

OTE is pleased to contribute to the public consultation launched by ERG on the issue of Regulatory Principles of IP-IC/NGN Core. With its commitment in making investments, promoting innovative solutions and services in the Greek market, OTE S.A. (Hellenic Telecommunications Organization), the incumbent telecommunications provider in Greece, is deeply concerned about ERG's current assessment of IP Interconnection and Next Generation Networks.

1. General Comments

OTE would like to raise some general comments on the assumptions made for the deployment of NGNs and the potential regulatory implications:

- NGNs network deployments are and will continue to be characterised by uncertainty: uncertainty over the optimal pace of transition to NGN, over the future interconnection arrangements of networks (both PSTN-NGN and NGN-NGN) and, most importantly, over the demand for next generation services by consumers. Since services and business models have not been established in the market, investments in fully fledged next generation infrastructures are considered of high risk. This should be borne in mind when considering another uncertainty – that of regulatory intervention. Inappropriate regulatory intervention endangers delaying innovation and investment in NGNs.
- Any regulatory approach should take into account that the deployment of NGNs is not an investment relevant only to fixed incumbent operators, but to all players. If this parameter is not acknowledged, there is a high risk that regulation applied to traditional PSTN networks and services will “spill-over” into the NGN sphere and is likely to create market winners and losers due to regulatory intervention and not due to efficient competition.
- Introducing interconnection regulation, before services and corresponding markets have adequately matured, could have the effect of regulating one part of the value chain, preventing the market from finding a workable solution suitable for new business models. An extension of the sector-specific interconnection regime for telephony into the IP world seems to be inappropriate.
- Interconnection arrangements should in principle be left to market parties and only when there is a market failure NRA should intervene.
- Quality of Service is an essential part of electronic communication services both at the wholesale and the retail level. In an NGN world, QoS can be expected to be an important differentiating factor in competition. Different services and markets for low quality and for high quality may develop. Generally, the market players should be left to determine prices and conditions in the context of QoS.
- The consultation document acknowledges the uncertainty of business development in NGN and its implications. The arguments in the analysis are based on presumptions (the word “could” is quoted 113 times, the word “may” 249) and ERG recognises that it is based on limited information. This already signals that it is too early to derive any concrete conclusions

on the need of regulatory intervention. OTE questions the value of delivering any regulatory Recommendation at this stage, established on completely hypothetical conditions.

1. A.4.1 Separation of transport and service

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?

It raises concerns why ERG has conducted the analysis on IP interconnection, based on definitions of transport interconnection and service interconnection different from the definitions provided by the relevant European standardisation bodies.

ERG acknowledges that the ETSI/TISPAN's definition of 'service oriented interconnection' includes also transport related information. The ETSI/TISPAN'S definition, apart from being the defined as a part of a standard, correctly describes the term since NGNs are not a sum of independent layers. The typical presentation of NGN architecture, as a set of separate layers each one providing specific network functionalities, can be misleading as it suggests that there could be different kind of operators operating different layers. This has not been the case with the OSI-model and may not be the case with NGNs. In fact, a next generation network operator will manage a set of layers since these layers are interlinked, when providing services supported by the NGN. It has to be mentioned that the ETSI/TISPAN specification does not exclude the possibility of providing interconnection at specific functional levels.

It is important to mention that multiple interconnection provisions, defined at several layers of the network would add significantly to total network costs for all services and operators, failing to benefit from economies of scale and scope in providing services and applications. It is also likely to create a strong disincentive for investments in upstream infrastructures. Furthermore, it is unclear how such a separation of transport and service level can assure and guarantee service specific quality of service and security to the customer especially to offer a substitute for PSTN services (in particular voice services), a point also raised by ERG¹. Finally it is important to mention that with separated transport and service levels other regulatory obligations (e.g. legal interception, security issues) could not be fulfilled.

2. A. 6 Structure of the document

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

¹ See ERG (2008), Consultation Document on Regulatory Principles of IP-IC/NGN Core, p. 3.

The discussion about the optimal interconnection regime does not sufficiently take the aspect of investment incentives into account which is an objective of Article 8 (2) (c)) Framework Directive. In this context it has to be stated that the analysis of Bill & Keep is mainly focused on the elimination of the termination monopoly and the decrease of transaction costs for the NRAs.

Further analysis of the following aspects is needed:

- Investment incentives in QoS under Bill & Keep-Regime
- Effects of Bill & Keep on added value services (e.g. Premium rate services).

3. B.3.3.1 Number of network nodes and points of interconnection (Pol)

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

The development and implementation of IP-based NGNs is in early stages and the final network architecture is not known today. So, no definitive statement about the future network structure (number of network nodes and / or points of interconnection in NGN) can currently be made.

ERG rightly is of the opinion that interconnection points will be more central since traffic in an IP-network in general becomes less dependent on distance and the capacity and processing power of modern network equipment has increased significantly compared to current PSTN networks. Therefore the efficient amount of Pol in a NGN will generally be substantially lower than in current PSTN networks. More precise statements currently cannot be factual.

4. B.3.3.2 Definition of local interconnection

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

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)?

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

As also mentioned in the document it is inefficient both in economic terms and technical implementations, while it could even be technically impossible, to interconnect at the lowest level of the NGN network (e.g. MSAN). Moreover as mentioned the NGN is a more centralized network and the influence of distance on cost is less relevant so the today's network levels. Local, regional, national definitions of PSTN interconnection may not be applicable for the NGN.

5. C.1 Existing and proposed Framework

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

Both the current and the proposed Framework require for a regulatory intervention when there is a clear market failure identified. Markets susceptible for ex ante analysis are being updated regularly by the European Commission. Markets are defined based on services, retail and equivalent wholesale and not on the technologies used to offer the services (technology neutrality). This framework is adequate to address NGNs and NGNs should be studied under this framework. This is not the case in the current consultation document. NGN is a technology that will be used to offer existing services (i.e. voice services) and expectantly new services, irrespective of the access network (fixed, wireless, mobile). The existing markets might need to be redefined (i.e. one market for voice services) and then if market failures are identified remedies will be applied. The approach of defining an ex-ante NGN SMP is not suitable to NGNs and appears to be a “spill over” of existing regulation of PSTN voice services.

The development and implementation of IP-based NGN is still at its initial stage and there is no clear information about how the network architecture of the NGN-only world will look like and what will be the possible services offered that will attract consumers. Therefore the development of NGNs should be left to market forces under competition rules and intervention restricted to when there is a market failure.

Interconnection, as defined in the document, is the physical and logical linking of public communications networks used by the same or a different undertaking in order to allow the users of one undertaking to communicate with users of the same or another undertaking. Therefore interconnection regulation has been introduced to solve the issue of “termination monopoly”. This will still be an issue that might need to be addressed by regulators under a CPNP regime, if market forces fail to address it. The proposal to extend the scope of Interconnection and redefine the term “call” in order to include access to service and not communication between “peers” does not address the issue of termination monopoly, but the issue of “origination” in order to have access to other network’s services. Access to services should be analysed under the current and the new framework and should be regulated only if there is a well defined market failure (for example carrier pre-selection is a remedy imposed to operators having SMP in the market of call origination on the public telephone network provided at a fixed location). OTE is of the opinion that the analysis of the Regulatory Principles of IP-IC/NGN core in this document are not in line with the current and proposed Framework.

6. C.3.1 Interoperability issues

What type of interoperability requirement do you consider necessary?

In order to develop fully interoperable solutions, participation to relevant standardisation bodies should be encouraged. This approach will lead to an effective interoperable multi-service NGN environment.

7. C. 3.2 Impact of charging mechanisms on transport bottlenecks

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

8. C.3 Bottlenecks and SMP positions

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

As already mentioned the only potential bottleneck that might need to be addressed is the “termination monopoly” issue, only if market forces fail to address it. The “termination monopoly” relates to the requirement to provide interconnection, which “is the physical and logical linking of public communications networks used by the same or a different undertaking in order to allow the users of one undertaking to communicate with users of the same or another undertaking”.

9. C.4.2 Measures based on USO directive

- 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?**
- 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?**

The issue of minimum quality of service, both in retail and wholesale level, will need to be addressed only if there are consistent failures (i.e. complaints of customers etc). NRAs should monitor quality and should provide end users with the tools to be able to select between providers based on prices and quality.

10. C.5 Costing and Pricing

- a.) Do you agree with the description of the relevant change regarding to cost level, the cost drivers and the cost structure?**
- b.) For a pricing regime under CPNP, which of the wholesale pricing regimes (EBC or CBC) do you consider more appropriate for IP Interconnection?**

As already mentioned the development of NGN is still at the beginning in nearly all member states, so no definite conclusions about the cost level, the cost drivers and the cost structure of a NGN can be made.

OTE is convinced that it is early to assume that NGN deployment will lead to lower costs than current PSTN networks because of its high initial investment costs and uncertainty over future demand for services.

Moreover ERG claims that during the migration period any stranded legacy assets or costs related with the sub-optimal use of capacity should not be taken into account. The consultation document, also, states that the costing approach will be based on the costs of an efficient operator and therefore the core part of the network should be NGN-based. This assumption, in our point of view is questionable and over simplistic, since it does not take into account the fact that most operators employing NGNs will do so over an extended period in order to achieve maximum efficiency. NGN technology is still considered not fully matured and NGNs implementations currently present technological uncertainties (e.g. interoperability issues, QoS etc), while the promising new services still have to demonstrate the awaited success. Therefore operators will employ both legacy PSTN networks and Next Generation Networks over an extensive migration period. This deployment approach by no means should be considered as inefficient. In principle the cost model should be based on efficient technologies available in the timeframe considered by the model and the efficient approach is a gradual migration approach.

Finally it should be mentioned that in the migration period the pricing regime for NGN-interconnection has to be set in a way that arbitrage between NGN-Interconnection and PSTN-interconnection is avoided.

11. C.6 Charging mechanisms

- 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?**
- b.) How can the migration process towards all-IP infrastructure 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.**
- 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?**
- d.) Do you consider that the issues mentioned here are comprehensive with regard to the application of Bill & Keep for IP-Interconnection?**

As a starting point we would like to mention that any analysis on NGN-interconnection issues should differentiate between NGN-interconnection in an All-IP-World and NGN-interconnection in the migration period when present and new network technologies exist in parallel (e.g. PSTN and NGN).

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

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

These objectives would be best achieved by privately negotiated arrangements. As stated by Ronald Coase, who received the Nobel Prize in Economics in 1991, privately negotiated arrangements are frequently superior to regulated arrangements².

Within the consultation document two different wholesale charging principles are mainly being discussed: the Calling Party's Network Pays principle currently used in PSTN networks and Bill & Keep. OTE views are that there is no IP interconnection model that can be defined as being superior under all circumstances and that regulators should be careful when imposing any particular IP interconnection charging model. CPNP is likely to be superior in most cases, but under certain conditions Bill & Keep can be advantageous. Through NGNs a wide range of services could be provided, with diverse retail pricing models (including QoS differentiation) and wholesale pricing must support that diversity, if it is to sustain efficiency and innovation in retail markets. Thus, the industry should be let to set the IP interconnection charging model under competition rules while regulators should be allowed to intervene only when market failures are clearly defined.

In today's PSTN networks, CPNP is the most commonly employed wholesale charging mechanism. This mechanism is seen as being economically efficient, since:

- Ideally, pricing should be such that it encourages only the calls that would pass a cost-benefit test. That is, the only calls placed should be those where the combined benefit (to both parties) exceeds the total costs to all networks involved in the delivery. But precise measurement of the benefit allocation is difficult, and billing additional parties imposes transaction costs, so practical considerations often dictate that only one party pays even though benefits are likely shared. The most efficient party to pay is the one for whom there is sufficient benefit available to induce them to place all (or most) of the socially desirable calls that they might initiate.
- Having as a basic principle that at the wholesale level, the primary beneficiary will be the CP which has the primary retail beneficiary as client, it can be supported that the initiator of a call (or the sender of a message) always expects to receive some benefit (positive utility) from the call, if it is completed (accepted) by the called party. In this case the CPNP appears to be the most suitable model as the primary beneficiary is the calling party. If we extend the analysis so that it is more general, then the party who expects to receive the most benefit at the time the call is placed (message sent) can efficiently subsidise the other party's direct costs.

² See WIK Consult (2008), The Future of IP Interconnection: Technical, Economic, and Public Policy Aspects, Study for the European Commission, p. 5.

- Due to the fact that network usage is always paid for, the CPNP-principle has the advantage that network operators can recover their costs. This gives the necessary incentives for investments especially to improve network quality. Moreover CPNP induces efficient network usage as every network operator has the incentive to route the traffic as long as possible in his own network.

In case the average benefit is approximately equal to both parties the costs of the call should be split respectively. B&K reflects the circumstance where the distribution of costs aligns exactly with the distribution of benefits. Then it is efficient to pay no interconnect fee at all. The disadvantages of Bill & Keep derive from the fact that there are only limited conditions under which it yields efficient market results:

- Bill & Keep can be a superior model only under very limited conditions: balanced traffic between peers; and where network costs equal retail customers benefits. If symmetry is not fulfilled in a Bill & Keep-relationship, larger networks are disadvantaged because they bear higher network costs than small networks, which is the case if the market structure – for example in the fixed telephone sector – is very heterogeneous.
- In most cases, Bill & Keep leads to market distortions and damages efficiency. With zero interconnect revenues, networks must recover all costs from their own customers and this usually leads to inefficient retail pricing.
- Because Bill & Keep is inflexible, it can lead to the “hot-potato” problem. The result is network structure bias: costs are pushed onto other networks. If costs are under-recovered, networks will under-invest.
- Applying Bill & Keep to services like telephony – where CPNP is the historic model – would create confusion to retail pricing models and major transitional issues for customers.
- Bill & Keep fosters the problem of SPIT (Spam over internet telephony) and SPAM.
- These inefficiencies are likely to be amplified in a QoS world, where network costs are greater (so the un-recovered costs would be larger).

It has to be mentioned that Bill & Keep exhibits a number of advantages. It avoids transaction costs between operators in case of symmetric traffic between peers. However, this benefit can be offset if strategic behaviours (e.g. the “hot potato” problem) and traffic balance need to be monitored to check whether the conditions in which Bill & Keep is efficient still hold. Any model that “locks in” a static price (as does Bill & Keep, with a zero price) risks becoming inefficient, even if it is efficient to begin with. Furthermore, existing billing systems will further be necessary for billing the traffic to specific service numbers (e.g. freephone numbers or premium rate services) or the traffic of network operators who have not realized the maximum amount of points of interconnection set by the NRA. Another advantage, acknowledged as most valuable by regulators, is that Bill & Keep wholesale charging model removes termination monopoly issues, and as a consequence reduces the need for regulation.

Last but not least the effect of the Bill & Keep wholesale charging model on the Universal Service has not been taken into consideration. Network costs are radically different for providers supplying

services and competing only to highly populated areas with reduced network costs and providers supplying services to the whole of a country. If Bill & Keep was to be introduced under such a circumstance the additional cost incurred to a Universal Service provider should be compensated by all service providers.

Based on the above OTE would like to conclude that:

- There is no IP interconnection model that can be defined as being superior under all circumstances
- Regulators should be careful when imposing any particular IP interconnection charging model.
- The industry should be let to set the IP interconnection charging model under competition rules while regulators should be allowed to intervene only when market failures are clearly defined.