobile: +91 98732 56666

Email: syngal@duaconsulting.com

6 attachments

-  **TRAI_Submission - Interconnection Usage Charges.pdf**
59K
-  **TRAI_Submission - Interconnection Usage Charge.doc**
67K
-  **TRAI - IUC - Bill and Keep.pdf**
30K
-  **TRAI - IUC - Bill and Keep.doc**
44K
-  **TRAI - IUC - France Telecom Orange Discussion Paper.pdf**
67K
-  **TRAI - IUC - France Telecom Orange Discussion Paper.doc**
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INTERCONNECTION USAGE CHARGE

Introduction

1. Interconnection forms an integral part to a telecom licensee's business and is at the heart of the telecoms services. It entails the linking of two or more networks for mutual exchange of traffic. The Interconnection Usage Charges ("**IUC**") are payable by one operator to another for usage of networks of each other, especially for receiving calls terminating on their network. This principle of Interconnection finds support in the Indian context under the unified license agreement as one of the conditions of the licence, which mandates the licensee to grant interconnection, if and when any request is made by another service provider, who could be a new entrant or an existing service provider wanting to enhance capacity. However, admittedly the matter relating to laying down of the terms and conditions of interconnection agreement, i.e. tariffs is within the exclusive domain of the Telecom Regulatory Authority of India ("**TRAI**").
2. Prior to the advent of the multi-operator scenario, basic wireline network operators received charges for usage of their network from the mobile operators without making any reciprocal payment. For every incoming call on the mobile network, mobile operators used to recover usage charges of their network from their customers themselves on which calls were to be terminated. Usage charges for the network of other operators, however, were recovered by other mobile operators from their customers only. They were not receiving any interconnection charges from other operators for usage of their networks, but only 'Airtime Charges'.
3. However, once the licenses both in respect of basic services as well as cellular mobile telephone services were granted from 1995 onwards, the need arose for putting in place cost based interconnection usage regime for the purpose of compensating the service providers for usage of their networks on 'work done' principle. Hence, the Calling Party Pays ("**CPP**") regime was put in place. IUC, therefore, was envisaged as a charge which is paid by one

operator to another out of the charges recovered from the calling party as tariff. IUC introduced a regime where charges were in the range of R0.15-0.50 per minute depending upon the destination network and whether it was in a metro or non-metro under the CPP regime. Prior to this, telecom subscribers used to pay for both making and receiving phone calls.

4. Beginning from 2001, TRAI started issuing/making directions/ regulations which were amended from time to time and were also subject to judicial review.
5. TRAI issued its first Telecomm Tariff Order (“**TTO**”) in 2003, clearly spelling out access, carriage and termination charges. These IUC rates were first revised in 2004 where TRAI recommended flat charges of Rs 0.30 per minute irrespective of distance. The same rates were again revised in 2009; they were pushed further down to Rs 0.20 per minute. But this was challenged by some telecom players all the way to the Supreme Court. Later, the matter was settled and in 2015 IUC was again revised to its current level of Rs 0.14 per minute. A normal revision of TTOs takes place every two years; thereby this sudden consultation is not understood.
6. Our submissions on the comprehensive regulatory review exercise by the TRAI of the regime for IUC with a focus on domestic termination charges, international settlement rates and international termination charges are stated below.

Submissions

Review of IUC Regulations by TRAI

7. The review of the IUC Regulations appears to be unwarranted and avoidable, since the existing regime has come into place a little over a year ago i.e. on 1st March 2015. On the other hand, TRAI has argued that when the IUC was fixed in 2015, it was based on Circuit Switched Radio Access Network (CS-RAN) which is used for 2G and 3G networks, whereas telecom service providers (pertinently only one) have built access networks using 4G and a few of them are using IP-based Voice over LTE (VoLTE) on such networks,

therefore, there is a need to review the IUC. The technology used in 4G is different from 2G and 3G; 4G uses a Packet-Switched Radio Access Network (PS-RAN). It is TRAI's position that comprehensive policy exercises take 6-9 months and hence the timing is in order.

8. In our view, the entire exercise for review of the IUC Regulations is superfluous and unnecessary, since the existing regime had come into place recently on 1st March 2015 and the next review is scheduled in two years i.e. 2017. This entire exercise appears to have been done for the benefit of some new telecom players in the market ostensibly because of the VoLTE/IP technology.

Bill and Keep Regime (BAK)

9. *The present consultation* paper floated by TRAI looks at the possibility of moving to a new regime called Bill and Keep (“**BAK**”) or Net Payment **Zero** (“**NPZ**”). In this method, telecom service providers (originators of the calls) do not have to pay any termination charges to the receiving interconnecting telecom service provider. Hence there is no share of revenue from the call originating company to the called destination company. The originator bills, keeps the entire money and shares nothing with other operators. The TRAI Consultation paper argues in favour of BAK, stating that fixing termination charges in the VoLTE/IP is “complex” and hence “debatable”. In addition, TRAI believes that termination charges work as a disincentive for telecom operators to deploy IP-based networks – which is the future of telecom. This understanding/ belief of TRAI is a very superficial argument and does not hold much water. If one were to analyse the dynamics of network, the onus of declaration of data sent to be terminated would rest with the sender. The sender for various reasons might not wish to undertake that exercise.
10. The same consultation paper also gives the counter argument against BAK, which states that this (BAK) will incentivise telecom players to set low prices to capture a larger market share which in turn will result in inadequate network infrastructure and consequently could impact telecom growth. However, the spirit of the TRAI consultation paper is in favour of BAK. The consultation

paper provides that the BAK regime helps improve wireline connection penetration and will similarly improve tele-density in the country. So far the impact of BAK in three configurations has not produced the intended result. In effect, we would argue that IUC should be reintroduced in all the four situations vis-a-vis only one today. As on May 2016, the country's mobile tele-density stood at 81.18, while in rural India it is only 51.27. Although Bill and Keep has gained momentum, some drawbacks have been identified with this model, such as issues related to the quality of service offered to the end user.

11. Thus, prima facie, BAK would appear very attractive. The BAK regime could be justified by claiming that telecom networks are becoming packet-based networks ("**PSNs**"), based on internet protocol. However, this approach is incorrect since in a country as large as India, where circuit switched networks ("**CSN**") are already in place and operators still have a huge voice demand (70%) from customers—it would be naïve to cost on the basis of a 100% PSN. Further, TRAI data show that almost all the mature and advanced networks of developed regimes follow the Mobile Termination Charge ("**MTC**") and not the BAK regime.
12. One of the views doing the rounds is that MTCs, eventually, have to be reduced to zero, and we should have a BAK—bill and keep—regime, like there is in the internet world, Para 2.22 of CP. Our view is that start a consultation for VoLTE/IP regime on the basis of data termination. In our view, that the telecom industry in India is not mature enough for the BAK regime. The BAK regime will favour new players and it would be disadvantageous to existing players. While at present, India also follow a BAK regime, but such regime only applies to calls originating from mobile to landline, from landline to landline (the segment dominated by PSUs) and from landline to mobile. This regime however has been challenged and is sub-judice before the High Court (Delhi and Gujarat). In our view, Termination charges must be paid by one and all. We believe that TC should be applicable under all possible combinations. It should be either TC or RPP to bring in discipline and avoid abuse of the networks by arbitrarily pumping traffic. FCC has cautioned against such a possibility.

Termination Charge (National)

13. Currently, as per the latest regulations governing interconnection charges, a termination charge of 14 paise per minute has been levied on only wireless to wireless calls. This number was arrived at using what is called the CPP regime. On the other hand no termination charges have been levied on calls made from one landline to another or a Smartphone to a landline. This follows the bill-and-keep (BAK) regime which TRAI thinks should be extended to wireless calls as well to encourage newer technologies like VoLTE and Internet telephony. TRAI believes getting rid of termination charges can reduce the major obstacles confronting Internet telephony.
14. TRAI has suggested the possibility of terminating “terminating charges” altogether to facilitate migration towards next generation networks (NGN) like IP-based networks. TRAI suggests this possibility, primarily, as it is difficult to impose the existing IUC regime when calls originate in regular public switched networks but terminate in IP networks or vice versa. This of course is of particular significance now with a new telecom operators VoLTE services and an existing telecom operators FMT. The other reason TRAI wants to do away with termination charges and move towards the BAK regime as the regulator notes in consultation paper, is termination charges work as a disincentive to the deployment of IP-based telecom networks by the TSPs. This is because termination charges form a significant amount of revenue for incumbent TSPs. Telcos have no good reason to move on to VoIP when they can earn so much from termination charges on voice calls. TRAI on the other hand wants TSPs to move on and start developing their technology and start providing VoIP services instead.
15. It seems that the demand for termination fee by Telcos appears to be legitimate as they have invested heavily in capital expenditure to complete calls originating from smaller networks to maintain a consistent quality standard. Hence, in the Indian scenario, it may be difficult to completely do-away with the termination fee but on the contrary, it could be suggested to

reduce the termination fee charges to bring it in line with international standards.

Termination Charge (International)

16. With regard to International Termination Charge, it is clearly evident that we continue to be amongst the lowest in the world. There is a need to revisit these charges, preferably fixed in line with those charged by correspondents. By some balancing in the international call termination charges the skew between incoming and outgoing would be considerably reduced.

Issues for Consultation

Q.1: In view of the recent technological developments in the telecommunication services sector, which of the following approaches is appropriate for prescribing domestic termination charge (viz. mobile termination charge and fixed termination charge) for maximization of consumer welfare (i.e. adequate choice, affordable tariff and good quality of service), adoption of more efficient technologies and overall growth of the telecommunication services sector in the country?

- (i) Cost oriented or cost based termination charges; or
- (ii) Bill and Keep (BAK)?

Please provide justification in support of your response.

In our view, the cost oriented/cost based termination charges should be adopted for domestic termination charges. One of the reasons for suggesting cost-based termination charges is to compensate the Telcos who have invested heavily in capital expenditure to complete calls originating from smaller networks to maintain a consistent quality standard. Hence, in the Indian scenario, it may be difficult to completely do-away with the termination fee but on the contrary, it could be suggested to reduce the termination fee charges to bring it in line with international standards. In our view, the telecom industry in India is not mature enough for the BAK regime. The BAK regime will favour new players and it would be disadvantageous to existing players.

In addition, the entire premise/hypothesis in this document appears to be based on the fact that BAK is future and Termination Charge is ancient, more suitable for Circuit switched systems. BAK is suited for VoLTE/IP based packet networks, where the packets travel randomly, on different routes, to be

assembled before delivery. Hence, it is difficult to measure the quantum and origin of data terminated. In this context, we would like to draw attention to Para 2.22 of the Consultation Paper (CP) Quote “ the general direction is towards PS (VoLTE and IP), hence call receiving party might have to pay for data charges while receiving a call, The question is; what is the big deal?

The moot point is a payment of charges to the receiving network for use of its network for, finally carrying intelligence to whom it belongs. If not delivered, what use is that intelligence, sent by the TSP. In addition, we believe that the responsibility of declaring the data sent shifts from the recipients to the sender. The sender should be transparent enough to declare the data sent to each and every TSP and pay the termination charge based on CS or PS. Let the authority decide the charges based on the use of Technology, ie CS and or PS. Terminations do need investments; hence have to be paid for.

In the consultation document most of the examples quoted are for retention of termination charge, though with a reduction over a period of time. Except USA, no where do they have BAK, which FCC clarified is because of near equality in terms of data sent and received by various TSPs. FCC, however, mentions that though Bill and Keep has gained momentum, some drawbacks have been identified with this model, such as issues related to the quality of service offered to the end user.^[3]

Having termination charges is a win win, making the sender a responsible TSP and the recipient receiving compensation for use of its resources.

Concluding, BAK is not the way to go, but a detailed study of Charging mechanism for upcoming technologies by the Regulator/Authority must be the way forward.

Q.2: In case your response to the Q1 is 'Cost oriented or cost based termination charges', which of the following methods is appropriate for estimating mobile termination cost?

- (i) LRIC+
- (ii) LRIC
- (iii) Pure LRIC
- (iv) Any other method (please specify)

Please provide justification in support of your response.

Please see response to Q4 below.

Q3: In view of the fact that the estimates of mobile termination cost using LRIC method and LRIC+ method yielded nearly the same results in year 2011 (as filed in the Hon'ble Supreme Court on 29.10.2011) and in year 2015 (as estimated for the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 dated 23.02.2016),

Would it be appropriate to put to use the estimates of mobile termination cost arrived in the exercises of year 2011 and year 2015 in the present exercise?

Please see response to Q4 below.

Q4: If your response to the Q3 is in the negative, whether there is a requirement of running the various LRIC methods afresh using the information on subscriber,

usage and network cost for F.Y. 2015-16 for estimation of mobile termination cost?

Please see below combined response to Q2, Q3 and Q4 combined

Prima Facie, we believe that the termination charge whether in the CS scenario or PS scenario must be cost based. In addition, the intent is to reduce the termination charge over a period of time. It would be prudent to go the LRIC + way.

Q5: In what manner, the prescription of fixed termination charge as well as the mobile termination charge from wire-line networks as 'zero' through the Telecommunication Interconnection Usage Charges (Eleventh Amendment) Regulations, 2015 is likely to impact the growth of the Indian telecommunication services sector as a whole? Please support your viewpoint with justifications.

As stated earlier in our submissions, it is our considered view that telecom industry in India is not mature enough for the BAK regime. The BAK regime will favour new players and it would be disadvantageous to existing players. Hence, contrary to acting as an impetus to the growth of the Indian telecommunications sector, it would in turn create an imbalance by dividing the telcos into two groups- one which is severely impacted by the introduction of the BAK and the other which finds the BAK regime extremely advantageous.

For detailed submissions, please see our submissions above.

We, therefore, believe that there should not be any BAK in any form. BAK is subject to abuse. BAK can be used for irresponsible and irrational behaviour affecting the networks. BAK should be avoided until more maturity and parity is achieved in the calling patterns amongst TSPs and their consumers. The termination charge must be paid. For the sake of repetition, let there be cost calculations for both CS and PS situations and a mechanism set in place to declare the traffic terminated in all situations i.e. CS and PS (VoLTE/IP).

Q6: Whether termination charges between different networks (e.g. fixed-line network and wireless network) should be symmetric?

It would be incorrect not to bring the termination charges between different networks at par. On the contrary, an attempt should be made to bring the termination charges in line with wireless networks.

Q7: Which approach should be used for prescribing International Termination Charge in the country? Should it be kept uniform for all terminating networks?

International Termination Charge (“**ITC**”) is an important element of Telecom network. With an increasing integration of the world, ITC assumes a significant place in the scheme of telecomm networks, especially installations of cable landing stations and international switching gateways. To say that an international termination is equal to a domestic termination is misplaced; hence any ideas or thought to equate the two is due to lack of understanding of the complications of the subject. Historically, ITC has been used as a subsidy, but with increased volumes the ITCs have substantially come down over the years from some US \$ 2 to US\$ 0.23 cents. Our considered view is

that International and domestic termination charges must not be the same, ITC should be uniform all across for reasons articulated in Paras 3.7 through 3.10. Finally, the ITC needs an upward revision from the present Rupees 0.53, because we are creating an environment which would be advantageous to the distant end carriers at our cost and expense. In effect an increase in our ITC might result in decrease in distant end ITC. Eventually, it could bring some balance between incoming and outgoing traffic. It could also reduce the third party routing by aggregators so prevalent today.

Q8: Whether, in your opinion, in the present regulatory regime in the country, the stand-alone ILDOs are not able to provide effective competition owing to the presence of integrated service providers (having both ILDO and access service licenses) and, therefore, there are apprehensions regarding sustainability of the stand-alone ILDOs in the long-run?

There are apprehensions that there might not be a business case for the independent stand alone ILDOs. The apprehension is not misplaced. The ILDOs in our view should be compensated on the principle of work done i.e. how is the call completed? For example, in very simple terms the call could flow from ILD gateway to NLD network and to access provider switch for termination or ILD gate way to the switch of the access service provider (this possibility might not exist). The stand alone ILD should receive some revenue share of the termination charge. He (ILDO) should be entitled to a aprt of termination charge.

Q9: If your response to the Q8 is in the affirmative, which of the following approach should be used as a counter-measure?

- (i) Prescription of revenue share between Indian ILDO and access provider in the International Termination Charge; or
- (ii) Prescription of a floor for international settlement rate (levied by ILDO upon the foreign carrier) for international incoming calls; or
- (iii) Any other approach (please specify)

Please provide justification in support of your response.

To begin with the International Termination Charges have to be revised and the stand alone ILDOs should be compensated on the principles of work done. After all, they are adding to traffic generation for access service providers.

Q10: Is there any other relevant issue which should be considered in the present consultation on the review of Interconnection Usage Charges?

Please see our detailed submissions above, and the following may also be noted:

- No Jingoism by an operator in the name of the consumer, technology etc, but strict commercial principles.
- This argument of industry debt is no argument. Industry debt is neither a barometer of the health of industry nor a reason enough to justify continuation of Termination charge
- Perhaps look at studied rationale (revenue neutrality) of diminishing termination charge but not eliminating entirely until reasonable parity is reached,
- Upward revision of International Termination Charge to reduce the skew between incoming and outgoing traffic.

- We have also observed that if there is no TC under CPP regime, there is RPP. By doing so it inculcates a discipline, obligation and regimentation not to abuse the recipients networks by frivolous activities, and
- Initiate studies for termination charge in environment of VoLTE / IP networks.
- We are also attaching two reports, which may be read as a part of our submissions. One observations of FCC on BAK and second from France telecomm justifying Termination Charge.

Bill and keep

From Wikipedia, the free encyclopedia



This article **needs additional citations for verification**. Please help [improve this article](#) by [adding citations to reliable sources](#). Unsourced material may be challenged and removed. (June 2009) (*Learn how and when to remove this template message*)

Bill and keep (B&K or BAK), also known as **net payment zero** (NPZ), is a pricing arrangement for the [interconnection](#) (direct or indirect) of two [telecommunications networks](#) under which the reciprocal [call termination](#) charge is zero. That is, each network agrees to terminate calls from the other network at no charge. According to the OECD, Bill and Keep is defined as "A pricing scheme for the two-way interconnection of two networks under which the reciprocal call termination charge is zero - that is, each network agrees to terminate calls from the other network at no charge".^[a]

Bill and keep represents a modern approach to interconnection charging in which the networks recover their costs only from their own customers rather than from their competitors. Such an arrangement acts to remove the wholesale cost barrier to the retail pricing for off-network calls and has been proven to result in significantly higher levels of calling activity.^[citation needed]

On October 27, 2011, the U.S. [Federal Communications Commission](#) (FCC) announced that it would adopt a bill-and-keep framework for all telecommunications traffic exchanged with [local exchange carriers](#) (LECs) as part of an effort to reduce [arbitrage](#) practices such as traffic pumping and phantom traffic, encourage the deployment of [IP-based networks](#), and reduce artificial competitive distortions between [wireline](#) and wireless carriers.^[a]

In the European [mobile telecommunications](#) sector, absent a bill and keep arrangement, the wholesale markets have traditionally applied the [calling party pays](#) (CPP) principle in which an originating network pays the terminating network a charge called the mobile termination rate (MTR) or fixed termination rate (FTR) for calls to the terminating network.^[citation needed] The MTRs paid under the CPP model, therefore, act as a cost floor to the retail pricing, preventing lowering of prices and innovation of retail propositions. In many countries including the UK, the CPP model has thus led to a high level of regulatory activity aimed at capping the MTRs at a competitive level, which inevitably acts to reinforce the cost floor rather than being pro-competitive.

Although Bill and Keep has gained momentum, some drawbacks have been identified with this model, such as issues related to the quality of service offered to the end user.^[a]

References[edit]

- ↑ **Jump up** http://stats.oecd.org/glossary/detail.asp?ID=6727
- ↑ **Jump up** "Connect America Fund Executive Summary", 2011-10-27. Retrieved on 2011-10-28.
- ↑ **Jump up** "Bill and Keep Alternatives", *TM Forum*, 2008-09-05. Retrieved on 2009-07-06.

Categories:

- [Telephony](#)

France Telecom Orange Discussion Papers on Bill & Keep

The Technical Impact of Mandatory Bill And Keep (BAK): BAK would imply high involvement of NRAs in controversial network operation issues

This short paper explains that if NRAs impose mandatory BAK the result will require an increase in regulation, rather than less regulation. If operators are forced to interconnect on a bill and keep basis, complex and numerous disputes will arise.

Operators are currently obliged to interconnect under current electronic communications regulation in Europe, but are able to charge a regulated interconnection fee. Voluntary BAK exists between peers among Internet carriers world-wide but are less common than transit paying arrangements. However these internet carriers are not mandated to interconnect and interconnect on voluntary BAK basis. Mandatory BAK, on the contrary, has never been observed on a large scale.

In this paper we develop concrete examples showing that mandatory interconnection and BAK does not simplify the process of interconnection and payment and therefore cannot lead to improvements in efficiency. Instead, mandatory BAK would require regulatory intervention to resolve disputes between operators.

1) Anyone can interconnect

Apart from current operators in the sector who are already interconnected, other actors (typically not from the communications sector, eg private companies) will be interested to take advantage of interconnection because of the free access to networks under mandatory BAK. Due to the availability of protocols like ISUP¹ there is no longer a technical barrier to interconnection. For example, in France 800 actors have notified ARCEP as providers of electronic communications networks and services and can therefore ask for a connection, even if some have no clear activity in the sector, while at the moment, fewer than 200 are connected to the France Telecom network.

Telecommunications operators have already seen many private companies requesting interconnection not for the purpose of selling public telephone services on the market, but rather to cover their own needs. Even though they have very asymmetrical traffic profiles, Broadcasters have asked for BAK interconnection.

In this way, any large company outside of the telecoms sector can request interconnection, if necessary by creating an ad hoc subsidiary, in order to be granted a BAK status and thus benefit from free telecommunication services from network operators. Interconnection would enable such an actor to originate and send traffic from a virtual private network (VPN) without bearing any of the cost of the network infrastructure used to transmit the call.

Wireless operators of all sorts and activities could ask for interconnection, content providers, content distributors, of all kinds and sizes, producing all sorts of traffic and volume could ask for interconnection including IPTV providers and VOD providers.

¹ ISUP defines the protocol and procedures used to setup, manage and release trunk circuits that carry voice and data calls over the public switched telephone network. ISUP is used for both ISDN and non- ISDN calls.

Due to the double obligation of interconnection and BAK, new candidates for interconnection will bring traffic but not the financial resources necessary to maintain and develop the network infrastructure, generating network congestion and, consequently, quality problems.

Due to network over-burdening and lack of investment, the regulator will have to issue a list of criteria for a company to be connected in order to limit the problem. An economically sound solution could be based on a minimal interface capacity or on a guarantee of symmetrical arrangements. But this will lead to litigation on the grounds of discrimination or regulatory capture.

BAK can lead to arbitrage if the same terms and conditions are not applied to all operators. It was the case when BAK existed between the French mobile operators (up to 2004). Some fixed operators disguised fixed-to-mobile traffic into mobile-to-mobile traffic in order to benefit from the free BAK agreements between mobile operators. As a consequence these gateways generated local overload and an inefficient usage of the frequency spectrum and regular users of the radio spectrum were disadvantaged.

2) Who will decide where the point of connection is located?

In the context of mandatory BAK the question of where the physical point of interconnection should be remains an open question. Some interconnection points are highly connected hubs with high direct link capacities to all national and international routes, while others are only connected to major national and international routes through congested intermediate nodes and links. Obviously, interconnection seekers will request to be interconnected to the highly connected hubs while interconnection providers will propose the intermediate hubs if they consider that Bill and Keep interconnection is not an equitable deal for them. It is then not clear who should build the infrastructure and who should cover the direct cost of interconnection. With no return value from the interconnection point or the transmission and switching equipment, there is no rationale for investing in the network. The tendency will be to minimize costs or to transfer the cost to the others in a form of hot potato routing as a call is transferred as quickly as possible from one network to another to minimise use of an operator's own network.

Without defined operational processes the mandatory interconnection and BAK mechanism will generate conflicts which the regulator will be frequently requested to solve. In the meantime, no satisfactory service will be available for customers.

3) Who will decide the capacity of the interconnection?

When two interconnected operators cannot use price to adjust their interconnection agreement they use interconnection capacity as a negotiation tool. The access seeker will ask for the maximum, but, without incentives, the access provider will offer the minimum. This will lead to disputes and to congestion at the connecting point; however, congestion can and will spread throughout the networks through the following phenomena:

- (1) when a direct route is congested, routing algorithms try indirect routes, hence the average number of links and nodes per communication increase, this inflates the amount of traffic to be carried by network elements and produces new congestion, which in itself implies even more indirect and inefficient routes and so on,
- (2) in a congested network, calls or packets are lost and are thus repeated at the source of the traffic until they reach their destination, therefore overall traffic increases.

In a congested network, it is extremely difficult to identify the original cause of congestion. It is very likely that increasing capacity somewhere will generate congestion elsewhere with no improvement of end to end performance for customers. It is difficult therefore, to define where capacity provisioning would be necessary.

If mandatory BAK eliminates price as an adjustment factor, the only remaining adjustment factors are quality and capacity. This phenomenon was very common in the bilateral national agreements related to international trunk groups. When an operator disagreed with a proposed tariff, considering that it was not equitable due for instance to the unequal volumes of exchanged flows, the consequence was often a reduction in interconnection capacity.

IP traffic on core networks continues to grow by around 40% per year on average. Therefore, it is necessary to continually invest to guarantee a satisfactory interconnection capacity and to adjust the necessary technical resources. Without financial compensation for interconnection, the system will lack any incentive to invest. We are already facing this situation in France: broadband access is sold at “the best capacity the (existing) line can offer”. This results in cheap flat rate prices, but if these retail flat rates were combined with BAK then there would be no economic incentive to bring higher broadband capacity to customers with low bandwidth eligibility.

On the other hand, with positive MTRs, mobile coverage was achieved without any government intervention: installing a new base station clearly and automatically meant more revenue.

4) Routing and metering problems occur when different traffic flows have to be identified creating extra cost

Today, several large operators are pure transit network operators². They face network costs but with mandatory BAK they would not earn any revenue. Therefore, these activities and the corresponding resources, critically necessary for the service to the customer, will disappear.

Even if transit companies are exempted from BAK obligations, they will be in competition with the “transit part” of “end to end” operators providing access and termination. If the latter have a general obligation of BAK, their transit service would be available for free; this will kill the business model of transit operators.

It could be said that a solution would be that integrated operators have the right to price transit while being obliged to propose termination for free. However this leads to two types of problems:

- one economical, where the frontier between transit and termination is unclear. This problem is as controversial and in the end identical to the question of defining relevant costs for termination prices. This point is addressed in the specific economic paper.³
- one practical related to routing and metering questions which will be developed below.

The same interconnection point will serve for transit traffic and for “free” termination service. In theory, only traffic flows that are addressed to customers located on the last segments behind the Point of Interconnection would “benefit” from BAK. But the issue arises of what to do with

² Transit is necessary to complete a call notably on long distance: for example, thanks to the Transit operators, the European Internet users can access an USA websites.

³ This point is addressed for instance in an economic paper by Professor Mason.

traffic flows addressed to other destinations, as these could be simply rejected or rerouted to their destinations, as far as the system is able to differentiate the traffic and the transit flows.

An operator that transmits a flow does not know if the flow is related to transit or termination, so he does not know if it is free or not, creating a source of conflict.

With the internet, the only thing that the routing tables know is that the use of an interconnection point will bring the traffic closer to its destination, with no distinction of the flows because the packets are aggregated. Then it would be extremely difficult to have different prices depending on the flow; so, because the transit activity must be compensated, the termination one must be compensated as well.

Filtering calls has a cost, and there is little incentive for an operator to engage additional computing or network resources to process traffic flows for which it is neither the source nor the destination. Rejecting traffic is always the source for many disputes (cf the problem of "phantom traffic flows" in the USA). In the case of rerouting, fairness would imply that operators who submit the rerouted traffic flows cover the cost of this rerouting. To calculate these costs, a traffic metering process must be set up to count how many calls, sessions, minutes or bits are sent by a given operator to a given destination.

Then the apparent advantage of lowering interconnection transaction costs that is put forward by BAK advocates suddenly disappears. Even with BAK, a sophisticated metering process must exist at the interconnection points; therefore we cannot expect any savings on the transaction costs. In any case, interconnection traffic metering is still necessary for destination-paid traffic flows (like 0800 numbers) and all value added traffic flows. If this extra cost cannot be compensated, no positive discrimination will be achieved between the two types of flows leading to disputes on the definition and the volume of the termination and transit traffics. In the end, ultimately, the transit activity could disappear.

5) SPAM will increase

If termination is essentially a free of charge service through BAK, traffic will increase even more due to unsolicited calls creating spam for consumers. It would surely be a nightmare for all customers if, as for their email box, most of the phone calls they received, day and night, were unsolicited. Moreover, customer voicemail or answering machines would be rendered totally useless, as it is much more difficult to browse through an even lightly filled vocal mailbox than it is through an email spambox.

As for vocal or multimedia content filtering, supposing it conforms to legislation, and that prior consent from the user is obtained, it would be incomparably more difficult and costly to develop and deploy than email text-based filtering.

6) Conclusion: mandatory BAK will lead to poor performance for customers and to high levels of litigation

We can see that conflicts will arise at each level of the interconnection process:

- ③ due to congestion problems, with list of interconnection criteria to be defined by NRAs,
- ③ points of interconnection to be defined,
- ③ interconnection capacity to be allocated to be defined,
- ③ transit activity to be protected,

- ③ quality to be maintained despite the lack of revenue/investment,
- ③ Spam

Network congestion will occur due to the increase of interconnected companies and the lack of resources to invest in the necessary equipment to upgrade the network. As previously seen to minimize this drawback, limits will be necessary and the regulator will have to define criteria to manage interconnection disputes. The operational process, from the interconnecting point issue to the level of capacity and quality offered to the interconnected parties, will also have to be defined in order to avoid the likely disputes between the stakeholders. The regulator will have to find alternatives for the lack of motivation from the network operators to invest in the networks. The lack of incentive to invest under BAK persists and it may be up to the regulator to determine alternative solutions to encourage investment.

Building, maintaining, upgrading networks has a cost. Interconnection obligations as well as quality obligations have a cost. As long as interconnection is mandatory, the recovery of the consequential costs is necessary. The lack of a well balanced cost recovery mechanism will lead to arbitration using other levers such as capacity and/or quality, which will lead to frustration, complaints and legal procedures. In this context, no party will be satisfied, the network operators will be restrained in their network development, the interconnected parties will suffer from poor quality, low capacity and the regulator will face multiple complaints and disputes.

Ultimately consumers will suffer as during the disputes, service will not be provided to the customer or very poorly, because disputes will concern how to technically operate the service. And when interconnection occurs; it is very likely that a vast majority of traffic will be junk traffic, including unsolicited spam.