July 2008

ECTA response to the ERG Regulatory Principles of IP-IC/NGN Core consultation document

Executive Summary

- In principle NGNs lessen the vertical integration between application and transport. In practice, however, there is a reasonably tight binding, especially with regard to voice calls.

- There can be no precise statement made on the number of network nodes and PoI, since it depends largely on the optimum number of softswitches/SBCs of the incumbent, but as a rough estimate we would expect the number of interconnections to reduce to approximately one third of those today.

- The concept of local interconnection can be understood in two ways. In the context of SBC-based NGN interconnection, there is no equivalent of local PSTN interconnection. To the extent that local interconnection relates to the concept of differential wholesale call termination charges according to where the call is delivered it remains relevant in the context of minimising network utilisation.

- Today's Framework is suitable to address competitive or other problems arising in an NGN context, technology neutrality being one of its fundamental principles. Provided that the proposed Framework is consistently technology neutral it will also allow NRAs to tackle the regulatory challenges of the future.

  There is no reason to believe that NGN developments increase risk for investors. ECTA is therefore concerned about a potentially excessive focus on risk arising from the European Parliament's proposals on the Telecoms Framework – in particular the proposed new concept of 'risk sharing' instead of the currently well functioning 'fair return on investment taking into account risk'

  ECTA would be supportive of the Commission's endeavours to harmonise quality and technical parameters to a certain degree thereby facilitating the creation of a genuine single market in telecommunications.

  There are two important issues that need to be addressed also by tomorrow's framework in order to ensure fair competition:

  - Stronger information requirements (NGN technology/interoperability) on SMP operators, especially for long term outlook (including phasing out of physical interconnection locations).
  - Instruments for NRAs to be able to address, where appropriate, new bottlenecks that may arise as a result of NGN.

- Vendor interoperability is necessary to allow seamless interconnection with dominant operators that have the ability to behave independently and thereby substantially affect wholesale and retail markets. These operators should not be allowed to use vendor specific technical solutions to prevent NGN interconnection, degrade the quality of inter-network traffic (only use of minimum codec) and to raise competitors' costs through R&D.

  The development of QoS interoperability should be in principle left to market forces; nevertheless ECTA would like to highlight the need to ensure that QoS is available across network boundaries. End to end connectivity of services and interoperability of networks are built-in principles of the current framework and need to be maintained.

- ECTA's members identified a number of arguments both in favour of and against Bill & Keep, and in our view further deeper study of the concept is required than has currently been undertaken before robust conclusions can be drawn, or before a regulatory approach can properly be formulated for implementation in the medium term.

  On a preliminary basis it seems that at least in circumstances where the glidepath to symmetric termination rates has been reached mandatory bill and keep between the incumbent and smaller fixed entrants in NGN may be an appropriate way to address dominance in termination, recognising that it is fair and desirable to set certain preconditions such as a reasonable minimum number of PoI in order to avoid anomalies.

- It is an important precondition of a fair NGN accounting system that fixed and mobile termination rates are based on costs and differ only to the extent justified by objective differences in their relative costs.

1) Considering that according to the ITU definition of NGNs where service-related functions are independent from underlying transport-related technologies, how do you evaluate the concepts of transport interconnection and service interconnection as defined in the document?

A. It is true that in principle NGNs lessen the vertical integration between application and transport. However, the practicality is that there is a reasonably tight binding, especially with regard to voice calls.

   For privacy and security reasons, NGN voice interconnection is achieved through SBCs (session border controllers). This means that the operator requesting wholesale termination services will not receive the IP address of the end user, but the IP address of the SBC. Therefore the concepts of service and transport interconnection merge to a certain degree in case of voice calls.

   Also, for a voice call to present a user-experience analogous to that experienced in the PSTN, or a video call to provide a better user-experience than just using the Internet, there is a need for the QoS of the transport layer to be controlled. This implies interaction between application and transport. Although opening of such interface between the functional levels is much touted, we see little evidence of it being realised as yet. Even when it is, there will need to be tight constraints, to maintain the security and integrity of the underlying network.

B. This being the case, the regulatory nirvana of multiple application providers competing seamlessly on a common NGN does not seem likely. Application provision will be liberalised, but undoubtedly this will be via limited API interfaces allowed by the NGN provider rather than unfettered access.

C. As is highlighted in the ERG consultation document, NGN results in high fixed costs with relatively low variable costs.

D. Notwithstanding this, the separation of functions does allow decomposition of transport versus application layer elements, which can be beneficial in determining interconnect commercial arrangements (under CPNP) as a more direct linkage to cost causation can be established.

2) Do you see other issues regarding regulatory principles of IP-interconnection/NGN core that should be dealt with?

More attention could be devoted to the possible creation/exploitation of new bottlenecks. The ERG could also elaborate more on the feasibility of implementing B&K in practice.

3) Can you make more precise statements on the number of network nodes and/or points of interconnection in NGNs?

There can be no precise statement made on the number of network nodes and PoI, since it depends largely on the optimum number of softswitches/SBCs of the incumbent.

This number is always a function of traffic volume; therefore it will be influenced by the following factors:

- if only true NGN access subscribers are (inter)connected with this network, the market share of the incumbent operator for NGN-based subscriber access, and the overall market share of NGN versus use of legacy networks;

- if all traffic with the incumbent network operator has to go through the NGN IC (by way of network internal gateways to its interior PSTN structure), traffic volume is much higher (i.e. higher efficient number);

- if carrier selection and pre-selection is continued – as it should to ensure that national voice markets are effectively competitive – traffic volume will significantly increase, i.e. there will be more PoI.

The following provides some empirical evidence:

A. When compared to legacy TDM switches, callservers tend to process 5-10 x more voice calls.

B. At the transport layer, economics of the number of interconnects tends to be driven by tension between few interconnects driving larger (hence more efficient) pipes but at the expense of causing greater cost in the terminating network via using more capacity. Conversely, larger numbers of interconnects mean less efficiency via smaller pipes, but less network elements used.

   In the UK, for voice, the compromise of 29 was agreed, because any fewer interconnects than this yield no cost advantage for competing operators with NGNs because at 29 they were sufficiently far up the dimensioning curve that any bigger pipe yielded no advantage. For broadband, the economics were slightly different (higher fixed cost of interconnect equipment) hence 20. As a broad-brush, we would expect the number of physical interconnect points to be approximately one third of the number of physical interconnect points in the PSTN.

C. At an application layer, for voice, it is clear that the call control requiring two callserver interactions (one controlling interconnect, another controlling the terminating line) costs approx 60% more than one where the same callserver carries out both functions. As such, to minimise cost, there is a need to have a relationship with the correct callserver. The architecture of NGNs is such that each physical handover may need to have multiple logical associations within it.

D. In UK metrics, for full interconnectivity in PSTN circa 700 connections are required via circa 70 physical locations. For NGN if the logical model described above prevails, it implies circa 200 logical associations across 29 physical locations. As such, we would expect the number of interconnections to reduce to approximately one third of those today.

4) a) Is there an equivalent in NGNs to the concept of local interconnection as known from PSTNs?

The answer to this question depends on what is meant by the concept of local interconnection.

On the one hand, from a purely technical perspective, in the context of SBC-based NGN interconnection, there is no equivalent of local PSTN interconnection. There is no hierarchy in the SBCs, thus the maximum number of SBCs would define “local interconnection”.

On the other hand, and to the extent that local interconnection relates to the concept of differential wholesale call termination charges according to where the call is delivered, the answer is: yes, this remains relevant, in the context of minimising network utilisation. More network usage = more cost. Operators should be rewarded for handing over calls as near to the end user as possible, hence minimising cost. It is fair to assume that the cost gradient is not as pronounced as it is in the PSTN, but it still holds true (witness call via 2 callservers= 60% more cost than via 1 callserver).

However, cost is only minimised where the handover is at a point where there is routeing flexibility in the underlying NGN transport layer. DSLAMs/MSANs, for example, are not designed to provide IP routeing capability, and hence interconnect for voice at this level actually increases cost, because the only way to handle the traffic is to trombone it to the nearest routeing point, i.e. the metro node.

b) What do you consider to be the locations for the lowest level of interconnection (physical and/or service), e.g. the broadband remote access servers (BRAS)?

Transport interconnection should be at the lowest point of interconnection, which is the lowest point where IP routeing takes place, which in practical terms is the metro node containing an SBC (N.B. as a matter of principle the incumbent operator should send all their traffic via this metro node as well, i.e. not route at a more local level). Application interconnection will inherently be application specific. For example for connection oriented services, it would be the callserver controlling the MSAN for the line.

c) Could the maximum number of PoI offered be considered equivalent to local interconnection?

ECTA notes that this question is open to interpretation.

If the question is interpreted as "Could the maximum number of PoI [for NGNs] be of the same order as those required for local interconnection [for legacy technologies]?", then the answer is no, because NGN interconnection will require far fewer interconnect handovers than legacy interconnection - see response to question (3).

However, if the question is interpreted as "In the same way that local interconnection [for legacy technologies] yields the lowest wholesale interconnect charges, should connection to the maximum number of available PoIs [for NGNs] result in the lowest interconnection rate?", then the answer would be “yes."

5) How do you assess the proposed Framework in the light of the migration process towards NGNs, their technical characteristics and economic implications? Are the proposals suited to address the specific challenges that these present?

Today’s Framework is already suitable to address competitive or other problems arising in an NGN context, technology neutrality being one of its fundamental principles.

Provided that the proposed Framework is consistently technology neutral it will also allow NRAs to tackle the regulatory challenges of the future. Our understanding is that NGN core networks will, over time (after legacy networks are phased out) induce costs savings and therefore will not result in increased risks or costs. Consequently the proposed new concept of ‘risk sharing’ instead of the currently well functioning ‘fair return on investment’ is misplaced and will hinder the competitive development of the market.

ECTA would be supportive of the Commission’s endeavours to harmonise quality and technical parameters to a certain degree thereby facilitating the creation of a genuine single market in telecommunications.

IP/NGN equipment is procured on a global market, so Europe needs at least a common approach towards standards that have implications for the technology used. If different NRAs set different requirements, demand will be fractioned and equipment will be more expensive due to additional R&D, which reduces European competitiveness as a result.

There are two important issues that needs to be addressed also by tomorrow’s framework in order to ensure fair competition:

- Stronger information requirements (NGN technology/interoperability) on SMP operators, especially for long term outlook (including phasing out of physical interconnection locations).

- Instruments for NRAs to be able to address, where appropriate, new bottlenecks that may arise as a result of NGN (see also our answer to point 6 below).

6) What type of interoperability requirement do you consider necessary?

At this stage it is difficult to provide a categorical answer, but the likely candidates are exchange of authentication and presence information. Emerging bottlenecks are bound to arise, but the scope of these is as yet unclear. Where incumbent operators mediate access to NGNs via exposure of APIs, the likelihood is that the nature of these APIs will drive what is technically/commercially possible.

In general vendor interoperability is necessary to allow seamless interconnection with dominant operators that have the ability to behave independently and thereby substantially affect wholesale and retail markets. Therefore these operators should not be allowed to use vendor specific technical solutions to prevent NGN interconnection, degrade the quality of inter-network traffic (only use of minimum codec) and to raise competitors' costs through R&D.

While clear standards for QoS interoperability have not evolved yet and development should be left to market forces, ECTA would like to highlight the need to ensure that QoS is available across network boundaries. End to end connectivity of services and interoperability of networks are built-in principles of the ECS framework today, and these principles need to be maintained when the network infrastructure underpinning these principles change. Certainly voice is the predominant application that requires assurance of minimum QoS across the NGN network boundary today, whilst not excluding different QoS levels being made available voluntarily, or on a non-discriminatory basis in response to a reasonable request for interconnection (subject to dispute resolution powers of the NRAs).

7) How do you assess different wholesale charging mechanisms in the light of the transport-related bottlenecks?

ECTA's members have identified a set of arguments both in favour and against the Bill & Keep (B&K) wholesale charging regime. It seems clear that further analysis is necessary on the practical implications of introducing B&K in Europe before robust conclusions can be envisaged.

- Investment incentives
  B&K could have a positive impact on **investment incentives**. A reciprocal B&K regime provides higher rather than lower incentives to invest. Where termination is set above incremental cost an operator does not want to have call imbalances since these will be costly. Therefore the operator does not have high incentives to invest in a higher quality network, since this will cause an expensive outflow of calls (the mechanisms that generate this could be many: better quality calls, higher coverage, etc. all lead to an increase in demand and output). Under a B&K exactly the opposite can happen, and a network wants to grow bigger via higher investments since the resulting outflow of calls will not be costly.
  B&K could also cause lower incentives to invest in other cases. In itself the fact that any operator would be able to use "for free" any other network could potentially lead to "free rider" conducts. A decreased level of investment could result in a degradation of the quality of the voice service. In order to avoid this phenomenon in an NGN context appropriate conditions could be set for interconnection under B&K such as the minimum number of PoI in case of unbalanced traffic between operators.

- Welfare
  In terms of **welfare properties**, B&K seems to be a more efficient way to cover costs in the presence of call externalities. The price of outgoing calls is reduced, while costs are recovered mostly via increased fixed fees and possibly but not necessarily, via the introduction of recipient charges. However, the exact structure of the prices is a marketing and business strategy question and can be driven by various factors. Nevertheless the current trend towards increased fixed fees both in the fixed and the mobile

sectors seems to point in this direction. Therefore under the B&K regime competition is likely to shift to the provision of network access to customers. Instead of generating revenues from charging for usage (which is inefficient, both because marginal costs are very close to zero and because even if the termination rates were set at the marginal costs, call externalities would still be unaccounted for), revenues would stem from providing access to the network.

An example is the US B&K system, which makes calls cheaper for end users. As a result, consumers make many more calls in the US (MoU) than in Europe. Consumers buy bucket plans, a bundle of inclusive minutes (both for making *and* receiving calls). The allowance is typically very generous so that customers use the phone a lot and are prepared to pay good money to access the mobile network. This is why ARPU in the US is actually higher than in other countries. Bucket plans with lots of inclusive minutes seem to be very successful in alleviating any consumer reluctance to pay for receiving calls: people do not actually pay for receiving calls ex post but ex ante to get access to the network.

On the other hand there is a potential for a 'waterbed effect' in Europe, which could imply an increase of retail prices by operators in order to be able to recover their costs.

It is a possibility that B&K at the wholesale level will lead to the introduction of Receiving Party Pays (RPP) at the retail level, which would significantly alter the way the market works today, whilst consumers' willingness to move to RPP is unknown today.

- <u>Regulatory costs</u>

  It is obvious that the regulation of termination rates generates significant regulatory costs both for NRAs and industry A B&K system does **not seem to require costly regulatory resources.** But the reduction of regulatory costs is not a sufficient justification in itself in to commit to B&K without detailed and in depth analysis (in particular about practical consequences for operators).

  In addition to being a cost friendly solution, under B&K there would be no opportunities for arbitrage among differential termination rates (under the assumption that B&K has to be applied to the whole industry, which is the preference of those ECTA members that advocate transition to B&K). This observation applies also to other settings where all termination rates (M2M, M2F, and F2M) are set at the same level and do not necessarily equal to zero.

- <u>Non discrimination and "competitive neutrality"</u>

  B&K could ensure non discrimination and a level playing field for all operators by creating a situation in which no operator would be allowed to recover costs from other operators and therefore operators would need to recover costs from their own customers.

  B&K may be able to avoid the risk of discrimination among operators caused by the non uniformity of approach by NRAs in the definition of termination rates among operators and categories of operators. The fact that some categories of operators are allowed to recover through termination charges a higher proportion of their objective costs compared to other operators causes unfair competitive distortions. Every operator should be given the same incentives for investment and efficiency and a uniform methodology for the definition of termination charges is essential in order to reach this objective. Since the assessment of each operator's costs by NRAs is complex and costly, B&K allows the immediate application of a uniform approach and is easy to implement.

Cost orientation would seem to be the preferable method for the definition of termination rates if costs were defined in a way that takes into consideration the characteristics of each operator in terms of technology, coverage, cost structure, market share, etc, while at the same time ensuring adequate incentives for efficiency and growth. In today's scenario characterized by a variety of operators in the fixed and mobile market with different characteristics and cost structure, the NRAs' task to assess adequate cost levels for termination rates for each operator is complex and costly. Therefore the risk under the current arrangements is that NRAs define a single rate applicable to all operators or categories of operators, which may be higher than the actual cost of some operators (typically the largest operators which benefited from legacy advantages) and lower than the costs borne by others. Or even in the case of assessing the costs of each operator, the methodology and approach used does not always allow to set the correct level of charges and therefore risks discriminating between operators. The introduction of a B&K system would solve this problem by creating a level playing field for all operators meaning that no operator would be allowed to recover costs from other operators and therefore operators would need to recover costs from their own customers. This would create strong incentives for efficiency since operators compete with others on the retail market and also **competitive neutrality** since all operators would recover costs in the same way.
On the other hand, distortions of competition could also occur, because operators have different cost structures and each operator is in a different market position. The same constraint on each operator where their situations are not the same does not necessarily result in a non-discriminatory outcome.

- Price differentiation and "club effect"
  B&K – in contrast to CPNP – may create a more stable competitive outcome through its "anti–club effect" properties. The club effect favours operators with a large customer base, especially in retail market scenarios with flat rate offers. Incumbent operators experience less costs per flat rate offer than smaller operators due to a significant difference between average cost (basis for IC charges) and incremental costs (additional internal call). For incumbent operators, a larger proportion of calls will terminate within their own network.. For those calls, the incumbent only entails marginal/incremental cost. So incumbent operators can either expect higher margins from identically priced flat rates or may compete aggressively on price, reducing the market presence of smaller companies. NGN interconnection will aggravate this problem already recognized within today's PSTN framework, as the difference between average and incremental cost is significantly higher than within the PSTN. Therefore with NGN interconnection and a retail market driven by flat rate offers (for national fixed and network internal telephony) competition problems deriving from the club effect will get worse.
  The introduction of a B&K system would strongly limit the competitive distortions caused by on-net tariffs of a single operator which are being financed by other operators through an excessive level of termination charges.
  On the other hand the reduction of termination rates may not be enough to prevent operators from developing on-net offers in the retail market and encouraging communities-of-interest to use their network, which is anti-competitive and distorts the development of the market when done by operators with a large customer base.
  There would be an incentive on terminating operators – particularly those with high volumes of existing customers – to over-recover the cost of terminating

off-net traffic (from the end-user) in order to subsidise on-net. Doing so would likely increase the relevant customer base as it would encourage communities-of-interest to use their network hence raise the relevant operator's customer base. It might be difficult to assess whether this is going on without establishing the cost basis of termination. As such, regulatory supervision and possible regulatory intervention would still be required, requiring shifting attention from wholesale to retail rates, which some NRAs may consider difficult in the light of the powers conferred to them under national law in application of the EU regulatory framework. Reliance on competition law alone to deal with such issues would be inefficient, as it is far too slow to deal with the constantly evolving and increasingly complex and varied retail pricing packages.

- Quality of Service
  B&K could potentially cause a risk for service quality, which should be addressed by NRAs (pls see question 6). Dropping calls as soon as possible may result in a "hot potato" effect where no operator has any incentive in managing the virtual paths devoted to voice in the core network so that the quality of the voice service is maintained at a high standard (at least as high as in the PSTN). Paying for transit coupled with with B&K on termination may result in an excessive multiplication of interconnect points by a large operator to ensure he receives a maximum amount of transit fees.
  Nevertheless, risk of degradation of QoS will depend on the choices made by operators rather than the kind of regime applied.

It is difficult to assess a pure transport interconnection, especially given that operators are focusing on an SBC-oriented interconnect structure.

Nevertheless, the main problem with transport interconnection is that such a model would strengthen the dominance of the largest operators since both directions of the traffic - termination into large network and termination to other operators' network - have to be paid for by the other, smaller operator.
The simplest model might be SBC interconnection with a dedicated line in between and cost sharing of this line either by traffic balance or equal distribution. If SBCs are connected through the Internet or public peering points, QoS might not be entirely ensured.

B&K might be suited as a wholesale charging mechanism, but it does not necessarily solve the problem of cost distribution for the connection between the two networks.

In summary, B&K is not an automatic panacea for all issues covered in the ERG consultation document and in our view further deeper study of the concept and its practical consequences is required than has currently been undertaken before robust conclusions can be drawn, or before a regulatory approach can properly be formulated for implementation in the medium term.

On a preliminary basis in circumstances where the glidepath to symmetric termination rates has been reached, regulated bill and keep between the incumbent and smaller fixed competitors could be appropriate in addressing the dominance of the incumbent due to its significantly higher share of subscribers in an NGN context. It would be reasonable in this case to stipulate a minimum number of interconnect points to protect incentives to invest. Elsewhere, it seems that operators with equal or very similar

bargaining power (i.e. similar customer base and traffic) should be able to agree bilaterally on their favoured wholesale charging regime and do not need to be subject to ex ante regulation in this respect.

Voluntary B&K assumes reasonably balanced traffic; there is an incentive on an originating operator not to flood the network of a terminating operator with traffic, lest the same happen to them.

For transit there would still need to be a revenue flow, albeit probably net bandwidth / sessions related rather than each party paying gross on a price per minute basis.

8) Do you see other areas (potential bottlenecks) for regulatory intervention?

Much of the issue at present is that inevitably there is scope for creation of new bottlenecks, but it is difficult to predict what they are. For example:

A. Authentication: does the network with the largest number of end-users become able to leverage this to be the "trusted central party" to establish that a user is who they say they are? With that, can this network leverage power onto other markets where customer authorisation is key?

B. Presence: does the network with the largest number of end-users gain competitive advantage through the ability to provide tailored services according to the location/status of the user?

It is mentioned that in the context of internet-based services the players have chosen to co-operate. A belief that this would also happen in industrial scale NGNs appears somewhat naïve.

This also brings in the question of "network hooks" versus "common capability". For example in authentication, do competing NGNs require access directly at a network level to allow a user on NGN-A authenticate via NGN-B's system (network hook), or is it a system level interconnect so that all users on NGN-A are authenticated by NGN-A's system, which communicates this to NGN-B (common capability).

Another important issue might be location information used to differentiate in importance, once the completion of the call itself stops being the sole valuable product.

9) a) Do you consider sufficient to potentially regulate minimum quality (Art. 22 USD new para 3)? b) Does this require additional regulation at the wholesale level?

It seems apparent that regulation is required to ensure that operators afford the same QoS to off-net calls as they do to their on-net calls, but otherwise there seems little need to mandate minimum quality levels per se; the market will decide, with a possibility for the NRA to intervene to resolve disputes. The issue of affording higher quality within the SMP operator's own network could be addressed for instance by an appropriately detailed non-discrimination obligation imposed by the NRAs on SMP operators.

If minimum QoS standards are to be designed for certain services, they should be developed by the industry. QoS requirements at a transportation level are appropriately dealt with by standards bodies under well established processes. If this cannot be done by industry then some form of regulatory intervention may be necessary: this should be a backstop rather than proactive measure.

c) What is your opinion on ERG's consideration that the power to set minimum quality of service requirements (both, on end-user and network level) should be entrusted directly to NRAs?

A harmonised, European approach would be optimal, but seems to be difficult to achieve since minimum quality is significantly driven by technology.

Different interpretations in different member states might have detrimental effects on
- pan-european operators that have to acquire and operate different technical variations within their equipment, which increases their costs and

- variations drive up equipment costs with global vendors, reducing competitiveness of European operators and the businesses they serve.

10) a) Do you agree with the description of the relevant change regarding the cost level, the cost drivers and the cost structure?

Not entirely. Likely cost drivers are peak bandwidth for transmission elements (which can be links or tunnels dedicated to a particular class of traffic), and maximum number of concurrent sessions for application layer control equipment (NB these are not directly related, because in an NGN regime there is no longer a fixed bandwidth per call so a given bandwidth could be supporting many or very few calls. This could imply a move away from price per minute to another regime.

However, price per minute has *never* been a transparent proxy for call charging. Even in TDM/PSTN, costs have always been predominately driven by the maximum Erlangs and BHCA offered. Price per minute was utilised because it provided a convenient mapping from retail tariffs.

Set against this backdrop, any move away from price per minute to a different regime needs to be carefully considered, to establish whether it warrants costly redesign of accounting systems.

b) For a pricing regime under CPNP, which of the wholesale pricing regimes (EBC or CBC) do you consider more appropriate for IP interconnection?

The characterisation of EBC versus CBC is not one that we would recognise or believe appropriate. Even in an IP world, linkage of wholesale pricing with the number of network elements traversed makes sense (a spurious argument often presented is that the dynamic nature of IP networks means that the exact network path taken by a given IP network cannot be predicted. For far-end-handover, however, it is usually pretty clear what trajectory the vast majority of IP packets will take through the network. In this context, even if the unit of measurement is bandwidth rather than price per minute, it makes sense that the more network elements are consumed in terminating traffic, the higher the

wholesale charge should be. CBC and EBC are therefore complementary, not alternatives as presented in the document.

There could be merit in incorporating elements of scale into the charging regime. For example, the "cost per bit" of supporting a large interconnect pipe or tunnel is lower than that of supporting a smaller pipe or tunnel. In a bandwidth-related model, this would imply a degree of non-linearity, in price per minute, volume-based discounts.

11) a) How do you assess the arguments with regard to the properties of the charging mechanisms CPNP and Bill & Keep raised in the sections C.6.2 – C.6.10?

There are several arguments both in favour and against the use of Bill and Keep. While the ERG's consultation paper appears to favour it we have highlighted some important arguments both favouring and against its introduction in our answer to question 7. Our members have different views on this subject, but what seems clear is that a much deeper analysis of this option is required.

b) How can the migration process towards all-IP infrastructures be alleviated for the following options:

1) ***long term goal CPNP,***
2) ***long term goal Bill & Keep? How do you***

evaluate the measures and options discussed here? Please also consider problems of practical implementation.

In general and in theory, termination rates close to cost seem to be a good solution for both long term goals.

It is an important precondition of a fair NGN accounting system that fixed and mobile termination rates are cost based and differ only to the extent justified by objective differences in their relative costs.
Otherwise there is a grave risk of aggravating the current situation of fixed-only competitive operators that are not members of integrated fixed-mobile corporate groups and a risk that the market would revert to a tight oligopoly. If NRAs concur with the glide path process for CPNP described in the document, the relative value of a termination minute will favour mobile operators even more, expanding today's imbalance and further undermining the competitiveness of fixed operators in a converging environment.

c) Assuming that different charging mechanisms would apply in different Member States: would this imply specific problems (e.g. arbitrage)? If so, how could they be addressed?

> Arbitrage problems may in theory exist, but one needs to differentiate between economically desirable arbitrage (increasing overall welfare) and economically undesirable arbitrage. If we think about the low incremental costs of "NGN minutes", economically undesirable may not constitute a significant problem. If there were such a problem, US mobile operators would have had massive problems with international arbitrage already.

Practical applications will certainly be call-back services from countries outside the B&K zone, endangering revenues from international calls. The practical implication of the Commission's draft recommendation, i.e. termination charges based an incremental, not on average cost will have the same effect. If one would want to differentiate now between national/European and international traffic (based on the E.164 number of the originator), the old termination problem might re-emerge, but will be limited by the bargaining power of the international counterparty at the border. As many national operators will compete for international traffic, rates may come down, too. But the termination monopoly problem may persist in national transit cases, as the final terminating network for the internationally originated call may want a fee from the national transit network.