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Definitions for IP Telephony

We need to establish some workable and stable definitions if we are to have a basis for clear and unambiguous discussions on how the policy towards IP telephony should develop. Regulators will in particular need sound definitions on which to base any changes in regulation.

Definitions should satisfy the following criteria:

- They should be clear and simple to apply leading to obvious answers whether a particular instance is inside or outside the definition

- They should be stable in the face of technology developments

- They should be stable in the face of commercial and economic developments

- They should use language in accordance with its natural meaning if possible

The situation that we are all facing is of a technology change (use of IP based technologies for voice) that is leading to diversification in services. The diversification in services is upsetting the current regulatory framework in either of two ways:

- For countries where regulation is **service** related, new services involving voice are being introduced and there is a question whether they are within the scope of the regulation

- For countries where regulation is **technology** related, new services are being introduced outside the scope of the regulation and since they involve voice there is a question whether they should also be regulated

This situation is causing considerable confusion because the definitions and terminology that are agreed formally in standardisation bodies have not kept up with the developments in the technology and the market place.

In addition to the multiplication of service types, there is innovation in service presentation and access, and innovation in the way in which what we categorise as different services may be combined together.

Services

We suggest that the most urgent need is to have clear definitions for services from a user's perspective because whatever regulation remains in the future is most likely to be service based. This is appropriate because:
- the service is the ultimate product for the user
- the main aim of telecommunications regulation is to support/protect the user

There are two fundamental and reasonably stable aspects to the type of service:
- the type of traffic – does it involve real-time voice? Does it include other traffic types as part of multimedia?
- the method of identifying correspondents and setting up a call – either public telephony based on E.164 numbering or "Internet telephony" based on Internet naming (user@host)

Some people would argue that quality and price are equally important aspects of a service. We agree, but we think that price issues and the whole way in which telephony is funded may change significantly in the future and that there may be some changes in quality with a wider range of qualities available. Consequently we think that price and quality are too unstable for use in definitions. Some

parties consider that regulation should be used to maintain a certain minimum level of quality in public telephony but this objective can be met better by applying a requirement to "public telephony" than by including quality in its definition. A further consideration is that including price or quality in the definitions would create market distortions and could, for example, provide a disincentive to improve quality – if regulation applies to telephony with a quality above some threshold, then operators will have an incentive to keep the quality below that threshold.

We propose that the term **Voice over IP (VoIP)** should be used as a general term for any service involving voice that is implemented using IP either as the public Internet or as a managed IP network. The reasons are:

- this meaning reflects the simple meaning of the words
- the distinction between the public Internet and managed IP networks is blurred and operators may migrate from one to the other whilst providing the same service

We propose that the term **IP telephony** should be used for telephony (a switched pre-dominantly one-to-one service voice service) provided on any network that uses IP either as the public Internet or as a managed IP network.. In other words IP telephony includes either E.164 naming or user@domain naming.

The same reasoning applies as for VoIP.

We propose that **Public Telephony Service (Public Telephony)** should be used for a switched pre-dominantly one-to-one voice service that uses E.164 numbering. This is its existing name and meaning and it would continue to apply whether the service is provided on circuit switched technology or the public Internet or managed IP.

We propose that **Internet Telephone Service (Internet telephony)** should be used for a switched pre-dominantly one-to-one voice service that uses public Internet naming, thus the "Internet" refers to the naming and not the technology nor the public Internet as opposed to managed IP.

We see these as two distinct and different services because they have different identification systems even though the traffic (voice) is similar. In practice many operators will offer both services and IP can support both, but **we consider that they are fundamentally different because a subscriber to only one service cannot communicate with a subscriber to only the other service because the caller can only use one identification system and the called party does not have a identifier within that system**. (Note: ENUM does not solve this because ENUM relies on called parties having **both** types of identifier.)

We note that most of the early implementations of Internet telephony support calls only to users on the same system (same domain name) rather than a full any-any service and that these services are tailored to use by informal closed user groups. They are sometimes marketed as part of an Instant messaging service.

We note also that **Multi-media services** may use either E.164 numbering or Internet naming. Multi-media services are at a very early stage of development with video telephony being one of the main examples to date. It is difficult to say more about them at present. They will need further study

Figure 1 shows the main area of confusion about the relationship of definitions to services, identification and technology. The main uncertainty is how the definitions relate to the services using E.164 that are implemented on IP technology.

Figure 1: Area of uncertainty in definitions
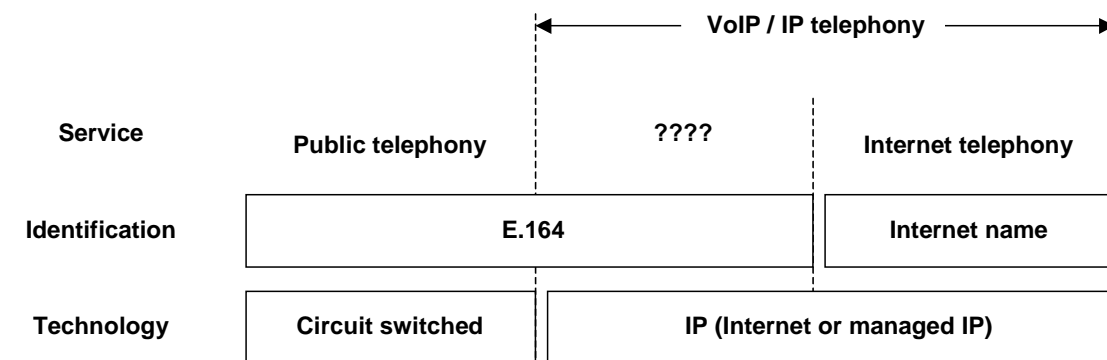
Unless there is a clear decision over the definitions for E.164 services provided on IP, clear discussions will be impossible. The choices are either:

- To extend the scope of "Public telephony" to cover this area
- To extend the scope of "Internet telephony" to cover this area

This paper proposes the former because:

- The current use of "public telephony" is largely technology independent
- If "Internet telephony" is defined to include E.164 on IP and "Public telephony" is restricted to circuit switching, then there is no name for the whole service area that uses E.164 and such a name is needed

Figure 2 shows the terms with the definitions proposed in this paper.

Figure 2: Proposed terms and definitions
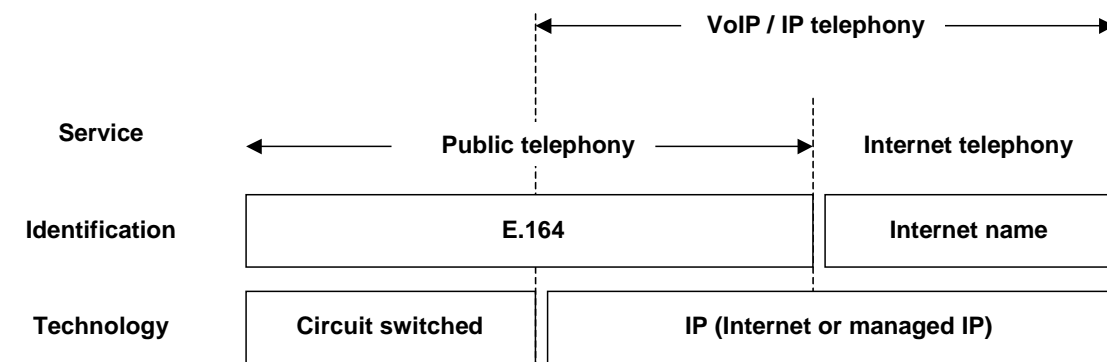
The Internet trade-jargon describes two services:

- **PC-Phone**: where a call can be made to a traditional telephone from a PC and where the call will be carried most of the way on the Internet and handed to a circuit switched network operator at the terminating end. This would be "public telephony" under the proposed definitions because the called party is identified by an E.164 number.

- **PC-PC**: where a call will be made entirely on the Internet. This would be "Internet telephony" under the proposed definitions because the called party is identified by an Internet name.

Both PC-Phone and PC-PC would fall within the proposed meaning of VoIP and IP telephony as both include voice/telephony and use IP technology.

Although the definitions proposed appear to the best solution, we must recognise that there will be some practical difficulty in adopting this terminology because in practice some people are using the term "Internet telephony" to include E.164 services provided on IP. If this practical problem is considered to be too severe to allow the definitions proposed here to be adopted, then other new terms should be introduced to indicate the boundary between services that relates to identification.

Service provision

There are four main categories of company that are providing services:

a)   Traditional telcos with a significant proportion of their own infrastructure
b)   Telcos who work mainly or wholly as indirect operators (their customers use carrier selection, carrier pre-selection or 2-stage call set up) and use leased lines for transmission
c)   Internet Telephony Service Providers (ITSP), who predominantly use the Public Internet and have little infrastructure under their own control (here Internet refers to technology rather than naming)
d)   Internet Service Providers who are adding voice related service features

The motivation for the telco culture operators, a) and b), is to use IP to provide cost savings and enable them to catch up with some of the service developments of the other types of operator.

The motivation for the Internet culture operators, c) and d), is to capture the established public telephony service market and establish themselves as the service providers of the future
In practice many larger companies may appear under more then one or even all categories. Many large telcos are currently backing all options because they are uncertain how the market will develop.

Figure 3 shows the relationship between three of the service categories that we define and the development routes being followed by the different players. This diagram does not show multi-media services because they have not developed significantly yet.

Figure 3: Development routes
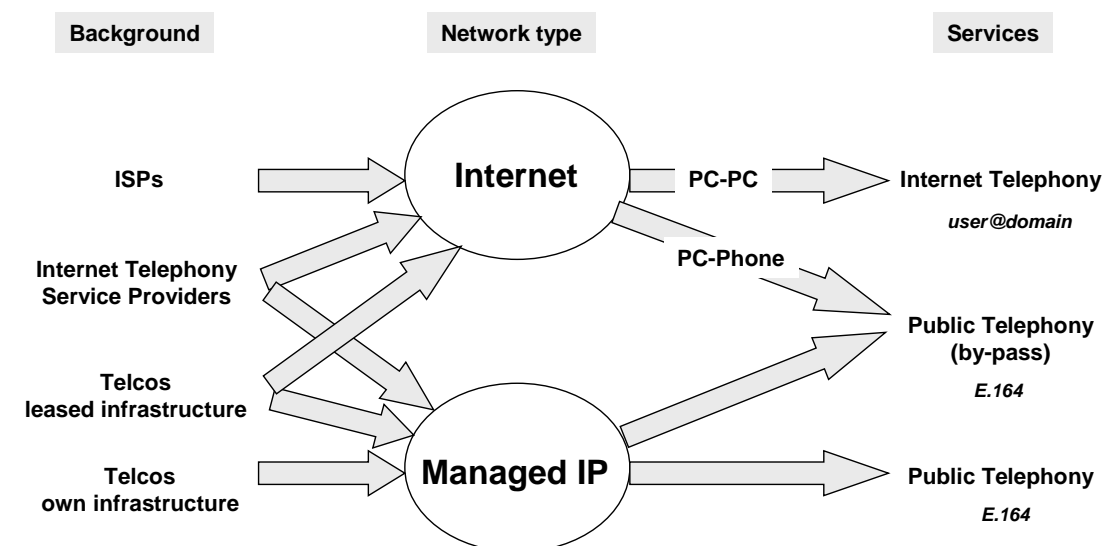
This diagram should help the reader to gain an overview of what is happening.

If regulation addresses services, then there is no need to have formal definitions of ISP, ITSP, telco etc, nor of the public Internet and managed IP

ENUM

How does ENUM fit with these definitions?

One function of ENUM (probably the main one) is to translate from one identification system (E.164) to another (Internet name).

- If the caller accesses ENUM then he does so before selecting which service to use (public telephony based on E.164 or Internet telephony based on Internet names). The caller sets up the call with whichever service they choose after reviewing the communication possibilities listed by ENUM.

- If the network accesses ENUM after accepting a call to a party identified by an E.164 number then the network is still providing the Public Telephony service to the caller but is delivering the call on a different service and can be thought of as providing a service translation.

Effect of draft 2 of the Policy Forum Report

The draft report currently says:

1.2 The term "IP Telephony" can mean different things to an engineer or policy-maker and there is no consensus at this point on its exact definition. However, for purposes of discussion, it is necessary to provide some delineation of the various forms that IP Telephony can take. Accordingly, as a working definition and for the purposes of this Report, "IP Telephony" is used as a generic term for the different ways of transmitting voice, fax and related services over packet-switched IP-based networks. The transmission of voice over IP-based networks can be subdivided into two major subsets: VoIP (Voice over IP) and Internet Telephony. The difference lies in the nature of the underlying IP network: VoIP utilizes managed, private IP-based networks, while Internet Telephony primarily uses the public Internet. Since IP Telephony is a broad term, throughout the Report an effort has been made to clearly identify the specific type of network or service that is being described and discussed.

These proposals take the same view of the term "IP telephony" but a different view of "VoIP (Voice over IP)" and "Internet Telephony". The draft report has not yet defined services and we think that adequate coverage of services needs to be added.

Regulation and functional equivalence

The discussion of functional equivalence as the basis for applying the existing regulations on telephony on circuit switched networks to some services on IP is focussing on the equivalence of the traffic rather than on the identification system. Consequently the discussion is struggling because the various aspects of the traffic do not provide clear, simple and stable handles for distinguishing where regulation should be applied.

The definitions proposed here would enable the existing regulations for public telephony to be applied to telephony that uses E.164 numbering but is provided over IP. Some countries may wish to review/simplify/reduce these regulations, but that is a de-regulation/liberalisation issue not one concerning IP.

The regulations for public telephony would not apply to Internet telephony (or instant messaging) unless positive actions are taken to apply them also to these services. Such actions may not be needed until the market develops to the point where some customers start to have only Internet telephony and no longer have public telephony, but that is some time away, possibly a long time away as it will be a commercial imperative to provide compatibility with users who still have only circuit switched technology.

The two areas that are driving the quest for a definition of functional equivalence are:

- Subsidies to support universal service
- High termination rates (accounting rates) in some countries

which are currently applied only to public telephony and therefore create an added incentive for using Internet telephony instead of public telephony. However for these issues the main question is not the definitions to use but the desirability and practicability of continuing these policies in their current form given the developments in technology.