COMMON POSITION ON VoIP (DRAFT)

of the ERG

High Level Policy Task Force on VoIP

Background

The ERG 18th Plenary Meeting held in Madeira (5-6 October 2006) concluded that the ERG members undertake to review and keep up to date the priority areas for harmonisation. Priority will be given to broadband access markets, termination markets, **VoIP** and cross-border services.

The Plenary decided to adopt as priority areas for harmonisation **VoIP** as this is a key area where the pan-European potential deployment is prevented by non-alignment of national regulations; it is also felt that increasing use of NGN and IP will worsen the existing situation unless proper measures are undertaken.

During the Plenary meeting of Madeira the ERG report on "VoIP consumer aspects ERG (06) 39" was presented.

This report deals with VoIP issues from a consumer perspective. It reveals that the regulatory requirements for VoIP (i.e. emergency services, numbering and number portability, tariffs, quality of service, cross border issues) vary considerably across Europe.
The Plenary approved the report for publication, and invited further work to consider which steps ERG should take to make the regulatory conditions for European VoIP providers more harmonised.

According to Madeira final declaration the ERG will implement its future work programme in a targeted fashion using dedicated project teams for individual work items.

At the 19th Plenary ERG Meeting of Bratislava (7-8 Dec 2006) a work carried out by PTS on *VoIP Harmonisation* was presented. The presentation outlined three critical issues:

● numbering and number portability (starting with discrepancies in the assignment of geographic and non-geographic numbers to PATS and non PATS providers);

● access to emergency services including cross border issues; and

● consumer information.

The ensuing discussion pointed out the difficulties of a harmonised approach on the ground of identifiable best practices. ERG decided to streamline work for 2007 by focussing on critical issues and inconsistent practices such as numbering management.

The **ERG/IRG Work Programme 2007** is built on three major topics, one of these is **Harmonisation**. The ERG will seek to boost harmonisation among its members and effectively contribute to the development of the single market. This will be pursued by identifying key priority areas for harmonisation, and effectively sharing regulatory best practices.

One of these areas is "VoIP", both in terms of interconnection (also taking stock of carry over activities on IP-IC) and horizontal issues of retail services provision.

At the Bruxelles plenary meeting, as far as Activities on **VoIP** are concerned**,** the Chair suggested to set up a "High level policy Task Force" on VoIP that builds on the technical work done by the EU PT and by the IP/NGN PT. It shall be made up of senior experts. They would have the task to draft a Common Position on

VoIP within the next 3 months and present it at the workshop of the Oslo Plenary (end of May). This would provide a response to stakeholders' requests for a common approach of ERG on VoIP. Such proposal was approved by the Plenary.

The Task Force started its activity in April 18th 2007, with a first meeting in Rome where the TF focus and work program was defined. During a second meeting, held in Rome as well (May 15th), the first conclusions on Numbering, NP, Access to 112 where agreed and a First Draft Index was defined. From May 15th until OSLO workshop (1 June 2007), it was defined the PRD and elaborated a first DRAFT Report. During the VoIP workshop in OSLO the first Draft Report on the VoIP ERG Common Position was presented to the ERG Plenary. During the third meeting in Lisbon the Task Force discussed a second Draft Report. From Lisbon meeting until the end of September a third and a fourth draft report where discussed.

1. INTRODUCTION

VoIP (Voice over Internet Protocol) consists in the delivery of voice and other services over networks based wholly or partly on Internet protocol (IP). As far as the IP based part of the network is concerned, the path of VoIP packets from the callers to the callees may travel public Internet segments, managed IP networks, or both. As a result the QoS (Quality of Service) may vary accordingly. The increased diffusion of VoIP services is parallel to the gradual shift of electronic communications networks towards IP-based networks and the migration to NGN.

VoIP itself is part of this migration as it emerges from an additional service or niche product to a real substitute of traditional telephony. This will lead to a complete replacement of the traditional telephony service by VoIP in the long run.

The consumer ERG report classifies the VoIP services in the following categories:

1. A service where E.164 numbers are not provided and from which there is no access to or from the PSTN. This case however includes different implementations: from pure *peer-to-peer*, based simply on a VoIP software which uses users' computers as nodes of the connection[1] to more centralized architectures based on call management servers, data bases and routers provided by the VoIP operator;

2. A service where there is outgoing access to the PSTN only and E.164 numbers are not provided[2];

3. A service where there is incoming access from the PSTN only and E.164 numbers are provided;

4. A service where there is incoming and outgoing access to the PSTN and E.164 numbers are provided.

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[1]   Different regulatory approaches are adopted by the Member States due to an uncertainty on the regulatory treatment of such services: it is not clear whether this case should be considered an electronic communication service (Framework Directive) that "*means a service normally provided for remuneration which consists wholly or mainly in the conveyance of signals on electronic communications networks, including telecommunications services….*" and where "*electronic communications network means transmission systems and, where applicable, switching or routing equipment and other resources which permit the conveyance of signals by wire, by radio, by optical….*".

[2]   With regard to Service 2, although it is possible technically to set up an outgoing call to the PSTN without having an E.164 number provided, it is not possible to fulfil some obligations that are mandatory for classical telephony services e.g. malicious call identification or lawful intercept.

	Outgoing access to PSTN	Incoming access to PSTN	E.164 number provided
Service 1	✘	✘	✘
Service 2	✓	✘	✘
Service 3	✘	✓	✓
Service 4	✓	✓	✓

The same classification has been used in the COCOM 05-52 questionnaire

The TF agrees that the above reported different VoIP categories should be taken into account in the new regulatory framework.

In the following of the present report the term **Telephony Service** refers in general to all services which allow the users to establish a call session for a real-time bidirectional voice communication (that may be combined with video and data) based on either circuit switched or packet switched technology, without any reference to the regulatory classification.

Furthermore, this report makes no specific differentiation between two distinct VoIP categories, that is Voice over Broadband (VoB) and Voice over Internet (VoI). Providers that offer VoB provide a VoIP service with a broadband service over their own network. VoI providers, on the other hand, offer a VoIP service only; the consumer has a broadband service from another supplier

2. WHERE AND WHY A HARMONIZED APPROACH TO VoIP REGULATION IS NECESSARY

In its 2005 Common Statement for VoIP regulatory approaches ERG argued for a pragmatic approach towards VoIP regulation in accordance with the objective of harmonisation whilst acknowledging that a one-size-fits-all-solution would not be suitable at this point.

At that time VoIP services began to spread and ERG wanted to enable the greatest possible level of innovation and competitive entry in the market. Meanwhile VoIP services are emerging. In its 2006 Report on VoIP and Consumer Issues ERG stated that VoIP services are becoming more common as electronic communications services are shifting to IP-based networks.

In the meantime, as migration to IP technology goes on, it becomes clear that VoIP is not only an additional service like it was in the beginning. VoIP will be the future telephony service replacing traditional PSTN telephony services one day. Hence a harmonized approach to VoIP regulation gains importance.

Identifying realistic opportunities for harmonisation is important since some issues (eg national emergency services, national numbering plans, ECS scope) might require more powers than those of NRAs, or a long time-frame.

To spot these opportunities it is worth considering the reasons why NRAs have taken different approaches. The principle drivers of different regulatory approaches appear to be:

- ✓ Electronic Communications Services (ECS) and Publicly Available Telephone Services (PATS) definitions – there are different ways of managing these definitions or even extending them;
- ✓ Network Termination Point (NTP) definition and its use in the geographic number definition;
- ✓ VoIP take-up (and thus whether intervention is justified on an admin priority or net-benefits basis);
- ✓ Structure of national numbering plans;
- ✓ Structure of national emergency services;
- ✓ The lack of user location indication capability in the current stage of standards' implementations on VoIP technologies and services.

Tackling these causes may not be a prerequisite to harmonisation, but harmonisation is an inevitable consequence of resolving these causes.

Main areas where a pan EU approach to regulation is required are:

➢ Numbering

In this area the result of current regulation is a disharmonised allocation and use of geographic numbers, against the increasing demand amongst consumers to use geographic numbers out of area (nomadic use). In fact, some member states permit out of area use and allocation of geographic numbers while others do not. In addition the use of non-geographic numbers specifically allocated to VoIP services is an option but could not be the primary choice for the market.

➢ Number Portability

Number portability between service providers is a consumer right already in current regulations. Following the EU Directive approach, it is considered as a right of PATS users and an obligation for PATS providers. At the same time not all VoIP services provided today can be classified as PATS. The result is that some users of VoIP services or VoIP providers can not take advantage from number portability. Furthermore, number portability is most useful when used with naked DSL because it enables users to port their PSTN number to their new VoIP service when they cancel their narrowband access line.

➢ Access to emergency services

The systems for handling emergency calls vary greatly between MS concerning both the technical solutions and legal requirements to manage location data from VoIP calls (localization of the caller) and routing of VoIP calls to the corresponding emergency response centres. In addition while PSTN fixed and mobile services are required to offer access to the emergency services, VoIP services are not. Although some VoIP providers offer emergency calls on a voluntary basis, there is a risk that VoIP users and other citizens are confused about whether they can access the emergency services from VoIP. That may result in delays in contacting the emergency services and increased harm or loss of life. Customer information is important but not sufficient to overcome this risk.

➢ In conclusion

VoIP offers a whole range of benefits to European consumers. Different regulation across MS has been justified in the beginning of VoIP diffusion. But with the further development, harmonized approaches are gaining importance and are necessary to ease the implementation of pan-European strategies and cross-border investment. The market and the consumers require ERG to introduce a common framework that ensures services available to consumers as a right regardless of the technology and the platform over which they are delivered. Lack of harmonisation risks hampering investments and consumer welfare.

With the aim to propose general high level recommendations/guidelines that should be able to allow a harmonized regulatory approach between member States this report is focusing on the following issues:

➢ **Numbering**

➢ **Number portability**

➢ **Access to emergency services**

➢ **Regulatory treatment of Wholesale services which impact on VoIP diffusion**

As above recalled, some current regulation differences between member states derive from PATS and ECS definition given in the 2002 USO Directive. Thus, the present report provides some suggestions to overcome the current difficulties in deriving a consistent VoIP regulatory framework.

Finally, the possibility for VoIP providers and for the end users to be located anywhere in the world (i.e., the service provider and the user can be in different countries) might create, for specific cases,

problems of jurisdiction such as which Member State is entitled to impose its regulation to a VoIP service provider located in a different country and how can this regulation be enforced. An analysis of cross border issues, which are considered by the Task Force relevant in the contest of harmonization, will be provided.

3. ACCESS TO EMERGENCY SERVICES

The considerations in this chapter apply with the following assumptions[3] and restrictions:

(1) PSAPs (Public Safety Answering Point) have a PSTN network access and are reached at 112 and any national emergency telephone numbers for the reception of location information PSAPs may be equipped with a data network access;

(2) Only service categories 2 and 4 (outgoing access to PSTN) from the table in section 1 are considered.

3.1. Regulatory background

The present legal framework sets out a number of obligations concerning access to emergency services (Universal Service Directive - 2002/22/EC) addressed to specific electronic communication services and network providers. However, such obligations typically contain only very high level provisions governing access to emergency services.

In particular **according to article 2 "**publicly available telephone service means a service available to the public for originating and receiving national and international calls **and access to emergency services through a number or numbers in a national or international telephone numbering plan**….";

Article 26 (Single European emergency call number) requires that "

1. Member States shall ensure that, in addition to any other national emergency call numbers specified by the national regulatory authorities, **all end-users of publicly available telephone services**, including users of public pay telephones, **are able to call the emergency services free of charge[4], by using the single European emergency call number "112"**.

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[3]   Directive 2002/21/EC (Framework Directive), Directive 2002/19/EC (Access Directive), Directive 2002/20/EC (Authorisation Directive), Directive 2002/22/EC (Universal Service Directive), Directive 2002/58/EC (ePrivacy Directive). In addition, the R&TTE Directive (1999/95/EC) deals with obligations to be imposed on manufacturers relative to the terminal equipment features required to ensure access to emergency services (Art.3 (e)) and/or to facilitate its use by users with a disability (Art.3 (f)). VoIP telephone sets need to be able to dial digits 0 9; modern softphones communicating with alternative addressing schemes (e.g. SIP-URI) may be considered, too, and require a destination address translation from the alternative addressing scheme to 112 in E.164;

[4]   Note (i) "free of charge" does not imply "without coins" or without any other means of payment, e.g. calling card. Sometimes public pay phones offer access to telephony service only when a means of payment has been inserted although the service is free of charge. We are of the opinion that emergency calling should be possible without presenting any means of payment. (ii) Usually telephony service providers barr outgoing calls if previous bills have not been settled. Some VoIP service providers offer their services with prepaid agreements only. Access to emergency services should be possible even if the deposit is zero or negative.

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2. Member States shall ensure that calls to the single European emergency call number "112" are appropriately answered and handled in a manner best suited to the national organisation of emergency systems and within the technological possibilities of the networks.

3. Member States shall ensure that **undertakings which operate public telephone networks make caller location information available to authorities handling emergencies, to the extent technically feasible**, for all calls to the single European emergency call number "112".

4. Member States shall ensure that citizens are adequately informed about the existence and use of the single European emergency call number "112". "

3.2. On the legal basis to mandate access to emergency services to telephony services

According to the regulatory framework recalled above only PATS providers are obliged to guarantee access to emergency services. Furthermore, there is circularity in the PATS definition meaning that although PATS providers are required to offer emergency calls, providers only become PATS if they offer emergency calls. Category 2 VoIP services cannot become PATS because they only offer a one-way service. It follows that emergency services access is only available from some VoIP services, when it's available from all PSTN fixed and mobile services. There is a risk of discrimination between VoIP users because users of similar services could have fewer rights than others. There is also a risk that VoIP users and other citizens will be confused about whether they can access the emergency services from VoIP, which may result in delays and increased harm or loss of life.

Recitals (12) and (36) of the Universal Service Directive state that:

"*For the citizen, it is important for there to be adequate provision of public pay telephones, and for users to be able to call emergency telephone numbers and, in particular, the single European emergency call number ("112") free of charge from any telephone, including public pay telephones, without the use of any means of payment. Insufficient information about the existence of "112" deprives citizens of the additional safety ensured by the existence of this number at European level especially during their travel in other Member States*";

"*It is important that users should be able to call the single European emergency number "112", and any other national emergency telephone numbers, free of charge, from any telephone, including public pay telephones, without the use of any means of payment….*"

Thus the possibility to access emergency telephone numbers is foreseen as a right of all citizens.

Probably, according to the above reported general principle which sees the user protection as a priority, some NRAs have mandated access to emergency services also to ECS VoIP services when they allow to call PSTN numbers (as an example this is what happens in Portugal, Italy, Spain. In particular Italy and Spain both define a special category of ECS, called "nomadic vocal services", with specific obligations).

Many VoIP providers have accepted that decision as a positive one, provided the regulator recognises that routing and localisation cannot currently be provided with the same level of reliability as over PSTN services. They also have concerns when providing access to the emergency services since they have to comply with burdensome PATS obligations, including the authorisation contributions.

A possible solution would be to impose the obligation to allow free access to the emergency services, i.e. extend the obligation under Article 26.1 of the Universal Service Directive to all telephony service providers that allow access to the PSTN (to cover category 2 and category 4 VoIP providers). As a consequence, making emergency calls would be removed from the PATS definition in the relevant EC Directives.

3.3. On the proper routing of emergency calls to the responsible PSAP

If regulators and emergency relief organisations accept the general idea that it's better for a consumer that a 112 call terminates at some point than not at all, the first level of the emergency service could be considered just the possibility, for the customer, to call the 112.

For non-nomadic VoIP emergency calls all providers should route the emergency call to the emergency response centre responsible to serve the area of the VoIP user. This can be achieved by a lookup in the address database maintained by the VoIP service providers and containing the VoIP user's address.

For nomadic VoIP, it's more complex to route emergency calls to the correct emergency centre. To date hasn't been clear whether a nomadic VoIP emergency call should be routed to an emergency centre next to the home VoIP service provider, e.g. for language reasons, or to the emergency centre serving the area of the user's current location. One solution is for the provider to place a VoIP flag next to the user's registered address on their database to prompt the emergency call handler to verify the caller's current location. Another solution is for the provider to enable users to update their current location (via the web), which would allow emergency calls to be routed to the most suitable PSAP

3.4. On the provision of the Calling Party Number to PSAPs

In most European countries the PSAPs are provided with the telephone number of the caller in case a call back is required.

In PSTN and GSM networks the caller's number is generated by the network. In particular, in the case of ISDN the caller's number is generated by the network, too, or provided by the user, checked by the network and only passed on if correct. In all these cases the caller's telephone number is reliable to a large extent. The same reliability is required for the calling user's number associating VoIP emergency calls. Since with many VoIP services there is a choice whether a user- or network-generated telephone number is associated with the call, the VoIP service provider should either generate the caller's number or pass on a user-generated number only after verification that the user-provided information is correct.

Users are entitled to suppress the presentation of their Calling Party number at the destination equipment. Since there may be a need for emergency relief organisations to call back the presentation restriction shall not apply to the network accesses of PSAPs, and they are entitled to CLIR/OIR override.

3.5. On the provision of location information to PSAPs

The main issue related to location information with VoIP is nomadism. Since address information is the key element for rescue, the Task Force recommends that all providers guarantee the availability of information that alert the PSAP when subscriber's address is not trustable, as it is in the case of mobile and nomadic service.

In most European countries the location information of calls directed to 112 and originated from non mobile end users is found by the emergency response centre by looking up the telephone number in a database or requiring such information from the operator that provides the service to the customer ("pull" approach). This database contains, at least, the telephone number and address of all subscribers. Such a database is fed with information by all service providers, who every week/month or whatever period update the data and provide the emergency response centre with it. This database is, in some countries, the same as the one used for directory enquiry services.

To cover the case of nomadic use, as a first step, providers could inform the emergency centres when a terminal can be used nomadically (reliability of the address data). A second step that is often discussed is where the provider enables the user to update his current location (via the web), which could be interrogated by the emergency centre if necessary. This approach could also be used when a geographic number might be used nomadically. The database would contain the caller location information and a warning that the address data might not be reliable; it would provide both in the case of a call to 112. This approach assumes that the caller's number (Caller Line Identification (CLI)) is transmitted with the call.

As an example, differently from the case of a classical PSTN telephone service where the database look-up provides the address from which the call actually originates (the address corresponds to the NTP), if the caller is a VoIP user the database look-up procedure should provide the address as well, but with the additional remark "nomadic service, address cannot be trusted".

Another approach under consideration to be implemented in some MSs is to impose VoIP providers the capability to recognise if the user is or is not located at the address corresponding to the NTP as a condition to the right of use of geographic numbers to establish calls (where 112 calls are necessary included).

Although a push-type provision of location information is to be preferred, a pull approach is recommended for an interim period. Both the push and the pull mechanism require a data network access for PSAPs. It should be pointed out that potential cross-border issues arise if the service provider and the emergency response centre are in different countries.

In conclusion, location information can be considered as a complementary service linked to the 112 calls.

It is worth mentioning that there are ongoing efforts to achieve a solution[5] to the problem of the caller location information for VoIP nomadic services,

The VoIP Task Force believes that the industry should be encouraged to find a solution within a reasonable period of time, so that location information can be reliably provided also in the case of nomadic use, even though privacy issues should be taken into account.

3.6. On the QoS of access to emergency services

The quality of a service is determined by both the networks and the terminals involved. In an IP environment many service properties are depending particularly on terminal features (VoIP uses a variety of different codecs[6]).

The intelligibility of a voice service depends very much on the bandwidth, packet loss, jitter, propagation delay and encoding of the voice signal. Some of these quality attributes can be negotiated between the initiating terminal and the network as well as between the initiating and terminating terminal at the time of call setup. It is obvious that VoIP emergency calls should be setup with the best quality available to the originating and terminating terminal as well as to the network at the time of setup of the emergency call.

Likewise it is important that VoIP emergency calls are established with priority[7]. If the control elements (softswitch, call server, application server, etc) offer different levels of call handling priority emergency calls should enjoy the privilege to jump to the head of a queue of calls waiting for setup or to be placed on the top priority queue because more often than not the decision between life, life-long handicaps and death is a matter of seconds.

3.7. On the different levels of availability and reliability of access to emergency services

Another aspect to take into account is the possibility to foresee different levels of reliability of the service that the user obtains when an emergency number, such as 112, is dialled.

Since emergencies may happen any time and are unexpected it is of paramount significance that the emergency calling service is available 24 hours/day and 7 days/week[8].

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[5] http://www.ietf.org/internet-drafts/draft-ietf-ecrit-requirements-13.txt,   http://www.ietf.org/internet-drafts/draft-ietf-sip-location-conveyance-08.txt

[6] Codecs are used to encode the acoustical to an electrical signal on the sender's side and to decode the electrical to an acoustical signal on the recipient's side. This process can be done with the aim to save bandwidth, to increase intelligibility etc.

[7] This feature is less relevant in PSTN which is based on a circuit switched technology.

[8] It is stated in Section 6.1. "Power failures will in most cases disconnect the VoIP service." However, this problem is not unique for VoIP services. It is known that power failures also could disconnect traditional telephony systems (PSTN/ISDN) and mobile telephone systems". In traditional telephony networks a lot of

3.8. Conclusions (Task Force recommendation)

1. All telephony service providers should be obliged to provide access to emergency services.

2. The ability to provide access to the emergency services should be removed as a factor in the definition of PATS in the Universal Service Directive

3. Routing should be provided to the locally responsible PSAP to the extent allowed by the technology.

4. Information about the caller's location should be provided to the extent allowed by the technology .

5. Telephony service providers should be obliged to provide the emergency response centre with information on whether the call originates from a fixed or a potentially nomadic user.

6. Telephony service providers should be obliged to clearly inform subscribers about any limitations in the services as compared to the traditional telephony service.

7. The information should be provided in comparable way in different MS, e.g. in the terms and conditions of contract, by means of a sticker on device or clearly visible information in bills.

8. Emergency calls should be setup with the priority, quality and availability to the extent allowed by the technology.

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technical solutions are possible to avoid interruption or disconnection of telephony service. The reliability of those ISDN/PSTN solutions is rather good compared with VoIP solutions where customer device or access technologies needs power supply. Deployed Consumer VoIP equipment or access technology equipment show less possibilities to avoid interruption or disconnection during power failures but possibilities may be enhanced

4. NUMBERING

4.1. On the geographic meaning of numbers

As stated in the "ERG Common Statement for VoIP regulatory approaches ERG (05) 12", although VoIP services can use addresses in several forms (SIP URIs, E.164 numbers, etc), E.164 numbers play a special role as they are needed in VoIP to receive calls from traditional telephony services, and services making use of them are the focus of this section.

Telephone networks traditionally address subscribers via an assigned number. The structure of this number is defined in the ITU-T recommendation E.164, which defines, among other issues, the structure of an international E.164-number for geographic areas.

An international E.164 number for geographic areas uniquely identifies a subscriber within a geographical area locally, nationally and internationally.

As stated in the Directive 2002/22/EC "Universal Service Directive", Article 2:

 (d) "geographic number" means a number from the national numbering plan where part of its digit structure contains geographic significance used for routing calls to the physical location of the network termination point (NTP);

Thus, operators of fixed telephone networks allocate this identifier to a NTP (residential or corporate) according to its location (usually identified by the address of the subscriber).

The E.164 number thus contains fields that identify the location of the subscriber, with granularity smaller than the country (i.e. it contains information like the region, or province, or district), used in traditional circuit-switched networks to route the call to the network termination point (NTP).

This identity between a physical connection point to the network (the NTP) and a telephone number aroused from the architecture of circuit switched networks. With the IP based technology, which is the base for VoIP services, all a user needs in order to access the VoIP service is an IP connection to a certain IP address (which represents the entry point in the VoIP switching equipment, typically an application server or a Session Border Controller-SBC[9]). The physical location of the user does not play any role, and it is actually not known by the application server delivering the VoIP service. This allows nomadism, meaning that a user is no longer tied to a particular location. This is actually a useful feature and could be seen as one of the drivers for adoption of VoIP, specially in corporate environments, where e.g. a user on a business trip can just connect the phone (or softphone) to the Internet (via a local ISP) and make use of the usual phone number to make and receive calls.

The above mentioned nomadism, due to the geographical nature of the E.164 numbers in the numbering plan, is not allowed or only with restrictions (for example only within a certain district) in

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[9]   See IP-IC and NGN ERG Report for details.

many Member States. Some Member States have introduced a non-geographic number range assigned to VoIP services in order to allow nomadism only for these numbers.

Currently Member States have three types of numbering available for VoIP:

- geographical numbering used in the traditional sense – with the number identifying the NTP–,

- geographical numbering with the number no longer identifying a NTP but with some geographic association, and

- non-geographical numbering (a number without any geographic significance), i.e. a specific number range for nomadic services.

All three are understood as numbers in the fixed telephone domain.

From experience in some countries, it seems that people prefer geographical numbers for making and receiving phone calls. There are various reasons for this, like being used to them, having more confidence in calls where the caller's location can be identified, preference for calling companies or commercial offers from the same area or fearing unknown rates when calling non-geographical numbers. These are all valid consumer concerns, which must be taken into account when meeting the needs of new VoIP operators and those using their services.

It is therefore important to balance the maintenance of this long-established consumer trust in geographical numbers with the objective of opening them wherever possible for VoIP services. This is necessary to help service providers who have difficulty convincing people to use the "new" VoIP-oriented numbers.

Clearly, along with any allocation of geographic numbers to the VoIP services, there should be a corresponding right and obligation to port such numbers from traditional telephone operators.

Equally important is the above mentioned issue of nomadism. It should not be limited[10] as it is seen by users (especially corporate users) as an advantage, and it is as such marketed and developed. **For this reasons, forbidding nomadism, which would in any case be difficult to enforce[11], could lead to discouraging the use of a major technological innovation.**

It therefore makes sense to adopt nomadism into the geographical meaning of telephone numbers, as this type of number could be preferred over non-geographic numbers, for the reasons stated above.

To this aim, NRAs (or other bodies involved) could maintain the geographic meaning of the number in the assignment, so that a local number would only be allocated subject to conditions like having an

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[10] Apart from possible restrictions that avoid the possibility of 'time-unlimited' nomadism (i.e. permanent out-of-area operation), which would defeat the prime purpose of the geographic significance on which consumers rely.

[11] It should also be recalled that restricting nomadism, due to IP technology underlying VoIP, even when technically possible may require a not negligible technical effort.

address in the corresponding geographical zone. In addition NRAs would permit nomadism (understood as a kind of roaming) so that the user is allowed to move without restrictions keeping the same telephone number (e.g. a user on business trip could temporarily make use of the same telephone number from another location outside of his area code). The area for nomadism could be national or international (that is without any restriction). It is useful to recall that this temporary dissociation of geographical number and physical location is also a feature of call-forwarding services, which are widely available on PSTN.

However, due to specific issues in some MSs (as far as voice communications are still mainly using PSTN rather than NGN networks), geographic numbers could not become available in a short time for this purpose and some measures could be taken to implement nomadic services (in a view to protect the consumer in terms of pricing issues and readability).

4.2. On the availability of numbers to service providers

The current framework mandates that numbers shall be available for all publicly available electronic communications services.

According to Directive 2002/21/EC "Framework Directive", Article 10

1. Member States shall ensure that adequate numbers and numbering ranges are provided for all publicly available electronic communications services. National regulatory authorities shall establish objective, transparent and non-discriminatory assigning procedures for national numbering resources.

2. National Regulatory Authorities shall ensure that numbering plans and procedures are applied in a manner that gives equal treatment to all providers of publicly available electronic communications services. In particular, Member States shall ensure that an undertaking allocated a range of numbers does not discriminate against other providers of electronic communications services as regards the number sequences used to give access to their services.

3. Where this is appropriate in order to ensure full global interoperability of services, Member States shall coordinate their positions in international organisations and forums in which decisions are taken on issues relating to the numbering, naming and addressing of electronic communications networks and services.

This introduces the issue of availability of numbers to VoIP service providers. Article 10 of the Frame Directive does not make distinctions between categories of electronic communications services.

For this reason, and in line with the conclusion of the "ERG Common Statement for VoIP regulatory approaches ERG (05) 12", "numbering plans should be technologically neutral, based on the service descriptions and the same number ranges should in principle be available for both traditional voice and VoIP services".

4.3. On the impact on legal interception of communications

A law enforcement agency is an organization authorized, by a lawful authorization based on a national law, to request interception measures and to receive the results of telecommunications interceptions. Interception is governed by national law and is not covered by the EU directives. Each country is in sovereign control over which requirements on lawful interception are imposed in the national legislature. The Directive on privacy and electronic communications (Directive 2002/58/EC of the European Parliament and of the Council), which protects the confidentiality of the communications, states in its whereas 11 and its article 15 that it does not affect the ability of Member States to carry out lawful interception of electronic communications. This possibility of retention of data refers to all operators, irrespective of the service provider's classification as ECS or PATS.

In order to provide a certain harmonisation, there is a Technical Committee Lawful Interception in ETSI, defining generic aspects and different handover interfaces. In its Technical Report TR 101 943 (Concepts of Interception in a Generic Network Architecture), it states:

> Given the proliferation of new forms of communications, such as satellite, third-generation mobile, Internet (IP) and the various ways in which such systems "plug & play", this "national" regulatory model is becoming outdated.
> Under these new circumstances a user may be registered in one country, located in a second, using the network facilities in a third, and communicating with correspondent(s) in fourth, fifth, and so on.

In traditional PSTN circuit-switched telephone networks, "wire-tapping" is a means for law enforcement agencies to obtain the content of the communication of a certain subscriber. As the telephone number of a subscriber is attached to a physical NTP, it is easy to identify which line or which port at a switch must be tapped in order to comply with the requirement, without disturbing the rest of the calls and maintaining the necessary security requirements. The inherent nomadic capabilities of VoIP complicate this picture, as a user may be making the call outside of the normal premises, and the network (call server and associated equipment) has no information on the actual physical location. However, from the point of view of law enforcement, there is no distinction between traditional PSTN and VoIP. As stated in TR 101 943, public telephony is supposed to be interceptable, regardless of how it is transmitted.

Centralised VoIP architectures have however the possibility of performing interception regardless of the physical location of the user. In these architectures, a call server has a number of associated equipment, like media servers and session border controllers, and is in charge of all signalling within the VoIP network and towards the elements interfacing to PSTN networks, like media gateways. This offers the possibility for interception, which is feasible and commercially available at elements like the media server or the session border controllers. Interception is thus, in the new network architectures, better done at the application level than at the access level[12].

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[12] As stated in TR 101 944 (Issues on IP Interception): The implied complement is that authorities requiring interception of tele-services should look to the service providers for solutions - again reaffirming the divide between network layer communications carrying and service provision.

On the other hand, systems based in distributed, peer-to-peer architectures, do not have such elements at hand. But these systems, classified as "Service 1" in the introduction of this document, are not subject to the requirements, as they are usually not ECS.

For this reason, allowing nomadism does not alter the situation of legal interception, which is possible in the elements surrounding the call server regardless of the location of the caller for both signalling data. As far as the content is concerned (i.e. voice data) it may not traverse the call server but could be routed directly from caller to callee. SIP allows intermediate proxies to stay in the communication path. However this possibility is reported into the SIP signalling messages and therefore visible to a potentially intercepted user with technical knowledge. Legal intercept requirements for VoIP providers of category 2, 3 and 4 may therefore be imposed by the national law enforcement agencies.

The issue has a new dimension however when the user to be intercepted and the service provider are in different countries. In this situation, interception has to be ordered by the law enforcement agency of the country where the service provider is located and registered, as it is in that country where the physical interception takes place, thus requiring collaboration between the involved authorities.

Similar and further reaching considerations have been taken in the USA, where the Federal Communications Commission (FCC) concluded[13] that the Communications Assistance for Law Enforcement Act (CALEA) applies to facilities-based broadband Internet access providers and providers of interconnected voice over Internet Protocol (VoIP) service, which are requested to comply by 14/5/2007[14].

4.4. Conclusions (Task Force recommendation)

1. All providers of fixed Telephony services should be authorised to permit nomadic use by their subscribers. Geographic numbers should be available for this purpose.

2. Numbering plans should be technologically neutral, based on the service descriptions and the same number ranges should be available within those service description. This means that, geographical numbers for traditional telephony services and geographical numbers for VoIP services should share the same number range, that is, come from a common "number pool".

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[13] First Report and Order and Further Notice of Proposed Rulemaking (NPRM), released 23/9/2005 (http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-153A1.pdf)

[14] See Second Report and Order and Memorandum Opinion and Order, released 12/5/2006 (http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-06-56A1.pdf)

3. Nomadism is an essential feature of VoIP services which should not be restricted. Nomadism does not preclude member states from maintaining the geographical meaning of geographical numbers if wished; this can be achieved by allocating such a number only to subscribers with a main location (address) in the corresponding geographical zone, as defined in the national numbering plan.

5. Number portability

5.1. Regulatory framework

As stated in the Recital 40 of the Universal Service Directive,

(40) Number portability is a key facilitator of consumer choice and effective competition in a competitive telecommunications environment such that end-users who so request should be able to retain their number(s) on the public telephone network independently of the organisation providing service.

Supplement 2 "Number portability" of the ITU-T E.164 recommendation describes three types of number portability: service provider portability (the ability of an end user to retain the same E.164 international public telecommunication number when changing from one service provider to another), service portability (the ability of an end user to retain the same E.164 international public telecommunication number when changing from one type of service to another) and location portability (the ability of an end user to retain the same E.164 international public telecommunication number when moving from one location to another).

Number portability is one of the main enablers of competition. As such, the Universal Service Directive, in its Article 30, mandates that subscribers of publicly available telephone services can retain their numbers independently of the undertaking providing the service (ie, service provider portability for PATS). The number portability mechanisms (onward routing, all call query, etc) are regulated independently in each member state, as portability between countries is not defined.

Number portability is seen in the meanwhile as a basic right by consumers in the member states. This has to be considered when analysing portability for VoIP services. It is difficult, from a user's point of view, to justify why a certain kind of services (VoIP) would be excluded from portability.

Increase in market share of VoIP providers would also be reduced if a user of the traditional public telephone service on the PSTN could not migrate to a VoIP service maintaining the number, when the VoIP provider is entitled to be allocated with the right of use numbers in the same number range.

In this sense, **it seems appropriate to impose number portability obligations to VoIP providers, and also allow number portability between traditional telephone services and VoIP services,** always within the same location (i.e. no location portability is meant here). The number portability mechanisms should remain decision of each member state.

It should also be noted that traditional telephone services (transported over PSTN) and VoIP services are both considered to be in the fixed network domain (as long as they make use of the fixed network numbering range), ie, portability between fixed and mobile domains is not meant here. A hypothetic VoIP service over a mobile connection would fall under the mobile domain portability.

5.2. Conclusions (Task Force recommendation)

- Number portability is important from a user and competition point of view.

- There should be an obligation to port numbers to any service provider which satisfies the conditions of use of the appropriate number ranges.

6. CROSS BORDER ISSUES

The ability to provide services across national borders, from a provider in one MS to a customer in another, is the essence of the Single Market. Nevertheless, it gives rise to regulatory challenges. Most of this report has been about alignment of the national conditions under which VoIP service providers are required to operate. Where the national rules are materially different, cross-border provision may be difficult, if not impossible, in practice.

Various other issues arise however. Consumers have got used to – and probably expect as a matter of course – a high level of protection concerning telephony services. They wish to be able to gain redress if the service is not of the standard contracted for; also they expect the NRA to be able to intervene to insist that service providers meet their obligations. It is not practical for most consumers to seek contractual redress through the courts – or even the ADR (Alternative Dispute Resolution) scheme – of a foreign MS. Therefore, either redress has to be available through the national legal and ADR systems of the customer or else cross-border services are bound to attract a reputation, sooner or later, as risky. In practice, NRAs can seek to address this by specifying in authorisation conditions that providers of VoIP services to residents of that member state provide their customers with access to the national ADR scheme.

However, this gives rise to another problem – how to enforce obligations against a service provider based in another country. Ofcom can for example issue enforcement notices against a foreign service provider for breach of UK authorisation conditions. But if the SP has no physical presence in the UK, enforcement may be impossible in practice. This problem is not limited of course to VoIP. It applies to any form of cross-border service provision. The Task Force believes that the gap should be filled in the forthcoming Framework Review. In the meantime, practical measures which the NRA can take include:

➢ withdrawing any numbers allocated to the offending service provider (however this measure has an impact on the subscribers of the offending SP). Where these numbers have been sub-allocated by another undertaking, this may require the imposition of obligations on that other undertaking.

➢ publishing "naming and shaming" notices on the NRA website, to promote widespread consumer awareness of the offending practices of the relevant service provider[15].

➢ pursuing national legal proceedings as far as possible. Although collection of a financial penalty may not be possible in practice if the offender declines to pay, failure to pay such a penalty is a criminal offence in some jurisdictions, restricting the Directors' ability to travel there, for example.

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[15] Detailed criteria and conditions would have to be established for adding or removing offending service providers.

7. VoIP ISSUES RELATED TO ECS, PATS AND PTN DEFINITIONS

7.1. Introduction

According to *I/ERG Response to EU Commission call for input* there is a need for review of a range of definitions currently contained in the Regulatory Framework to address imperfections in definitions and to ensure that articles in the Framework are sufficient to ensure and support future developments in electronic communications markets[16].

There may be a need, considering technological developments, to ensure that the provisions of the Universal Service directive are reviewed in a timely manner to consider the development of services such as Voice over IP (VoIP). In some Member States operators have already taken considerable steps towards replacing the PSTN services with VoIP services and there is also some evidence from some member states of fixed mobile substitution. As these services evolve along with mobile communications, it is necessary to review definitions used in the directive. This should ensure that the use of new technology is not hindered or user rights neglected. Presently, it is unclear if and to which extent the current provisions of the USD cover VoIP services. In the interests of technological neutrality this issue should be clarified in the Review, in particular with regard to definitions.

The current definitions for Electronic Communications Service-ECS Electronic Communications Network (ECN) and Publicly Available Telephone Service (PATS) (Directive 2002/21/EC Article 2), included in the Framework need to be reviewed to ensure they are future proofed for converged sectors and are technologically neutral. One of the issues concerns Voice over IP (VoIP) operators and the definition of PATS in relation to emergency services

7.2. ECS definition

According to Article 2, Framework Directive, "electronic communications service" means "a service ....which consists wholly or mainly in the conveyance of signals on electronic communications networks, including telecommunications services .....". An "electronic communications network" means transmission systems and, where applicable, switching or routing equipment and other resources which permit the conveyance of signals ......"

It is not immediately clear from these definitions which VoIP services from the categories introduced in section 1 fall within the definition of ECS. This is particularly the case for PC-to-PC services. However, the solution of the abovementioned case is not of primary urgency at present since PC-to-PC services are not generally regarded as close substitutes for telephony services, given that they

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[16]   I/ERG would draw the European Commission's attention to inconsistencies in Articles 4 and 5 of the Access Directive where 'operators' are referred to, and the diversification in the definition of undertaking in Articles 12.1 and 12.2 of the Framework Directive.

can only be used for communication within closed user groups. Such services have traditionally been unregulated and are not a priority for consideration at present. This could possibly change in the future if consumers disseminate their electronic messenger service addresses in the same way as phone numbers and/or if the major messenger services interconnect with one another without using the PSTN (MSN and Yahoo! set this up last year).

A possible temporary approach for NRAs could be carving out all PC-to-PC services (category 1), which do not potentially allow incoming or outcoming calls to PSTN (regardless of where the gateway to PSTN is located), from regulations in the short term, so long as the framework review resolves this issue in the longer term. This approach can be justified by the fact that consumers have different expectations of PC-to-PC services, and these services are not substituting other voice services.

It's clear that an ECS is being provided in the case of VoIP services that permit inward and/or outward connections to the PSTN. What has proved more controversial is whether the ECS is provided by the VoIP service provider or only by the operators of the broadband networks which are being used to carry the VoIP traffic. The network operator is certainly providing an ECS. But the Task Force understands that most NRAs take the view that the VoIP service provider also provides an ECS since it has the contract with the end user, collects payment for the service and negotiates network access to allow the service to be offered, manages directory data base and the servers for call set-up signalling (In some cases, VoIP service providers offering access to/from PSTN are considered resellers of PATS, which qualifies them as providers of PATS themselves). The VoIP Service Provider is therefore providing the service to the end user, even if some aspects of it are sub-contracted to various agents.

From the above it seems clear that, for the avoidance of doubt, the ECS definition needs to be rethought and/or clarified in the EC framework review.

7.3. PATS definition

There are two problems with the PATS definition.

The first is **circularity** and has generated substantial debate: PATS providers are required to offer emergency calls, but providers only become PATS if they offer emergency calls. This is illogical but the consequences should no longer be significant. In the case of VoIP services providing access to the PSTN, this will become a non-issue in all member states where providers of such services are required to provide access to emergency services, as proposed by the Task Force.

The second issue is that PATS captures only some VoIP services, that is those offering calls both to and from ordinary numbers. However many VoIP services include only calls from ordinary (E.164) numbers or alternatively calls to ordinary numbers. Since there is no cost to consumers of having multiple VoIP services (and indeed there can be price incentives to using multiple services), in combination 'one-way' VoIP services could replace other PATS services.

Another controversial issue user rights and operator's obligations linked to PATS services. The consequences of PATS status, derived from the Universal Service Directive, are:

a) transparency obligations on providers (Art 21);
b) "network integrity" obligation to take reasonable steps to ensure uninterrupted access to emergency services (Art 23). Logically, in practice this obligation has greater implications for network operators (e.g. VoB providers) because service providers that aren't also network operators (e.g. VoI providers) can only control aspects of the transmission/transport layer that relate to call session control of the call server (and associated equipment);
c) Right of subscribers to have their number listed in the universal national directory (Art 25);
d) Right of subscribers to port their number to another PATS provider (Art 30);
e) In addition, Art 20 sets out minimum requirements for contracts for the provision of services providing connection and/or access to the public telephone network. This appears to be a broader definition than PATS including, in particular, services which provide only outgoing access to the PSTN;
f) Finally, Art. 22 empowers NRAs to require publicly available ECS providers to publish QoS information.

Subscribers to VoIP services which are not PATS therefore do not derive from the Directives in respect of transparency, directory listing or number portability. They do appear to be guaranteed rights in respect of contracts (Art 20). Regarding the network integrity obligations, VoIP providers of PATS services are required to take "reasonable steps", which can be seen to refer to technically and practically feasible steps and for the parts of the network under their control.

It should be pointed out that subscriber rights mentioned above at (a), (c), (d) and (e) are appropriate for subscribers to any telephony services which provide access to the PSTN. The restriction to PATS services made sense in a PSTN-only world but is outdated. However, this may not matter in a number of Member States where a certain amount of latitude has been taken by the national legislator in transposing the Directive. Accordingly, in those states, the subscriber rights may in practice apply to subscribers of VoIP services which provide access to or from the PSTN, whether or not they fulfil the definition in the Directive of PATS.

It appears that NRAs in other Member States may have the power to extend those rights to subscribers of VoIP services which provide access to or from the PSTN. Art 6(1) of the Authorisation Directive empowers NRAs to impose general authorisation conditions. In accordance with paragraph 8 of the Annex to the Authorisation Directive, these may include "consumer protection conditions". It therefore appears open to NRAs to impose conditions (a), (c), (d) and (e) on suppliers of VoIP services which provide access to or from the PSTN as general authorisation conditions, where these rights are not already guaranteed under national law.

In the Framework review, we understand that the Commission proposes to redefine the categories of service provider who are required to guarantee these rights so that these make sense in an era of IP services and NGNs. This deserves the support of ERG.

Conclusions (Task Force Recommendations) relating to allocation of consumer rights and service provider obligations

The following is an objectively justifiable set of rights and obligations relating to telephony services which provide access to or from the PSTN. The rights should apply equally to traditional PSTN services and to VoIP services, irrespective of whether they fulfil the USD definition of PATS:

- Subscribers should have rights in respect of contracts consistent with Art 20 USD;

- Subscribers should have rights to tariff transparency consistent with Art 21 USD;

- Subscribers with numbers should have the right of directory listing consistent with Art 25 USD;

- Subscribers should have the right to port their numbers to or from any other such services;

- Subscribers should have the right to call emergency services.

This implies a corresponding set of obligations on providers of such services, in respect of provision of contracts, tariff transparency, directory listing and number portability. In some member states, these obligations may be applied (due to national laws) to PATS providers only or to some other limited set of telephony service provider. In particular, the portability obligation may apply only between PATS providers.

The Task Force recommends that NRAs avail themselves of the maximum freedom under national law to implement this set of rights and obligations. As noted above, where national law provides that such rights are available only to subscribers to PATS services (or another limited subset of telephony services) NRAs appear to have freedom to extend the rights and obligations by means of appropriate authorisation conditions.

The Task Force recommends that in practice the "network integrity" obligation should be applied to telephony service providers for the parts of the network that they control. Where national law does not permit explicit misapplication, it can be achieved in practice, consistent with Art 24 USD, by means of guidance noting the limitations on the "reasonable steps" that are open to the service providers in practice.

In some MS, the definition of "PATS" set out in national law is not completely in line with that set out in the USD. That may mean that rights and obligations are allocated in a slightly different manner from that envisaged by the European legislator. Achieving a suitable amendment to national law may be time-consuming; even so, it may still not lead to the full application of rights and obligations set out above. NRAs in these countries may therefore need to consider introduction of a transitional authorisation category in order to ensure that the allocation of such rights and obligations is objective justifiable.

7.4. Public Telephone Network (PTN) definition

As reported in the NGN IP-IC ERG report, future electronic communications networks will be packet switched, mostly or completely based on the Internet Protocol (IP). They will be multi-service networks for audio (including voice), video (including TV-services) and data rather than service specific networks. These developments might imply changes in the type of services, at the infrastructure level and in the profile of the actors in the value chain.

With regard to services, Voice over IP (VoIP) can be considered an important sample of new services in the wider context of migration from circuit switched to packet switched networks. The number and heterogeneity of VoIP services has gained relevance in the last 12-18 months.

A crucial feature of NGN architecture having implications for interconnection is the separation of the main functional levels. NGN strategy of implementation typically is based on a horizontal platform that means separation of service, control, transport layers both of which separately interconnected to other networks.

Transport service layers can thus be technically and commercially separated and provided by different market players.

Generally speaking NGN can be considered as a multi-service network based on a packet mode technology, able to support voice, data and video and where there is a more defined separation between the transport (connectivity) portion of the network and the services that run on top of that transport.
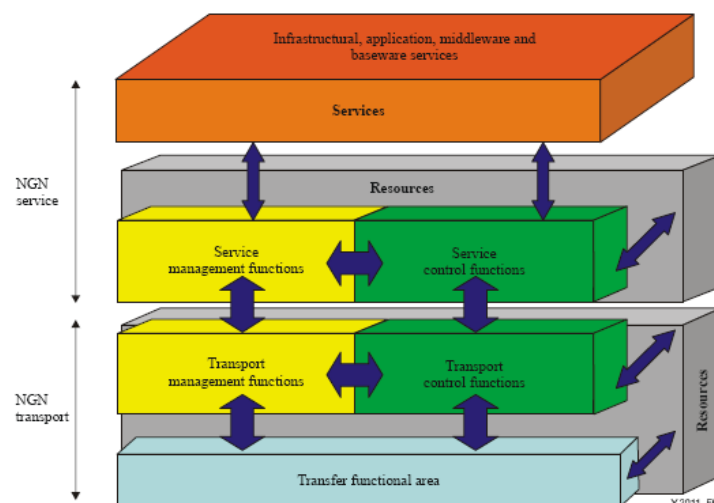

Figure 2: General principle of NGN architecture (Source: Source ITU-T Rec Y.2012)

The NGN architecture is intended to offer convergent multimedia services using a unique and shared core network for all types of access and services and packet mode transport (IP flow transport in native IP, or on ATM in the short term with a progressive convergence to IP). Another key point is the adoption of open and standardised interfaces between each layer, and in particular for the Control and Services layers in order to allow third parties to develop and create services independent of the network.

A NGN supports multiple applications (multimedia, real-time, transactional, mobile) adaptable to the user and growing and varied capacities of access networks and terminals.

The NGN architecture described above makes definition b) of article 2 (*public telephone network*) difficult to apply: a single public telephone network does not exist as a dedicated network but as part of NGN common *transport layer* where *the transfer between network termination points of speech communications, and also other forms of communication, such as facsimile and data* is supported by a specific *control layer*.

Thus the Task Force supports a revision of such definition by the Commission.

8. CONCLUSIONS

Emergency services

- All telephony service providers should be obliged to provide access to emergency services.

- The ability to provide access to the emergency services should be removed as a factor in the definition of PATS in the Universal Service Directive

- Information about the caller's location should be provided to the extent allowed by the technology.

- Routing should be provided to the locally responsible PSAP to the extent allowed by the technology.

- Telephony service providers should be obliged to provide the emergency service centre with the information on whether the call originates from a fixed or potentially a nomadic user.

- Telephony service providers should be obliged to clearly inform subscribers about limitations in the services (e.g regarding localization and routing of emergency calls).

- The information should be provided in comparable way in different MS, e.g. in the terms and conditions of contract, by means of a sticker on device or clearly visible information in bills..

- Emergency calls should be setup with priority to the extent allowed by the technology.

- Emergency calls should be setup with the best quality available to both the originator and the recipient.

Numbering

- All providers of fixed Telephony services should be authorised to permit nomadic use by their subscribers. Geographic numbers should be available for this purpose.

- Numbering plans should be technologically neutral, based on the service descriptions and the same number ranges should be available within those service description. This means that, geographical numbers for traditional telephony services and geographical numbers for VoIP services should share the same number range, that is, come from a common "number pool".

- Nomadism is an essential feature of VoIP services which should not be restricted. Nomadism does not preclude member states from maintaining the geographical meaning of geographical numbers if wished; this can be achieved by allocating such a number only to subscribers with a main location (address) in the corresponding geographical zone as defined in the national numbering plan.

Number portability

• Number portability is important from a user and competition point of view.

• There should be an obligation to port numbers to any service provider which satisfies the conditions of use of the appropriate number ranges.

Allocation of consumer rights and service provider obligations and ECS/PATS/PTN definition

The following is a set of rights and obligations relating to telephony services which provide access to or from the PSTN (categories 2,3 4 listed in section 1) should apply equally to traditional PSTN services and to VoIP services, irrespective of whether they fulfil the USD definition of PATS:

• Subscribers should have rights in respect of contracts consistent with Art 20 USD;

• Subscribers should have rights to tariff transparency consistent with Art 21 USD;

• Subscribers with numbers should have the right of directory listing consistent with Art 23 USD;

• Subscribers should have the right to port their numbers to or from any other such services;

• Subscribers should have the right to call emergency services.

The Task Force recommends that in practice the "network integrity" obligation should be applied to telephony service providers for the parts of the network that they control. Where national law does not permit explicit misapplication, it can be achieved in practice, consistent with Art 24 USD, by means of guidance noting the limitations on the "reasonable steps" open to the service providers.

In some MS, the definition of "PATS" set out in national law is not completely in line with that set out in the USD. That may mean that rights and obligations are allocated in a slightly different manner from that envisaged by the European legislator. Achieving a suitable amendment to national law may be time-consuming; even so, it may still not lead to the full application of rights and obligations set out above. NRAs in these countries may therefore need to consider introduction of a transitional authorisation category in order to ensure that the allocation of such rights and obligations is objective justifiable.

ECS/PATS/PTN directive definitions need to be reviewed in order to solve the issues reported in the previous section 8. In particular the VoIP TF recommends:

➢ The removal of the access to emergency service requirement in the PATS definition to eliminate the circularity;

➢ New definitions of ECS and PTN that take into account the emerging NGN architecture and which clarify the regulatory role of those VoIP providers which operate just at the control/application layer and exploit other's operators transport networks for speech transferring, after set up of the VoIP session. The Task Force' view is that the network operator is certainly providing an ECS even though the VoIP service provider also provides an ECS (in particular the VoIP SP provides a telephony service as defined in the present report) since it has the contract with the end user, collects payment for the service, negotiates network access to allow the service to be offered, manages directory data base and the servers for call set-up signalling. The VoIP SP is therefore providing the service to the end user, even if some aspects of it are sub-contracted to various agents.

ANNEX1: PREVIOUS ERG VoIP ACTIVITIES: MAIN CONCLUSIONS AND OPEN ISSUES

ERG Report on "VoIP and Consumer Issues"

In the Report on "VoIP and Consumer Issues" ERG examined five areas in which regulatory challenges still exist and analysed how consumer interests are being served here at present. The report investigates the current status and identifies areas for deeper harmonisation among the members of the ERG.

The areas examined are

➢ Emergency services
➢ Numbering and number portability
➢ Tariffs
➢ Quality of Service
➢ Cross-border issues

A summary of the results of the end consumer report are given in the following concerning emergency services, numbering and number portability, and cross border issues, the areas where the ERG VoIP Task Force decided to focalize the first part of its work on harmonization of the VoIP regulatory framework.

Emergency services (Reference: US Directive Art. 26)

According to the US Directive, it is important for end users to be able to call emergency telephone numbers – including 112 - free of charge from any telephone. All Member States should have in place arrangements to ensure that calls to this number are adequately answered and handled. Caller location information should be made available to the emergency services.

Currently the end user's ability to access 112 from VoIP services varies depending on the regulatory treatment of the VoIP services provided. In addition, also in those MSs where access to emergency services is mandated, caller location information is provided according to the technical feasibility.

The national systems adopted for handling emergency calls vary greatly, both from an administrative and a technical point of view.
While some member states have adopted the single European number "112" most member states have national emergency number(s) in addition to 112. It is common to have additional national numbers for police, fire or ambulance.

The number of PSAPs (Public Safety Access Point) range from one to several hundred. Most member states have a regional organisation, meaning that each PSAP covers a specific geographic area. In these cases the routing is based on the location of the caller.

Regarding the technical solutions for providing location information, the PSAP generally uses a reverse telephone number directory in case of an emergency call from the PSTN/ISDN or contacts the GSM

network operator to obtain the cell ID in case of an emergency call from a GSM terminal ("pull" technology).

The data from the member states indicate that the main limitations of using VoIP services when contacting emergency services are nomadic use, routing of calls and power failures.
Generally nomadic use of VoIP is considered a limitation because it is technically difficult to provide location information if the VoIP service is used nomadically. The VoIP service provider will in these cases normally not know the end users' whereabouts.
Some member states are about to install a system showing Emergency Response Centres whether the call is delivered via VoIP or not. Thus, the person processing the emergency call can make explicit inquiries regarding the whereabouts of the calling party.

Power failures will in most cases disconnect the VoIP service. However, this problem is not unique for VoIP services. It is known that power failures also could disconnect traditional telephony systems (PSTN/ISDN) and mobile telephone systems.

In the majority of member states VoIP providers are obliged to inform their customers about any limitations of their service.

In many member states the information is made available in the terms and conditions of the contract. Further common sources for information are user guides, the operator's homepage or marketing material.

Some member states have decided more specific ways on how to make information available.

Numbering and number portability (Reference: US Directive Art. 30)

According to the current Regulatory framework number portability is a key facilitator of consumer choice and effective competition.
End users who request it should be able to retain their number on the public telephone network independently of the organisation providing the service.
However, according to the US Directive, only subscribers of publicly available telephone services (PATS) have the right to number portability. This might lead to restrictions for the availability of number portability in VoIP services which are not considered to be publicly available telephone services.

As far as user's ability to select the type of number (geographic or non-geographic) for the VoIP service is concerned nine member states allow VoIP providers to offer both geographic and non-geographic numbers to end users, regardless of whether the VoIP service is PATS/non- PATS or fixed/nomadic.
A further six member states limit the availability of geographic numbers to certain types of VoIP services and have made non-geographic numbers available for VoIP services that do not meet this specified criteria.

In some MSs geographic numbers can be used for VoIP services provided at a fixed location. Non-geographic numbers are available for nomadic services.
In some cases geographic numbers are available for PATS and non geographic numbers are available for non-PATS.

In contrast to this, in some cases it has been allocated geographic numbers for VoIP both for nomadic services and non nomadic services.

As far as restriction of number portability for VoIP is concerned some MSs do not restrict number portability with regard to VoIP services. The requirement to offer number portability therefore includes all services regardless of whether they are PATS or non-PATS.

However the majority of member states do restrict the requirement for VoIP providers to offer number portability. Some member states restrict number portability to services classed as PATS (though in many cases other non-PATS – services may enter into porting agreements) or to services using geographic numbers at a fixed location.

In some cases, although number portability is mandatory for PATS, providers offering non-PATS (i.e. ECS) must also offer number portability on request by a PATS provider, but only if that PATS provider confirms they are prepared to offer number portability to the non-PATS provider.

In most member states, there is no specific obligation to inform end users that they may not be able to port their VoIP number. But in several member states a general obligation exists to inform end users about the nature of the service.

Again, in most member states general requirements for providers exist to make information about their services available to the public in contracts, on web sites and information material.

Cross-border issues

According to the regulatory framework VoIP services can be provided and used internationally. VoIP services can be offered via the Internet independently of a fixed connection to the PSTN, broadband or mobile networks. This makes it possible for the service provider and the user to be located in different parts of the world. The user can register and use the service at any access point in any country and can access the service when travelling abroad. The service provider can control the service from any point in the world and it is fairly easy to shift the service provision to another country.

This creates problems of jurisdiction: which NRA can issue regulation on a VoIP service provider and how can this regulation be enforced? If a common understanding on cross-border jurisdiction cannot be found, there is a risk of two or more NRAs claiming jurisdiction over the same matter or a matter might fall out of all NRAs' jurisdiction.

From a legal point of view in part of the member states the national legislation applies to the provision of electronic communication networks and services in the member state – including services offered by foreign providers.

Generally part of the member states have not yet identified any problems concerning enforcement of regulation against foreign providers.

In some other member states the competence the regulatory treatment of services provided by Skype such as the question whether the registration as a provider of public voice telephony is required.

Project Team on IP-Interconnection and NGN

One of the main challenges emerging out of the developments towards NGN in the core network is (IP) interconnection and interoperability and its implications. These have been dealt with in an ERG report on IP interconnection (See ERG (07) 09) in the PT NGN, which was published in March 2007.

This document describes the significant evolution which is taking place in (IP) interconnection and in the networks of most European operators, particularly PSTN-incumbent's networks, reflecting the developments towards Next Generation Networks (NGN) and the massive adoption of IP based services such as VoIP.

The document builds on the answers of NRAs and several European industry associations (ECCA, ECTA, ETNO, ETP, GSM-E and EuroISPA) to a questionnaire on issues and problems related to the transition of IP-IC and NGN deployment and the answers from a public consultation on a draft text of this document, concluded November 27th 2006. Currently, the issue of IP interconnection seems to be in a relatively early stage of assessment by the NRAs as well as by the market players themselves.

The following major issues have been dealt with in the document: Separation of functional levels (Service, control and transport), Quality of Service across interconnected networks, Structural implications for the IC regime (number and structure of interconnection points, mirroring restructuring of the network architecture), Charging Principles (e.g. Calling Party's Network Pays, Bill & Keep).

The changes which are taking place in technology affect not only the whole set of interconnection products, but also the provision of networks and services in general. The correct estimation of the impact on competition brought by changes in interconnection products will be one of the most relevant tasks for NRAs in the near future. Incentives to upgrade the network can be attributed to cost savings or to the need to be able to provide advanced services as voice revenues decline, but the use of more efficient technology to provide existing regulated services does not alter the justification for that regulation; the move to NGNs does not provide an opportunity to roll back regulation on existing services if the competitive conditions have not changed. The NRAs will therefore need to address several issues:

· Develop some guiding principles in order to clearly identify the regulatory challenges and evaluate regulatory options.

· NRAs may have to ensure that all types of interconnection which are technically feasible are possible, ensuring end-to-end connectivity and allowing for full interoperability of the IP based services offered to the customers of the interconnecting networks; for this reason, operators should be encouraged to give access to the technical interfaces, protocols and all other technologies necessary for the interoperability of IP based services, and to use standard interfaces and protocols.

· Regulators should take account of the need for interoperability and quality of service at all levels of the value chain. A more ubiquitous application of Article 5 of the Access Directive may be needed to ensure end-to-end connectivity as well as allowing users to access services provided by another undertaking.

· The transition towards NGNs entails several structural changes such as rearrangement of core network nodes and points of interconnection, number of points of interconnection or changes in the number of network hierarchy levels, as well as the question of interconnection tariffs. Furthermore

IP-interconnection may be differentiated along the lines of services, according to quality of service classes or not differentiated at all.

·   Besides regulation such as Article 5, appropriate areas for regulatory intervention have to be defined, based on the existing list of relevant markets and findings of SMP. These changes may require the adaptation of existing SMP products for interconnection. More particularly markets 8-10 so far only include narrowband interconnection services. A broadening of these markets should be allowed to include IP-interconnection by defining the markets more generally in those countries, where NGN related services already play a more important role. Also, the introduction of a Bill & Keep model for interconnection of voice calls on IP networks would have a major impact on the market for call termination. If needed, further markets for regulation and de-regulation may have to be identified.

·   Adaptation of existing SMP products in the light of changes. With reference to SMP notifications, some elements of the analysis performed by NRAs will be NGN specific. For instance, control over architectural functions that constitute "control points" – i.e. functions that are necessary for service provision to end users – can result in market power. As long as control points might reside in any layer of the network hierarchy, this might increase the complexity of the competitive assessment. There might be cases where this control provides only a temporary advantage, while in other cases it may trigger abuses of dominant positions which could call for regulatory intervention.

·   Determination of the cost of regulated interconnection products in a multi-service environment.

In the migration process towards NGNs, different charging principles (like Calling Party's Network Pays versus Bill & Keep) are currently being used for the interconnection of different networks. Therefore a discussion on the appropriate charging principle for IP-interconnection has begun, This paper reviews options for wholesale arrangements in an all-IP world also considering problems during the transition phase. Bill & Keep and CPNP differ with regard to their relevance to the termination monopoly problem. IRG/ERG do not consider traffic symmetry a strict requirement for the applicability of Bill & Keep. Bill & Keep may lead to Receiving Party Pays (RPP) at the retail level. Possible acceptance problems of this shift might be alleviated by the trend towards end-user flat rates. Apart from devising an appropriate interconnection regime including charging principles for an all-IP world, regulatory work will have to focus on the migration period towards NGNs, where different network and charging principles are used in parallel. Currently, this particularly applies to the provision of voice services.

Further aspects of NGN core developments (e.g. interconnection continued, interoperability, universal service) will be taken up by the PT NGN in Q2/Q3.

Other activities

PTS carried out a work on VoIP harmonization that was presented ERG Plenary Meeting Bratislava December 7, 2006. Issues where lack of harmonization is considered critical by PTS concern:

➢   Numbering and number portability
➢   Emergency services (including cross border issues)
➢   Consumer information.

ANNEX2: TELEPHONE NETWORKS AND SERVICES UNDER 2002 EU REGULATORY FRAMEWORK

According to article 2 of the US Directive 2002

(*) public telephone network means an electronic communications network which is used to provide publicly available telephone services; it supports the transfer between network termination points of speech communications, and also other forms of communication, such as facsimile and data;

(*) publicly available telephone service means a service available to the public for originating and receiving national and international calls and access to emergency services through a number or numbers in a national or international telephone numbering plan, and in addition may, where relevant include one or more of the following services: the provision of operator assistance, directory enquiry services, directories, provision of public pay phones, provision of service under special terms, provision of special facilities for customers with disabilities or with special social needs and/or the provision of non-geographic services;

(*) geographic number means a number from the national numbering plan where part of its digit structure contains geographic significance used for routing calls to the physical location of the network termination point (NTP);

ANNEX3: The Expert Group On Emergency Access (EGEA)

The priority actions for the Expert Group on Emergency Access (EGEA), which is a group that reports to the Communications Committee[17] and the Civil Protection Committee and which brings together representatives of the emergency authorities from the Member States, is to define the requirements for the interface between electronic communication providers and the entry into the PSAP/ECC system.

Considering that currently each Member State has developed its own practices concerning the interconnection between public operators and the entry point of the public safety organisation, the aim of the EGEA work is to present a common set of Operational requirements that are agreed by all EU PSAPs. Such operational requirements should as far as possible be expressed in a manner that does not imply the use of a particular technological implementation, e.g. operational requirement for voice calls should apply to both PSTN and Voice over IP calls.

Agreeing on Operational Requirements will help to bridge the gap between the legal obligations for access to emergency services, and the work done in standards & protocol developing bodies such as ETSI and IETF, allowing for more harmonised and cheaper provision of emergency services across the EU, and also permitting manufacturers and service providers to take advantage of the benefits of the internal market by being able to propose more standardised products and services.

In the operational requirements EGEA makes a distinction has been made between common and supplementary operational requirements.

Common Operational Requirements are required by all PSAPs. As such they form a minimum set of requirements within the EU. However some PSAPs may have requirements above this minimum set. It is proposed to have agreed definitions for such additional requirements, and to call them Supplementary Operational Requirements.

Having a pre-defined set of Common and Supplementary Operational Requirements makes it easier for standards developers, manufacturers and operators to develop protocols/products/services that can be used across the entire EU.

Public authorities can select which Supplementary Operational Requirements are applicable in their environment, out of the agreed set of supplementary requirements. This makes it possible to make some (supplementary) requirements applicable in those Member States that have technologically more advanced PSAPs and/or operators, while allowing operators and PSAPs in other Member States to apply only the minimum set of Common Operational Requirements.

It is envisaged that EGEA document will be of use to network operators, standardisation bodies[18] and manufacturers, for the development of standards and specifications that will lead to products and services that satisfy these operational requirements

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[17] The Communications Committee is a committee of Member States chaired by the Commission established under Directive 2002/21/EC

[18] Note that a lot of standardisation work has already been undertaken by organisations such as the IETF and 3GPP.

The picture below describes the interaction and interfaces between the different actors in a 112 emergency call.
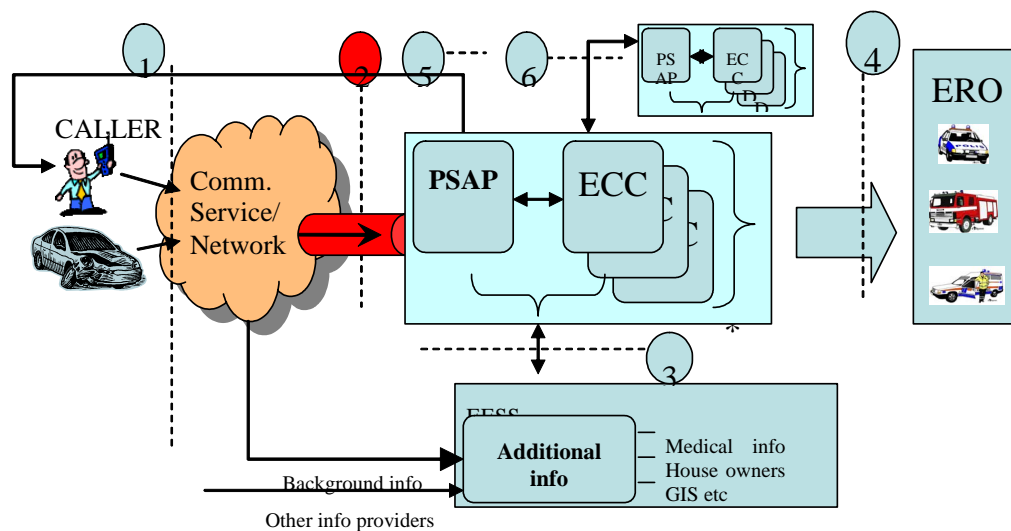
Interfaces needed to access emergency services

Fig.1 Interfaces to emergency services

Overview of interfaces:

(1)   A citizen makes an emergency request by using the 112 service provided by its local network/service operator.

(2)   The network/service operator hands the call or alarm over to the most appropriate PSAP/ECC.

(3)   The PSAP/ECC can receive or request additional information related to the 112 call by contacting an external information system.

(4)   The PSAP/ECC notifies/alerts the proper emergency response organisation

(5)   PSAP/ECC may need to warn/inform citizens about emergencies or imminent disasters.

(6)   PSAP/ECC transfers the call to another national or international PSAP/ECC

The EGEA document defines the requirements for the interface between electronic communication providers and the entry into the PSAP/ECC system (interface "2"). Note that, in relation to an emergency call, the PSAP/ECC may require additional information from third party systems (interface "3"). However, the requirements for interface "3" are at present not defined in this document.

Terminology:

– Emergency Response Organisations (ERO): e.g. the police, fire service, mountain rescue and emergency medical services.

– Public Safety Answering Point (PSAP): physical location where emergency calls are first received under the responsibility of a public authority.

– Most appropriate PSAP: is the PSAP dealing with a specific emergency (e.g. fire, anti-poison, ambulance, police…) that is either the closest or best equipped to respond to a specific emergency.

– Emergency Control Centre (ECC): those facilities used by a specific Emergency Response Organization to accept and handle emergency calls. (Note: those could be integrated with the PSAPs).