



Office of Utility Regulation

**ENUM – Accessing multiple customer
services through Telephone Numbers
DTI Consultation**

Information Notice

Document No: OUR 04/21

October 2004

Office of Utility Regulation
Suites B1 & B2, Hirzel Court, St Peter Port, Guernsey, GY1 2NH
Tel: [0]1481 711120, Fax: [0]1481 711140, Web: www.regutil.gg

1. The Development of ENUM in the UK

In June 2003, the OUR published an Information Notice¹ on possible future developments of and use for ENUM. The Department of Trade and Industry (“DTI”) in the UK has the lead in implementing ENUM- an acronym for *Electronic NUMbers*. The purpose of this Information Notice is to make interested parties aware of a further consultation currently being undertaken by the DTI on the arrangements being proposed for the ENUM public database.

ENUM is an addressing protocol which facilitates convergence between traditional telecoms and internet worlds by enabling a range of communications mechanisms (e.g. mobile telephone, fax, email, etc.) to be identified for a participating customer by mapping that customer’s telephone number into the Internet domain name system using a system developed by the IETF’s (Internet Engineering Task Force) Telephone Number Mapping working group, a technical body that develops Internet Standards. Annex 1 sets out further how ENUM works.

This sounds complicated but in practice should be easy to use and transparent to the customer. Users make calls by dialing up a single phone number in the usual way and within seconds they will be given choices of how they can complete the call in a variety of different ways. If widely taken up, ENUM potentially offers a mechanism to contact anybody, anywhere on the communication terminal and using the communications service that is most efficient or convenient for both parties.

2. Objectives of this Information Note

The purpose of this Information Notice is twofold; first to make interested parties in the Bailiwick aware of current progress in the development of ENUM and second to highlight the consultation currently being undertaken by the DTI.

This matter is also being considered by the States of Guernsey, in particular by the Department of Commerce and Employment and the Data Protection Commissioner. Anyone who wishes to bring any comments on this matter to the attention of the Department of Commerce and Employment or the Data Protection Commissioner should do so as soon as possible, but in any case at least one week before the closing date for submissions to the DTI of 10th November 2004.

This will mean that, if there are any issues specific to Guernsey that might facilitate future opportunities and benefit customers in the Bailiwick, those issues can be raised with the DTI as part of the consultation process.

¹ Document OUR 03/16: ENUM: Accessing multiple customer services through Telephone Numbers: Opportunities for Guernsey

3. How to respond

Details of the DTI's ENUM consultation are available from that organisation's website at:

www.dti.gov.uk/consultations/consulation-1230.html

Interested parties who wish to comment should send their comments to the DTI by 10th November 2004 to:

ENUM Consultation
Simon Hicks
Communications Networks
Department of Trade and Industry
Floor 2
151 Buckingham Palace Road
London
SW1W9SS

Email: ENUM.consultations@dti.gsi.gov.uk

Tel: 020 7215 1028

Fax: 020 7215 1721

4. Next Steps

The DTI proposes to publish within 3 months of the end of the consultation a summary of the main points made by respondents and the further actions it proposes to take. This will be published on the DTI website.

Separately there are some fundamental regulatory issues that will need to be considered for the longer term development of ENUM in the Bailiwick, such as whether the number allocations for the Bailiwick form part of the mainland UK Tier 1 & 2 registries or whether the Bailiwick should have its own registry. There are also a number of issues that need to be considered that may impact upon the way in which ENUM develops – among these are matters relating to data confidentiality, the demand for numbers, identity hi-jacking and the fact that monopolies may result for the administration of ENUM.

Should there be interest in developing ENUM in Guernsey, the OUR, in conjunction with other parties where appropriate, will progress relevant issues in the Bailiwick once the proposals in the UK have been developed further.

/ENDS

What is ENUM?

ENUM is a key Internet DNS²-based emerging protocol, supported by its own architecture of databases that specifically targets the convergence of the telecoms and internet worlds. Put simply, ENUM allows one to type a standard telephone number into a Web browser (or similar tool) and receive back the number-holder's email address, Web URL or other data that can be used to contact the number-holder. This data can also show that person's preferred means of contact, facilitating connection using the cheapest or most effective or most efficient means available – for example IP telephony if it is available, or fax in the case of simple page-image transfer. The list of contact details can be amended, added to, or updated without changing the telephone number to be used for access. Figure 1 below demonstrates this graphically.

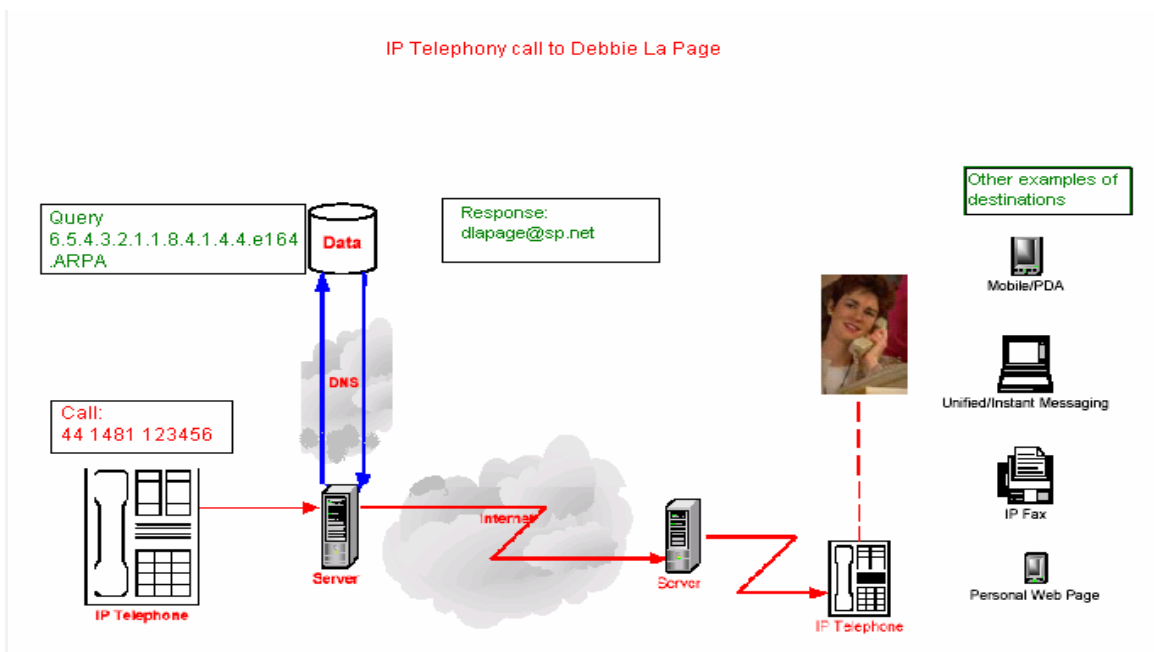


Figure 1

How does ENUM Work?

The standard RFC 2916 specifies that ENUM will utilise a format that appends telephone numbers to the suffix e164.arpa³. The following example demonstrates how the technique

² Domain Name System

³ The Address and Routing Parameters Area top level domain, used for network infrastructure. e164 relates to the telephone number that uses a string of decimal digits to uniquely indicate a public network termination point

would work. The example takes a Bailiwick phone number [+44 1481 123456] and translates it into a format that the DNS system can understand. The conversion process is as follows:

Step 1: Write the E.164 number in its full form, including the country code, then remove all non-digit characters with the exception of the leading "+". This results in +441481123456.

Step 2: Remove all characters with the exception of digits and put "dots" between each digit.

This results in 4.4.1.4.8.1. 1.2.3.4.5.6.

Step 3: Reverse the order of the digits and append "e164.arpa"

This results in 6.5.4.3.2.1.1.8.44.1.4.4.e164.arpa.

Each and every digit to the left of the domain is a zone in DNS terms, and authority for zones can be delegated at each digit. Although this does not have to be done, it makes the system more scaleable and would enable Guernsey lookups to be handled by a different server to those for Jersey for example. A DNS look up is then made using this domain name format from which will be returned a set of NAPTRs⁴ records that correspond to this number. Details held within the NAPTRs would previously have been specified by the user who has the rights of use to that particular e.164 number.

This permits both individuals and enterprises the ultimate right to decide what Internet services are available for this number. This data can be stored by order and preference, which is important, as this will allow user applications to be written to exploit this information. For example: a VoIP⁵ application can be written to always search for a SIP⁶ address associated with a telephone number. If a SIP address exists then a voice session can be set-up between two IP clients rather than the original IP call being routed to the PSTN⁷.

As well as SIP URIs⁸ for VoIP calls, the DNS entries can contain mobile phone, voicemail, e-mail addresses for Voice Profile for Internet Mail (VPIM)-based universal

⁴ Naming Authority Pointer Resource Records. A DNS resource record that specifies a regular expression-based rewrite rule, which when applied to an existing string, will produce a new domain label or a Uniform Resource Identifier (URI)

⁵ Voice over IP

⁶ Session Initiation Protocol. SIP is an emerging protocol for Internet conferencing, telephony, presence, event notification and instant messaging. The protocol initiates call set-up, controls routing, authentication and other signalling for IP communications.

⁷ Public Switched Telephone Network

⁸ URI – Uniform Resource Identifier

messaging, PGP⁹ keys for secure messaging, or Lightweight Directory Access Protocol (LDAP)-based white page resources for advanced caller identification. The DNS entries could even contain H.323¹⁰ addressing information. In fact, any URL can be placed inside, allowing clients to be contacted using a variety of communications mechanisms - even a web home page.

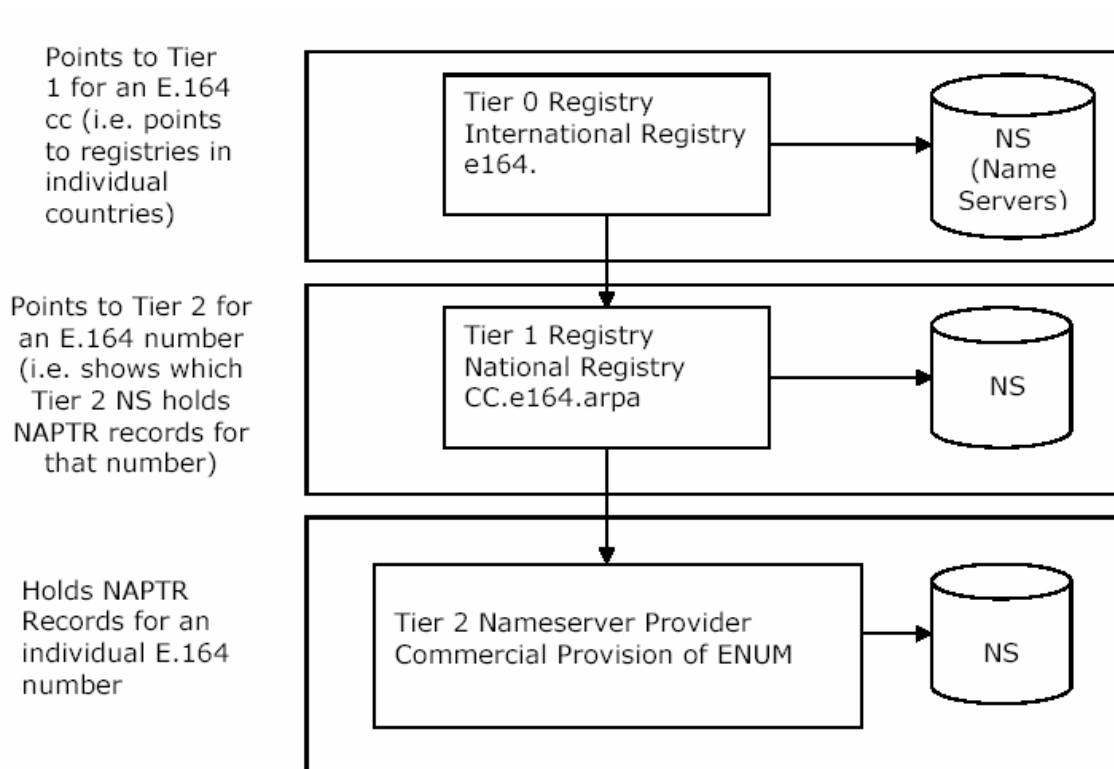
Since each NAPTR record has ordering and preference values for the URI associated with it, powerful and flexible communication strategies can be applied. For example, the configuration could be set to use VoIP if the mobile phone is unreachable or to use email if the fax number is busy. Despite these endless possibilities, ENUM depends, of course, on a particular phone number having some kind of resource on the Internet associated with it. However, the vast majority of phone numbers correspond to simple PSTN phones. Under the proposals included in the DTI consultation, these numbers would have no corresponding entries in the DNS. These numbers will have no corresponding entries in the DNS. ENUM is primarily of use if a user has several ways of being contacted (i.e. mobile, email, fax)

⁹ Pretty Good Privacy (PGP) is a popular program used to encrypt and decrypt e-mail over the Internet. It can also be used to send an encrypted digital signature that lets the receiver verify the sender's identity and know that the message was not changed en route.

¹⁰ H.323 is a standard approved by the International Telecommunication Union (ITU) in 1996 to promote compatibility in videoconference transmissions over IP networks.

ANNEX 2: ENUM Structure

The diagram below shows the core ENUM relationships, from the international level through to the end-user, apart from the Registrar, who assembles and enters the customer data in the relevant databases. An explanation of the various tiers is set out below.



Tier 0 Entity; Entity that maintains the name server for the e164.arpa zone containing the authoritative NS records for domain names corresponding to recommended E.164 Country Codes or portions thereof, as defined by ITU member states.

Tier 1 Entity; The entity that operates the Tier-1 ENUM service within a country or Region and has (a) pointer(s) to the Tier 2 Entity or Entities for all ENUM-enabled telephone numbers in that country.

Tier 2 Entity; The entity that hosts the NAPTR resource records associated with each telephone number.

Other Useful Links

Internet Engineering Task Force: <http://www.ietf.org/html.charters/enum-charter.html>

International Telecommunications Union: <http://www.itu.int/home/index.html>

UK ENUM Group (also contains links to other resources) www.ukenumgroup.org