ENUM
A Protocol with Big-time Ambition.

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As Internet based Voice-over-IP services continue to improve in quality and user acceptability, the need for practical interconnection between the legacy PSTN network and the new IP environment increases. ENUM, as a protocol, was developed to help PSTN users access users of IP devices. But ENUM is also a service, and companies are jockeying for position in the hope of making big profits. Ultimately, whether this ambition comes to fruition still depends on how interested users are and how much they are prepared to pay.

Voice-over-IP is getting there. VoIP services continue to improve as VoIP service providers improve client software, and as they build out their own IP backbones to bypass more of the Internet, to reduce latency, noise and distortion. SIP devices are appearing, H.323 will continue to have its place too. IPv6 will also help, some day.

VoIP may not supplant plain old telephone service for "lifeline" services in the near future. But there are three main reasons why people will start to make more and more use of VoIP:

1. For cost savings – especially on international calls.

2. Being able to integrate different types of connectivity in one portable end device – for example receiving voice, text, fax, file transfers and video, all on a PDA, which may connect sometimes via high speed land line, sometimes via a wireless data link (G3, GPRS or 802.11x).

3. Being able to use different devices at different times – a desktop computer in the office, a notebook on the road, a PC in a cyber café, a Mac at a friend's house, a VoIP handset at a WiFi public hotspot – and quickly and easily make that device "their" terminal for receiving and making calls of any type supported by the machine.

To achieve these benefits, we need interworking between the world of traditional phones and the world of IP. Interworking will be attractive to users, and could accelerate the acceptance of IP telephony as a mainstream service. One of the tools that claims to be essential in helping us make that transition is ENUM.

ENUM stands for E.164 Number Mapping. ENUM started life as an IETF (Internet Engineering Work Force) Working Group, then became a protocol, and now it has transformed itself into a service, and a money-making opportunity.

ENUM (the protocol) provides a means of translating old-fashioned phone numbers into Internet destinations, and is therefore seen as a key tool in accelerating the

transition to VoIP (Voice over IP) telephony. As a primary aim therefore, ENUM facilitates the making of calls between the legacy environment and the new world of IP.

Almost as a by-product, but now fundamental to the ENUM concept, once the phone number is translated, any call can be redirected not just to a single destination, but to one of several. This provides a means of delivering both a follow-me service and unified messaging.

ENUM converts an E.164 number (a plain old telephone number) into a domain name, which then can use the existing Internet DNS hierarchy to identify a location that contains a list of Unified Resource Identifiers (URIs – also known as a URL). A URI can be an email address or an SIP identifier or even another telephone number. In this way a phone number can be used as a unique identifier to point to a prioritized list of possible destinations for a call. The call is then redirected according to preferences set by the number's owner.

The methodology is clearly described in IETF RFC 2916, for those interested in the details. (It is also summarized in just about every document and article written on the topic of ENUM, so there is no need to repeat it here.) When there is a need to convert phone numbers into URIs, ENUM seems like a pretty good approach, based on a simple algorithm and tried and tested DNS technology.

By the end of 2002, the IETF should have accepted the ENUM protocol as a standard. Indeed several companies (for example NetNumber) are already piloting services based on ENUM.

ENUM has been the subject of much publicity. Ownership of ENUM registries has created much debate. Put simply, there are two camps, one arguing for a centralized approach, the other for a decentralized approach. No one suggests it doesn't matter.

It matters mainly because the financial opportunity is seen to be enormous. The assumption must be that of all the users of the 2 billion phones in the world, quite a few million will pay extra for ENUM based services.

If people are prepared to pay, then companies will be prepared to charge, and ENUM certainly creates a number of charging opportunities. So far it is not clear what business models will work best, what interconnect charging schemes will be most appropriate, and what customer charging structures will be most successful in winning customers and delivering profits. Leading ideas for chargeable services include:

– Fees to register a number and the associated URIs on the ENUM database.

– Charges to arrange for the intelligence in the PSTN to divert incoming calls based on an ENUM query.

– Per-call charges for ENUM database queries, and for interconnection between PSTN and IP networks.

ENUM proponents may consider ENUM to be an indispensable new technology, but will enough cash-paying users agree? How likely are people to pay for these services, and how much?   Hard facts are still not readily available. No doubt the IETF and those who are investing heavily in ENUM's future are basing this initiative on more than supposition. However we have not yet seen authoritative large-scale market research which assesses the size of the market for ENUM *based on interviews with potential buyers of these services*.

The target market consists primarily of people who use Internet-based devices and have a dedicated personal phone line (probably a mobile). They need to value the convenience of being able to receive calls (voice, text, video) from both Internet VoIP and from PSTN users while publishing only a traditional phone number. They will also have multiple identities (email, phone, fax, VoIP etc.) that they would like to manage in a unified way, so that calls to any of these destinations can be channeled to a chosen device.

In the short term, unified messaging might sell. In the past, numbers were assigned to devices, not people, and to make use of multiple services, people had to use multiple devices. Now that we have devices able to handle multiple services, clearly it will help some people to be able to receive everything on one terminal. But, ultimately, if everyone moves in that direction, unified messaging happens anyway, without chargeable registry services.

So is ENUM essential for VoIP telephony? Not entirely. Many other IETF and ITU protocols are probably more important and they are already out there, working away. Millions of people already communicate using VoIP. VoIP service providers have been around for some time, providing PC-to-PC and PC-to-phone voice connections. Instant Messaging services of various types have extended their capabilities – no longer just for simple real-time text messages, now they can handle voice calls, video calls and data file transfer. Inexpensively. There is certainly a need for worldwide service provider interconnection, and ENUM could help there, but it isn't technically necessary.

The biggest gap that ENUM can help fill is by making it really easy for a PSTN user to dial an IP phone. Here ENUM offers the ultimate solution – no change for old world users. This is achieved by inviting all users in the new environment to define their identity using a legacy environment phone number. It's certainly one way of doing it.

If the cost of using ENUM proves to be low enough then perhaps everyone will opt in automatically. If the cost is too high, we can expect some people to remain opted out, and live with legacy/IP separation for some time longer. Or we can expect imaginative work-arounds to appear. The main problem, after all, is the inability of a telephone to generate an alpha-numeric URL. Any of a number of technologies could be used to allow PSTN users to connect to IP users – voice recognition, interactive voice response systems, or some variation on the speed dialing approach.   The challenge of connecting POTS calls to IP terminals could be solved in the POTS environment, without compromising and complicating the IP environment.

This is not to say that ENUM will not be a commercial success. On the basis of what we understand right now, it may be the easiest way forward. But it will be optional, and success will depend on convincing users to pay money for the value that ENUM delivers. There may be a good business opportunity in running the registers, but it is difficult to see this as a potential treasure trove of high profits in a captive market. Once again, as in so many other areas of telecommunications, money-making opportunities are there, but profitability will need high volumes and high service levels coupled with low prices. Commodity connectivity is already here, especially in the world of IP and the Internet. ENUM, if it plays, will have to fit in with that model.

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