ERG Consultation Document on Regulatory Principles of IP-IC/NGN Core
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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 is unclear at this stage to which degree transport and service will be separated. Certain services, especially voice services have high quality requirements. It's only possible to meet these requirements if the transport-level provides the in each case needed quality. In public internet these function are not available, just because the transport- and the service-level are completely separated. Totally separated levels are not appropriate to offer voice services, since promised quality on the service-level can only be provided on the transport-level if both levels act in a co-ordinated manner. Therefore, interaction between the transport- and the service-level is required to realise service-related needs efficiently.

If a certain quality of service is not required, separation of transport and service is probably a realistic solution. Actually this is the situation nowadays, e.g. with "voice over internet"-services. This solution allows separated interconnections for the transport- and the service-level.

Arcor expects competition of transport networks without a SMP-operator. Therefore it is not necessary to implement ex ante regulation for the transport-level. Supply of transport will take place on a voluntary basis in an competitive market environment.

Beside the transport- and the service-level, there is additionally a control-level that directs the technical-level. Service companies should not be granted access to the control-level of other companies. It is not necessary because competition between transport networks will lead to a good result also for service operators. Also the network sovereignty of NGN operators must be respected because otherwise they can not guarantee efficient transport.

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. Regarding arbitrage problems, the document focuses on such possibilities between a CPNP- and a bill & keep-regime. Arcor's concern is more on arbitrage-possibilities of operators of voice services without an own network ("voice over internet; VoInt"). These operators have the possibility to receive termination charges even though they do neither produce nor pay for the transport.

   Costs of the concentrator-network of the network operator are not covered by the VoInt-service operator, though this operators charges full termination fees. These costs have to be

covered by the network operator that offers access to the costumers, though it is not able to receive termination charges. ERG should focus on this arbitrage possibility as well.

2. Transport- and/or service-charges should depend on the quality that is offered and needed, in the case of transport-interconnection as well as in the case of service-interconnection. Different qualities induce different costs which must be reflected in the structure of charges. Only identical qualities cause identical costs that must be covered by identical charges.

3. *B.3.3.1 Number of network nodes and points of interconnection (PoI))*
Can you make more precise statements on the number of network nodes and/or points of interconnection in NGNs?

At present it is not possible to make a final statement about the expected number of network nodes and points of interconnection, because the portfolio of services and technical realisation is not clear until now. The number of points of interconnection depends on the

- necessary bandwidth for services
- development of cost-relation between switching and transmission technology
- requirements for network security or network failure security in NGN

However, the number of PoI in NGN is smaller compared to PSTN at the beginning of the migration, because it will take some time until all traffic runs through the NGN.

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?

The concept of local interconnection is technology neutral. It is useful in an PSTN as well as in an NGN environment. Local interconnection can be defined as interconnection with data traffic passing only one switch and the costumer being assigned to this switch.

If there is one hierarchy level, "non local interconnection" takes place if data traffic passes through several switches and the called costumer is not assigned to the first switch.

However, with high data traffic as a result of data services, hierarchical net structures with different added values are useful. Multimedia applications require enormous bandwidths, so that regional networks will be necessary. Because of new, linear pricing models for wholesale products economies of scale get less important. Additionally we find the tendency to smaller BRAS devices, which helps to reduce costs of non-usage. This reduction of non-usage costs make a relative high number of PoI within the reasonable range and two hierarchy levels economically feasible.

If there is more than one hierarchy level, "non local interconnection" can be defined as interconnection

- where data traffic passes through several switches on the lower hierarchy level and the called costumer is not assigned to the first switch, or

- where data traffic is routed to an upper hierarchy level.

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)?

Principally all hierarchy level (router) are technically applicable, if the functionality of a SBC and a BRAS at the same or a lower level are existing. Therefore interconnection at the lowest level is appropriate.

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

If interconnection at a lower router level takes place, this maximum number of router is the equivalent.

Conceivable is a mixed EBC/DBC-model: Only if all router at the lowest level of interconnection are connected, the lowest interconnection-charge ("local tariff") has to be paid. Otherwise a higher charge ("non local tariff") has to be paid.

Within the local zone the relevant cost driver is the line between PoI and the relevant MDF (< in urban regions, > in rural regions). Thus higher costs of access of nation-wide operators can be reflected adequately.

5. *C.1 Existing and proposed Framework*
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 suite to address the specific challenges that these present?

On the transport level and in the absence of SMP, it is unlikely that an operator would try to limit interoperability or interconnection. Any anti-competitive behaviour would mainly end up harming the operator itself. Therefore the preconditions for regulatory intervention should be kept unchanged. However, the remedies must be completed with an obligation to interconnect on the service-level. Especially an interconnection between sip server should be mandatory (on request). Arcor believes this is the only feasible possibility to avoid arbitrage problems (see 2. A.6 Structure of the document). Sip server interconnection would enable the terminating infrastructure-based operator to identify a called costumer and to terminate a call at the transport-level. The forced bundling of sip server interconnection and transport as well as the arbitrage problem would be avoided (for a more detailed description of sip server interconnection see answer to question 8).

6. *C.3.1 Interoperability issues*
What type of interoperability requirement do you consider necessary?

For an any-to-any-communication between different networks, definitions of technical standards are necessary, e.g. IP-protocols, codecs, QoS-classes etc. This is desirable to reduce the expenditures of interconnection-services. In Germany standardisation of ETSI/TISPAN is used in a working group of the telecommunications operators and manufacturers ("AKNN") to guarantee the interoperability between NGN, based on a minimum standard with focus on the guarantee of QoS.

Quality of service can be guaranteed by several means:

1. Overdimensioning / overprovisioning: The bandwidth offered is in any part of the network <u>always</u> enough to meet the demand fully. This is often the model for capacity planning today. It is possible because the services today often don't need a high quality. This method of capacity planning will not be efficient in the future, since traffic is increasing rapidly and especially voice services need a higher quality of service.

2. Prioritisation: Prioritisation of IP-packets enhance the quality of transport of prioritised IP-packets compared to non-prioritised IP-packets. The service level must demand prioritisation from the transport level. In certain cases prioritization can assure the needed quality of transport, that is necessary for voice services. If there is even not enough bandwidth for voice services in the highest QoS-class, there will be derogation in voice services even with prioritisation.

3. „Control of bandwidth" (e.g. reservation of a defined bandwidth for voice services including call admission control or resource admission control): Voice services get inarticulately if there is not enough bandwidth even for a short moment. High-quality voice services and other real-time services get useless if quality is below a certain standard. „Control of bandwidth" prohibits this if the service-level is informed about the available bandwidth on the transport-level and only connects a call, if the necessary bandwidth is available.

„Control of bandwidth" is the prime method to guarantee QoS on the transport level at interconnection interface. Furthermore, QoS must also be guaranteed from end-to-end, but how this is achieved within a network is left to the actual operator.

7. *C.3.2 Impact of charging mechanism on transport bottlenecks*
How do you assess different wholesale charging mechanisms in the light of the transport-related bottlenecks?

Arcor expects that in general no wholesale charging mechanism implies transport related bottlenecks. Because of competition on the retail level DSL-operators are forced to supply enough transport capacity to their costumers. These market forces (on the retail level) are independent from charging mechanisms (on the wholesale level).

8. *C.3 Bottlenecks and SMP positions*
Do you see other areas (potential bottlenecks) for regulatory intervention?

Access-obligations for different services are necessary, so that unbundled services can be used. This comprises the access to the sip server of the called party. An interconnection for sip signalling is necessary to provide voice services over the public internet. The VoInt-operator replies by transmitting the dynamic IP-address that is associated with the called E-164 number. After receiving the IP-address RTP voice data streams are transferred between both parties.

An access-obligation to the sip server is necessary, because only the called VoInt-operator possesses the possibility to address the costumer by knowing the linkage of the E-164 number with the associated IP-address. Because the VoInt-operator does not have a managed IP-network to offer QoS, he is not able to offer (NGN-)termination. The costumer receives this termination from the operator offering access (often DSL) and has already paid for it by flat rate or capacity-based charges. Therefore only the costs for access to the sip server can be charged on the wholesale-level.

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)?

Arcor assesses that there are no current problems that would justify additional quality regulation. Regulation of minimum quality is not necessary, because competition at the retail-level effectuates the demanded minimum quality. There is no justification for regulated minimum QoS in competitive markets where customers can exercise choice – indeed such regulation may end up harming customers through limiting the price/quality choices available to them.

Arcor points out that the current "recommendation on relevant markets" has reduced significantly the number of markets that are due to ex ante regulation. The premise for the reduction was that beside the access to the public telephone network there is usually no significant market power. Without an SMP-operator there is no reason to be apprehensive that operators have the possibility to reduce quality.

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, like working groups of telecommunications operators and manufacturers ("AKNN" in Germany).

b) Does this require additional regulation at the wholesale level?

See answer to a): No.

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?

See answer to a): No.

10. *C.5 Costing and Pricing*
a) Do you agree with the description of the relevant change regarding the cost level, the cost drivers and the cost structure?

Generally speaking the description of ERG comprehend all relevant changes. Beside that it is to note that the implementation of Next Generation Networks involves substantial investments by network operators and significant risk. While NGNs may result in lower variable costs in supplying services, very significant fixed costs are incurred in NGN construction and operators also need to recover their fixed and common costs.

Additionally Arcor suggests to (re)conceive

- the statement about lower hierarchy level and a small number of network components. This is only true, if only voice services are considered in a short term.

- step costs for QoS and further services. They are not considered adequately.

- the position of ERG, operators should not have the possibility to claim costs for NGN and TDM during the migration period. It is to note that advantages is the cost structure occur only in the long run, because of the necessary parallel operation of both networks. This parallel operation causes significant real costs that should be incorporated in a gliding-path.

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

See answer to 4 c)