

# France Telecom Orange Discussion Papers on Bill & Keep

# <u>The Technical Impact of Mandatory Bill And Keep (BAK): BAK would imply high</u> 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 ISUP<sup>1</sup> 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.

<sup>&</sup>lt;sup>1</sup> 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 minimize 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 operators<sup>2</sup>. 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.<sup>3</sup>
- 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

<sup>&</sup>lt;sup>2</sup> 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.

<sup>&</sup>lt;sup>3</sup> 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:

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



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