

dti

ENUM

Consultation on the
Proposed Arrangements

AUGUST 2004



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Proposed Arrangements for ENUM

10 August 2004

DTI is consulting on the arrangements proposed for the ENUM public database that will link telephone numbers to Internet locations and identities such as email addresses.

ENUM may become an important element in the process of convergence between the traditional telecommunications world and the Internet world. The arrangements for ENUM necessarily include at least one unique registry function and therefore particular care needs to be taken to prevent abuse.

The proposed arrangements have been defined by an open group of interested UK parties. DTI is seeking confirmation that the arrangements meet the needs of an open competitive market and adequately protect the interest of all participants and safeguard the public interest.

Issued **10 August 2004**

Respond by **10 November 2004**

Please send comments, together with supporting evidence, on any issue covered by this consultation, preferably by e-mail, to:

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Foreword

**by Stephen Timms,
Minister of State for Energy, E-Commerce and Postal Services**



ENUM is a system that links telephone numbers to Internet names and destinations, increasing the flexibility of electronic communications. It is one of a number of developments that will allow us to operate more easily and effectively in the converging worlds of telecommunications and the Internet. The UK has been one of the foremost players in developing the ENUM concept and the Government wishes to continue to stimulate further development in this area.

The purpose of this consultation is to seek the views of all stakeholders on proposals for the management of ENUM in the UK under self-regulation by the industry. We would welcome views from service providers, future subscribers, users and those with a general interest in electronic communications. The DTI wishes to ensure that the framework will ensure open and fair competition and that it contains safeguards to protect the public interest. This approach is consistent with current Government policy not to regulate the allocation and use of the Internet identifiers on which ENUM relies. It also accords with the trend in Europe and the UK towards greater liberalisation and self-regulation for electronic communications.

The proposals in this document could have an important impact on development of the UK's online economy, in which we want to be world leaders. Please do let us know what you think.

A handwritten signature in black ink that reads "Stephen Timms". The signature is written in a cursive style with a long horizontal line extending from the end.

Stephen Timms

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Executive Summary

- 1** ENUM is a proposed international public database that links telephone numbers to Internet names and other Internet related destinations and identities. Any party can interrogate the database with the telephone number of an ENUM subscriber and the database will return a list of identities and Internet related destinations that are associated with the subscriber; examples are the subscriber's email address, mobile telephone number or web page. These identities can then be used to establish various forms of communications with the ENUM subscriber, eg the party could send an email to an ENUM subscriber having initially known only their telephone number. The ENUM database can be used both by human users and by electronic processes (applications) that are providing other forms of communications services.
- 2** DTI is consulting on ENUM because ENUM may become an important element in the process of convergence between the traditional telecommunications world and that of the Internet. The arrangements for ENUM necessarily include at least one unique registry function and therefore particular care needs to be taken to prevent abuse.
- 3** The three main issues that the DTI are consulting on are:
 - the proposed implementation of ENUM in UK including the distinctions in the functions between the single Tier 1 registry and the competing Tier 2 registrars and nameserver providers
 - the management arrangements for ENUM including the formation of the UK ENUM Committee (UKEC) and the principles for the appointment of the Tier 1 registry and the terms under which the registry will be run
 - the arrangements for the authentication of ENUM entries
- 4** The arrangements have been proposed by an open group of interested UK parties and are based on procedures specified under the European Telecommunications Standards Institute.
- 5** DTI is seeking feedback on whether the arrangements meet the needs of an open competitive market and adequately protect the interest of all participants and safeguard the public interest.
- 6** This consultation is addressed to all parties in the telecommunications industry and to users.
- 7** A list of those organisations and individuals consulted is in Annex E. We would welcome suggestions of others who may wish to be involved in this consultation process.

Crynodeb Gweithredol

- 1** Mae ENUM yn gronfa ddata gyhoeddus ryngwladol arfaethedig sy'n cysylltu rhifau teleffon ac enwau Rhynggrwyd a chyfeiriadau a dynodiadau eraill sy'n perthyn i'r Rhynggrwyd. Gall unrhyw un ymgynghori â'r gronfa ddata drwy rif teleffon y tanysgrifydd ENUM a bydd y gronfa ddata yn dangos rhestr o ddynodiadau a chyfeiriadau Rhynggrwyd sy'n gysylltiedig â'r tanysgrifydd; enghreifftiau yw cyfeiriad e-bost, rhif ffôn poced neu dudalen gwe'r tanysgrifydd. Wedyn, gellir defnyddio'r dynodiadau hyn i gychwyn gwahanol fathau o gyfathrebiad â'r tanysgrifydd ENUM, e.e. gellid anfon e-bost at danysgrifydd ENUM o wybod dim ond y rhif teleffon i ddechrau efallai. Gall y gronfa ddata ENUM gael ei harfer gan ddefnyddwyr dynol a hefyd gan brosesau electronig (cymwysiaid) sy'n darparu mathau eraill o wasanaeth cyfathrebu.
- 2** Mae'r DTI yn ymgynghori ynghylch ENUM gan y gall ENUM ddod yn elfen bwysig yn y broses gydgyfeirio rhwng y byd telathrebu traddodiadol a byd y Rhynggrwyd. Gall trefniadau ENUM gynnwys o angenrheidrwydd o leiaf un ffwythiant cofrestru unigryw ac felly mae angen gofal arbennig i osgoi camddefnyddio.
- 3** Y tair prif ystyriaeth y mae'r DTI yn ymgynghori yn eu cylch yw:

 - yr arfaeth i weithredu ENUM yn y DU, gan gynnwys y gwahaniaethau o ran ffwythiant rhwng y gofrestrfa Lefel 1 unigol a'r cofrestryddion Lefel 2 cystadleuol a darparwyr gweinyddwyr enw
 - trefniadau rheoli ENUM, gan gynnwys ffurfio Pwyllgor ENUM y DU (UKEC) a'r egwyddorion ar gyfer penodi'r gofrestrfa Lefel 1 a'r amodau ar gyfer rhedeg y gofrestrfa
 - y trefniadau ar gyfer dilysu cofnodion ENUM
- 4** Cynigiwyd y trefniadau gan grwp agored o fuddwyr yn y DU ac maent yn seiliedig ar ddulliau gweithredu sydd wedi eu pennu o dan Sefydliad Safonau Telathrebu Ewrop.
- 5** Mae'r DTI yn ceisio atborth o ran a yw'r trefniadau'n diwallu anghenion marchnad gystadleuol agored ac yn gwarchod budd pob cyfranogydd yn ddigonol, ynghyd â lles y cyhoedd.
- 6** Mae'r ymgynghoriad hwn yn anelu at bawb sydd â buddiant yn y diwydiant telathrebu, ynghyd â defnyddwyr.
- 7** Gwelir rhestr o'r cyrff a'r unigolion hynny yr ymgynghorir â nhw yn Atodiad E. Byddem yn croesawu awgrymiadau ar gyfer eraill a allai fod am chwarae rhan yn y broses ymgynghori hon.

Questions

DTI would welcome feedback on any aspect of the proposal including on the questions listed below:

- 1** *How important do you think ENUM is likely to become?*
- 2** *How keen would you be to add your details to ENUM?*
- 3** *Is the structure at option iv the best option for the UK market? If not, what alternative would be most suitable? Please give your reasons.*
- 4** *Are the proposed arrangements likely to be sufficiently effective, transparent and commercially neutral?*
- 5** *How could the arrangements be improved?*
- 6** *Which independent organisations would you like to see appointed to the UK ENUM Supervisory Board? Please give reasons.*
- 7** *Are the proposed principles and methods for selecting and appointing the ENUM Tier 1 Registry appropriate?*
- 8** *What additional considerations (if any) should be applied in the selection process?*
- 9** *How could the incentives for good performance by the ENUM Tier 1 Registry be increased?*
- 10** *Authentication*
 - a. To what extent are the proposed authentication methods justified?*
 - b. Do they represent an unreasonable disincentive to potential ENUM subscribers?*
 - c. How much effort would be reasonable for the registration process?*
- 11** *a. What role, if any, should telephone service providers play in authentication?*
 - b. Should they be required to authenticate ENUM entries?*

12 *How can the authentication proposals be improved?*

13 *What interest do you have and what uses do you foresee for a UK number range specifically for entries in ENUM and independent of the provision of a telephone service?*

14 *Competing systems*

a. Do you consider that there is a role for more than one such system in the market?

b. What controls should be applied to other systems to ensure that they are run in a responsible manner?

c. How should such controls be applied?

Please see also the Regulatory Impact Assessment in Annex C.

1 Introduction

- 1.1** The purpose of this Consultation is to invite opinions and comments about the proposed arrangements for the implementation of ENUM in UK. The arrangements have been planned over the last eighteen months by the informal UK ENUM Group (UKEG), which was established following a workshop on ENUM run by the DTI in June 2001. A trial of ENUM by the UK ENUM Trial Group (UKETG) was run in UK during 2003, and trials have also been held in various other countries. This consultation is about 'Public ENUM', available for general public use. It does not cover 'Infrastructure ENUM', which is used for closed systems between commercial operators.
- 1.2** The development of ENUM will be primarily a commercial initiative and the investment and its commercial prospects are issues that will be left to the market players. The main issues of concern in this consultation relate to the top level of ENUM, where the management of the UK's numbering space within ENUM is logically a single monopoly function, and the extent to which the proposed organisational framework allows for open and fair competition without unduly advantaging any particular class of organisation.
- 1.3** The DTI is particularly concerned that the arrangements should not allow existing large companies such as the larger telecommunications operators and Internet Service Providers to gain undue influence in ENUM. This could arise as a result of their strong position in existing markets to the detriment of smaller newer companies. The openness and competitive neutrality of the arrangements are especially important. DTI is also concerned that the public interest aspects are taken into account and adequately protected.
- 1.4** A glossary of terms, including a list of abbreviations/acronyms, can be found in Annex B.

2 What is ENUM?

The basic concept

- 2.1** ENUM is a proposed international public database that links telephone numbers to Internet names and other Internet related destinations and identities. Any party can interrogate the database with the telephone number of an ENUM subscriber and the database will return a list of identities and Internet related destinations that are associated with the subscriber; examples are the subscriber's email address, mobile telephone number or web page. These identities can then be used to establish various forms of communications with the ENUM subscriber, eg the party could send an email to an ENUM subscriber having initially known only their telephone number. The ENUM database can be used both by human users and by electronic processes (applications) that are providing other forms of communications services.
- 2.2** Figure 1 shows how ENUM works. Caller A (the ENUM End user) wishes to communicate with Called B (the ENUM Subscriber). Caller A knows B's telephone number and interrogates ENUM with the telephone number. The ENUM database holds information about B's communications facilities and optionally his current preferences for receiving incoming communications. The ENUM database returns this information to Caller A and then A decides how to communicate with B and initiates a normal form of communication using whichever of the identities and forms of communications seem most appropriate. For example, Caller A could use ENUM to find out B's email address and then send an email.

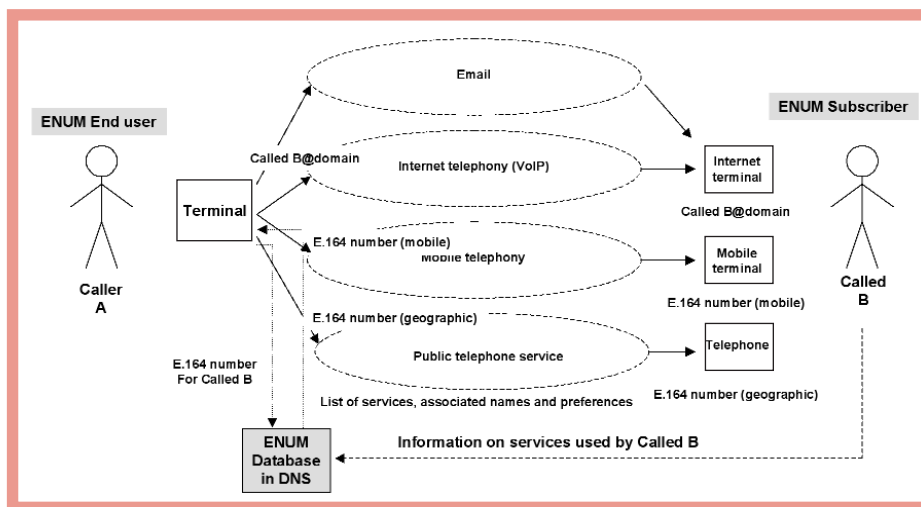


Figure 1: The basic ENUM concept

- 2.3 Although Figure 1 shows an end user interrogating the ENUM database, this is only one of various possibilities. The ENUM database could be interrogated automatically by software in the end user's terminal, or by an entity in a system that is used to provide a service to an end user. In the latter case, the end user may not be aware that ENUM is being used by the service provider. An end user does not need to be an ENUM subscriber.
- 2.4 Figure 2 shows an example of the information that can be retrieved from a query to ENUM for the number +441794833303. This example is taken from the UK trial.



SMS to +447765402268

POTS to +441794833303

SIP to 3666@voip.srmr.co.uk

EMAIL to mike.hook@roke.co.uk

WWW to www.roke.co.uk

Figure 2: Example of information from ENUM

- 2.5 The potential significance of ENUM is that it provides a bridge between the disparate systems of telephone numbers and Internet identities. Although there is a wide range of views on the prospects for ENUM, such a bridge could become important as telco networks and the Internet "converge" in the future. This potential significance is one of the main reasons why the DTI has facilitated the development of ENUM.

Questions

- 1 *How important do you think ENUM is likely to become?*
- 2 *How keen would you be to add your details to ENUM?*

ENUM Provision

2.6 ENUM is based on the Domain Name System (DNS) that supports the main naming structure of the Internet and provides translation from a domain name to an IP address, which is used for the routing of packets across the Internet. The technical aspects of ENUM are specified in the Internet Engineering Task Force's specification RFC 3761¹, which includes the formats for storing information about ENUM subscribers within the DNS and a description of the protocols for accessing this information.

2.7 The implementation of ENUM involves the creation of a special sub-hierarchy within DNS that mirrors the allocations of E.164 numbers with the order of the digits reversed. The numbers are held under the domain e164.arpa. The domain .arpa is used to support the Internet infrastructure.

2.8 As an example, the number

+44 20 7215 5000

would have the corresponding domain name:

0.0.0.5.5.1.2.7.0.2.4.4.e164.arpa

2.9 Within DNS the location .4.4.e164.arpa is the top of the hierarchy for UK numbers. The party that runs the systems for this location that point to the systems that support the lower levels is called the ENUM Tier 1 registry. Running the ENUM Tier 1 registry in UK will be a unique function and a major part of this consultation is concerned with the appointment of the party that will be the ENUM Tier 1 registry.

2.10 The main function of the ENUM Tier 1 registry is to point to the nameservers that hold the information about ENUM subscribers. These nameservers are run by or for ENUM Registrars who are competing organisations that interact with ENUM subscribers. For example the ENUM registrars collect, check and update the information about the subscriber, inform the ENUM Tier 1 registry that the subscriber's number is now active within ENUM and store the information on line as part of DNS. Competition and choice at the ENUM Registrar level are important, as this is where most of the administration and costs are incurred and where there is more scope for innovation and service differentiation.

1. See <http://www.ietf.org/rfc/rfc3761.txt?number=3761> issued April 2004. This supersedes RFC 2916 (September 2000 - See <http://www.ietf.org/rfc/rfc2916.txt?number=2916>)

- 2.11** The physical storage on line is the function of nameservers, which may be run by the same organisation as the ENUM Registrar or run by a separate organisation.
- 2.12** Application Service Providers (ASPs) will use the subscriber information in the ENUM database to provide or to augment various services to users. Figure 3 shows the main parties and their relationships. The exact information flows are still being specified.

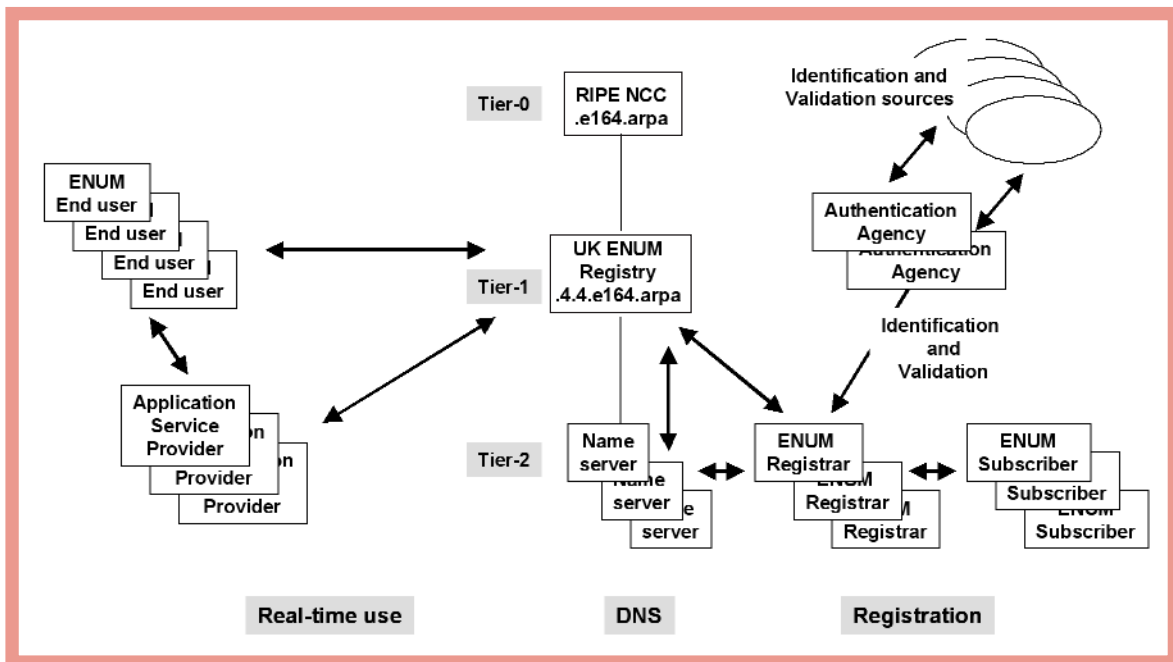


Figure 3: The organisation of ENUM and main categories of parties

- 2.13** In its preparatory work, UKEG reviewed several options for the structure of ENUM, including:
- i. Separate ENUM Tier 1 registries for different ranges of numbers
 - ii. A single integrated ENUM Tier 1 registry, ENUM registrar, nameserver
 - iii. A single integrated ENUM Tier 1 registry and nameserver but separate competing ENUM registrar functions
 - iv. A single ENUM Tier 1 registry, but with separate, competing nameservers and ENUM registrars that may be run separately or by the same organisation
- 2.14** UKEG concluded that option iv, which is the one described previously, is the best option. It provides the simplest solution for the monopoly registry

functions whilst moving most of the functionality into the competitive and flexible nameserver and registrar area where there is most scope for innovation and adding value.

Questions

- 3** *Is the structure at option iv the best option for the UK market? If not, what alternative would be most suitable? Please give your reasons.*

ENUM Responsibilities

- 2.15** ENUM provides a linkage between telephone numbers and domain names and so links two communications worlds that have developed quite differently. The proper handling of rights of use of telephone numbers and domain names is a central part of the arrangements for ENUM and one of the main reasons for the DTI's involvement.
- 2.16** Telephone numbers are allocated in accordance with Recommendation E.164 of the Telecommunications Sector of the International Telecommunication Union (ITU), which is an international Treaty organisation under the United Nations. The DTI, with support from Ofcom, represents the UK in ITU. Recommendation E.164 allocates numbers beginning with 44 to the United Kingdom. These numbers are sub-allocated in blocks to operators by Ofcom whose responsibilities in relation to the numbers are set out in the relevant Act². This defines "telephone numbers" in a very broad manner that is intended to include domain names through the definition : "number includes data of any description"³. However, an exclusion order⁴ excludes a domain name from treatment as a telephone number because the Government's current policy is to adopt a light handed approach towards Internet regulation.
- 2.17** The Internet uses a system of domain names to identify entities connected to the Internet. Domain names have the form:

<stringN>....<string2>.<string1>.<second level domain>.<top level domain>

2. Communications Act 2003 (Sections 56-63)

3. Section 56(10)

4. Statutory Instrument 2003 No 3281 (Telephone Number Exclusion (Domain Names and Internet Addresses) Order 2003).

with the highest priority to the right. Internet top level domains are allocated by the Internet Corporation for Assigned Names and Numbers (ICANN), which has the status of a not-for-profit organisation based in California. There are two types of top level domain, country codes such as .uk and generic domains such as .com and .org. The generic domain, .arpa, is allocated for use by functions that support the operations of the Internet. Unlike the telephone networks, the Internet depends on an international hierarchical and distributed database called the Domain Name System (DNS) to translate domain names into Internet Protocol Addresses that are used by the networks of the Internet to route communications. DNS is composed of a cooperative hierarchy of database computers that corresponds to the structure of the domain name. These computers are operated by registries who follow guidance from ICANN.

2.18 The running of the international routing for ENUM as a whole (Tier 0 Registry) has been delegated to Réseaux IP Européens Network Coordination Centre (RIPE NCC) by the Internet Architecture Board. RIPE NCC has made an interim agreement with the ITU to notify it of any applications by parties who wish to act as registry of domain names that correspond to E.164 country codes and the ITU in turn notifies the national administration concerned, ensuring some control over the domain names space that relates to E.164 country codes. DTI has agreed to the use of .4.4.e164.arpa for the trial and will transfer this function to the UK registry appointed under the permanent arrangements for ENUM. The long term arrangements between ITU and RIPE NCC remain under discussion but are not expected to differ markedly from the interim arrangements. However, there is a slight commercial risk for the commercial players in ENUM in starting operations ahead of all the arrangements being finalised at the international level. In particular, some countries are known to favour a new top level domain specifically for ENUM, rather than the use of .arpa.

3 Proposed arrangements for managing ENUM in UK

3.1 The proposed arrangements described here were prepared by the informal and open UK ENUM Group (UKEG). Various experts from the UK have also contributed to the preparation of the European Telecommunications Standards Institute (ETSI) Technical Specification TS 102 051⁵ on ENUM Administration in Europe. The UK proposals are intended to conform to that specification.

3.2 The proposal is to form an organisation to be called the UK ENUM Committee (UKEC) that consists of two boards:

a. An executive UK ENUM Policy Board composed of stakeholders to formulate the rules and policies underpinning ENUM implementation within the UK. The membership would be:

ENUM Tier 1 Registry	- 1 seat
Tier 2 nameserver providers	- 2 seats
ENUM Registrars	- 2 seats
Authentication Agencies	- 2 seats
Users	- 2 seats
Application Providers	- 2 seats

b. A UK ENUM Supervisory Board whose role is to review and comment on the documents prepared by the UK ENUM Policy Board. The intention is that the UK ENUM Supervisory Board will provide the checks and balances necessary to ensure transparency, fairness and equality. The membership would be:

Independent organisations	- 3 seats
Ofcom	- 1 seat (observer status)
DTI	- 1 seat (observer status)

5. This document can be obtained from the ETSI website via http://www.etsi.org/SERVICES_PRODUCTS/FREESTANDARD/home.htm

- 3.3** Public awareness would be ensured by posting all policy proposals developed by the UK ENUM Policy Board on a publicly accessible web-site and inviting interested parties to register their interest so that they can be advised by e-mail when new documents become available. In addition an annual public forum would be organised to gain wider inputs and present the main developments.
- 3.4** Further details of how the UK ENUM Committee will be constituted legally are still under discussion and await the outcome of this consultation.

Questions

- 4** *Are the proposed arrangements likely to be sufficiently effective, transparent and commercially neutral?*
- 5** *How could the arrangements be improved?*
- 6** *Which independent organisations would you like to see appointed to the UK ENUM Supervisory Board? Please give reasons.*

4 Appointment of the ENUM Tier 1 Registry

- 4.1** DTI sees the appointment of the ENUM Tier 1 Registry for UK as the most important decision for the UK ENUM Committee. This is because it will result in a single organisation being appointed and the operation of ENUM in UK will be dependent on the operation of this registry.
- 4.2** The proposal is that the ENUM Tier 1 Registry will be appointed by the UK ENUM Committee as a result of a competitive tender that will be evaluated by an independent panel of experts on behalf of, but separate from, the UK ENUM Supervisory Board. The successful organisation will be appointed under contract to the UK ENUM Policy Board for a defined period probably of 4-6 years, with the possibility of tendering for renewal for a further period.
- 4.3** Applications will be considered from any organisation. However, a condition of appointment of the successful organisation will be that neither they, their subsidiaries, their parent organisation, any related organisation under the same parent, nor any executive directors/controlling shareholders can operate in the UK at the ENUM Tier 2 level. This condition is being imposed to ensure that the Tier 1 registry operates in an independent and neutral capacity with respect to Tier 2.
- 4.4** The legal status of the applicant (not for profit, for profit, UK based company, etc.) and any participation in the ENUM trial will not form either a barrier or an advantage for the bidders. Thus organisations that are commercial companies and organisations that are not primarily commercial, eg universities, research establishments or industry bodies, are welcome to apply.
- 4.5** The applicants will be required to submit detailed plans for the operation and financing of the registry and to commit themselves to a cost model that will apply for the duration of the initial period of appointment.
- 4.6** The applications will be assessed according to the following criteria:
- The services offered and the level of any proposed charges for registration
 - The level of any quality of service targets that they propose to achieve and the mechanisms that they propose for dealing with quality of service problems

- Their experience of running an independent operational organisation with function similar to that of the proposed registry
- Their financial ability to deliver the services for the proposed period if other parts of their operations are affected by changes or if the demand for ENUM registrations is less than anticipated and the way in which they can adapt their costs and their resources to meet changes in demand
- Their understanding of the purpose and potential of ENUM and their ability to innovate to improve their operations and to adapt to changing external circumstances
- The effectiveness and efficiency of the methods that they propose for the organisation and operation of the registry, especially regarding the need to maintain the security and integrity of the data held, and the need to minimize unscheduled outages of registry or registration systems due to technical failures or malicious activity of others.

4.7 The DTI will notify the identity of the organisation appointed as ENUM Tier 1 Registry to RIPE NCC so that the ENUM Tier 1 Registry is linked fully into DNS.

4.8 DTI has given careful consideration to the commercial prospects for ENUM and whether it should auction the role of ENUM Tier 1 Registry in a way that is analogous to the auctioning of radio spectrum, in order to raise public revenue from the appointment of the registry. Our opinion, however, is that it is not in a position to auction the role of ENUM Tier 1 Registry because the concept of ownership or rights of use, for a domain name under .arpa that corresponds to an E.164 country code, is not sufficiently clearly established as belonging to the national government. We believe that whilst the DTI as the national administration does have rights of use for +44 under E.164 in the context of telephony networks, the equivalent rights do not apply to corresponding domain name .4.4.e164.arpa, which is under the supervision of ICANN and not under the same legal framework.

Questions

- 7** *Are the proposed principles and methods for selecting and appointing the ENUM Tier 1 Registry appropriate?*
- 8** *What additional considerations (if any) should be applied in the selection process?*
- 9** *How could the incentives for good performance by the ENUM Tier 1 Registry be increased?*

5 Accreditation of Tier 2 Registrars

- 5.1** Any organisation except the ENUM Tier 1 registry may become an ENUM registrar at Tier 2. There will be no *a priori* accreditation of ENUM registrars but they will be required to abide by a Code of Practice to be developed by the UK ENUM Supervisory Board. The UK ENUM Supervisory Board will investigate complaints against ENUM registrars who fail to comply with the Code of Practice and in the event of recurring non-compliance will disqualify the ENUM registrar.

6 Subscriber control and authentication

- 6.1** Control and authentication are both important aspects of adding entries to the ENUM database. There are various possible abuses including adding entries to ENUM for telephone numbers that the ENUM subscriber has no right to use. This hijacking of telephone numbers could be carried out with the intention of stealing incoming traffic, perhaps containing valuable business details, or of otherwise masquerading as someone else.
- 6.2** The UKEG has from an early stage adopted the principle that each subscriber should opt-in to ENUM, and that legitimate and accurate information should only be added to ENUM with a subscriber's consent. This principle is essential not only to prevent abuse but also to facilitate the expansion of ENUM because only the subscriber knows the full range of information about themselves. Various service providers may have partial information but not complete and up-to-date information. This means that service providers will not be able to add subscribers to ENUM en masse without the consent of each subscriber. The principle of opt-in is also important because it involves the choice by the subscriber of ENUM registrar. Bulk subscriptions by service providers would remove this choice from the subscriber.
- 6.3** To prevent the abuses, UKEG has taken the view that each ENUM Subscriber will need to be authenticated before their information is added to ENUM. Authentication involves two aspects:
- Identification - to prove that the subscriber is who they say they are
 - Validation - to prove that the subscriber has a right to use the telephone number that will be added to ENUM
- 6.4** In most cases the only party that holds authoritative information on a subscriber's right to use a number is the telephone service provider that serves the customer on that number and through whom the number has been allocated. This suggests that the telephone service provider has an important part to play in ENUM validation. Furthermore, because the telephone service provider has a billing relationship to the customer, they can also provide identification. However, not all telephone service providers will wish to facilitate the entry of numbers into ENUM as they may take the view that at best entries in ENUM will have no impact on their business relationship with the customer, and at worst will result in loss of traffic, eg loss of incoming telephone calls as ENUM will help the substitution of email and Instant Messaging for traditional telephony. Consequently the UKEG has

proposed a range of options for identification and validation that will be provided by an Authentication Agency to the ENUM Registrars. The validation options that do not involve direct participation by the telephone service provider include the use of the UK's directory enquiry database and the number portability process, checking against bills and call-backs to the number concerned.

- 6.5** Several different options for authentication and validation have been identified providing different levels of confidence. They have been categorised into two classes - trusted and basic. Both identification and validation will need to be at the trusted level for the overall authentication to be classed as trusted. The level of authentication will be up to the ENUM user and application service providers may restrict some applications to ENUM subscribers with trusted authentication. The options identified so far and their trust levels are listed in Annex A. The intention is that this will form the basis of a code of practice that will be established for ENUM Registrars.
- 6.6** Further work is being undertaken on the procedures for authentication. In particular no solution has yet been found to the need to ensure that numbers are removed from ENUM when telephone service on the number is discontinued.
- 6.7** The alternative to authentication and the opt-in approach would be to allow the entry of unauthenticated data into ENUM and to use the data provided to send an independent message to the user that his number has been added to ENUM and to inform him how to have the number removed if the entry is fraudulent.

Questions

- 10** *Authentication*
- a. To what extent are the proposed authentication methods justified?*
 - b. Do they represent an unreasonable disincentive to potential ENUM subscribers?*
 - c. How much effort would be reasonable for the registration process?*
- 11** *a. What role, if any, should telephone service providers play in authentication?*
- b. Should they be required to authenticate ENUM entries?*
- 12** *How can the authentication proposals be improved?*

7 Privacy

- 7.1** ENUM is a public database and the public have access to all the information held in DNS. The proposals for ENUM have been built on the principle that subscribers opt-in to ensure that they are aware that this information is being made public and have consented to its inclusion.
- 7.2** The existing legal requirements concerning data protection and privacy apply to the organisations involved in ENUM. Compliance with these legal requirements is a matter for the organisations concerned. No additional measures are proposed.
- 7.3** Registries commonly provide a WHOIS service that gives the details of the owner of each domain name in DNS. Because of privacy considerations, although the ENUM entries are domain names, there will be no provision of a WHOIS service that would translate telephone numbers in domain name form back to the identity of the persons or organisation using them. There already exist various forms of Directory Enquiry (DQ). It is up to the ENUM user to choose the level of exposure they wish to have via the DQ system.

8 Number allocation specifically for ENUM

- 8.1** During the discussion on ENUM in both the European Telecommunications Standards Institute and the ITU, various experts suggested that a range of telephone numbers could be allocated exclusively for use as identifiers in ENUM. These numbers could be used for specific purposes, e.g. specific business functions, and they could also be used by people that do not have a permanent and individual relationship to a telephone number, such as students and people who share telephone services. In addition to providing numbers for such people, the creation of a separate number range specifically for ENUM would give end users and application service providers an indication that ENUM queries for numbers in that range would be successful and this could be an important factor in developing some applications.
- 8.2** The creation of a separate number range for ENUM is an issue for Ofcom, but the DTI would like to take the opportunity of this consultation to receive views on the level of interest in this option.

Questions

- 13** *What interest do you have and what uses do you foresee for a UK number range specifically for entries in ENUM and independent of the provision of a telephone service?*

9 Other systems like ENUM

- 9.1** ENUM is not intrinsically unique; the protocol and the concept of using part of the Domain Name System to store information that relates to telephone numbers can be replicated by other organisations in other parts of the Domain Name System. This possibility has always been recognised by DTI and the Department has indicated that in principle it would not favour one system above another. DTI does recognise and welcome the efforts that commercial players have put into ensuring that ENUM is run in an effective and responsible manner that avoids actions that might introduce confusion into the processes of number allocation and the expectations of users about numbers.
- 9.2** ICANN has recently received an application from a consortium, primarily based in the USA, for the creation of a new generic top level domain called ".tel", which would be used for purposes similar to ENUM. DTI is represented on the Government Advisory Committee of ICANN, which will comment on this application.

Questions

14 *Competing systems*

- a. Do you consider that there is a role for more than one such system in the market?*
- b. What controls should be applied to other systems to ensure that they are run in a responsible manner?*
- c. How should such controls be applied?*

10 How to Respond

Consultation Process

- 10.1** The Department of Trade and Industry welcomes comments, including supporting evidence, by **10 November, 2004**.
- 10.2** When responding please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of an organisation, please make it clear who the organisation represents and, where applicable, how the views of members were assembled.
- 10.3** A response can be submitted by letter, fax or email - please use email where possible - to:
- ENUM Consultation
Simon Hicks
Communications Networks
Department of Trade and Industry
Floor 2
151 Buckingham Palace Road
LONDON
SW1W 9SS
- e-mail: ENUM.consultation@dti.gsi.gov.uk
Tel: 020 7215 1028
Fax: 020 7215 1721
- 10.4** A list of those organisations specifically consulted is in Annex E. We would welcome suggestions of others who may wish to be involved in this consultation process.
- 10.5** In addition to the process outlined, a public workshop will be held during the period of the consultation to allow for more detailed discussion.

Additional copies

- 10.6** Additional copies of this document may be made without seeking permission, or downloaded from the Department's website

<http://www.dti.gov.uk/consultations/consultation-1230.html>.

10.7 Further printed copies of the consultation document can be obtained from:

DTI Publications Orderline
ADMAIL 528
LONDON
SW1W 8YT

Tel: 0870 1502 500
Fax: 0870 1502 333
Minicom: 0870 1502 100
<http://www.dti.gov.uk/publications>

Confidentiality

10.8 Your response may be made public by the DTI. If you do not want all or part of your response or name made public, please state this clearly in the response. Any confidentiality disclaimer that may be generated by your organisation's IT system or included as a general statement in your fax cover sheet will be taken to apply only to information in your response for which confidentiality has been explicitly requested.

10.9 We will handle any personal data you provide appropriately in accordance with the Data Protection Act 1998.

Help with queries

10.10 Questions about the policy issues raised in the document can be addressed to:

ENUM Consultation
Simon Hicks
Communications Networks
Department of Trade and Industry
Floor 2
151 Buckingham Palace Road
LONDON
SW1W 9SS

e-mail: ENUM.Consultation@dti.gsi.gov.uk
Tel: 020 7215 1028
Fax: 020 7215 1721

10.11 The DTI seeks to comply with the Government's code of practice for consultations set out in Annex D. If you have any complaint or comment about the consultation process, please contact:

Nick Van Benschoten
Consultation Co-ordinator
Department of Trade and Industry
Room 723
1 Victoria Street
LONDON
SW1H 0ET

Email: Nick.van_benschoten@dti.gsi.gov.uk

10.12 As well as answers to the specific questions asked, we would welcome any further points that you may wish to make relating to the implementation and use of ENUM.

11 What happens next

- 11.1** DTI will review all the responses to the consultation carefully and publish within three months a summary of the main points made and the further actions that it proposes to take. This will be placed on

<http://www.dti.gov.uk/industries/ecomunications/downloads.html>

- 11.2** If the results of the consultation broadly endorse the formation of the UK ENUM Committee, then interested parties will form this committee as a legal entity. Considerations generated during this consultation will be incorporated where reasonable into the UK ENUM Committee set-up. DTI will facilitate these activities and notify the ITU and RIPE NCC of the eventual appointment of the ENUM Tier 1 registry. The transitional arrangements will be handled by UKEG.

Annex A: Authentication options

Identification (verification that the applicant is who they say they are)

A1 Financial identification - Trusted

The Authentication Agency checks the address on the applicant's telephone bill against the address registered for their credit card.

A2 Mail identification - Trusted

The Authentication Agency sends the applicant a personal identification number by post to the claimed address and the applicant has to present the personal identification number to the Authentication Agency.

A3 Paper documentation identification - Trusted

Applicant shows the Authentication Agency some supporting documentation with their identity and address. Examples are a passport or driving licence with a utility bill or bank statement showing their address.

Validation (verification that the applicant has been assigned the number)

A4 Telephone service provider validation - Trusted

The Authentication Agency checks with the telephone service provider that the applicant's name and address match the telephone service provider's records.

A5 Directory enquiry validation - Trusted

The Authentication Agency queries the UK Directory Enquiry database with the applicant's name and address and checks to see if the telephone number returned matches the one claimed.

A6 Number portability process validation - Trusted

The Authentication Agency makes a query for the number to the current serving telephone service provider through the number portability procedure and checks the information obtained against the claimed name and address.

A7 Customer bill validation - Basic

The Authentication Agency checks the claimed name and address against that shown on a telephone service provider's bill for service to the number concerned.

A8 Personal Identification Number Validation - Basic

Depending on the type of service (i.e. Voice, Fax, Mobile) provided to the number that is being validated, a personal identification number is communicated to the number within an agreed time period, and the applicant has to present the personal identification number to the Authentication Agency.

Annex B: Glossary

ASP	Application Service Provider - Entity that provides specific application(s) which may be linked to an E.164 number using ENUM e.g. email or voice messaging to the end user
DNS	Domain Name System, the part of the Internet that translates domain names into IP Addresses
DTI	Department of Trade and Industry
E.164	The ITU-T Recommendation on "The international public telecommunication numbering plan"
ENUM	(not an abbreviation) See the description in section 2
ENUM End user	A user or process that queries ENUM
ENUM Registrar	Entity that provides direct services to ENUM subscribers by processing name registrations
ENUM Tier 1 Registry	Entity in DNS that points ENUM queries to the nameserver that holds the records for the ENUM subscriber
ENUM Subscriber	A person whose telecommunications details are stored in ENUM
ICANN	Internet Corporation For Assigned Names and Numbers
IP	Internet Protocol
ITU	International Telecommunication Union
RFC	Request For Comments - a draft specification produce by the IETF
RIPE NCC	Réseaux IP Européens Network Coordination Centre, allocates IP addresses for use in Europe and manages the domain .e164.arpa

Tier 0	Level in the tiered architecture corresponding to the ENUM root, i.e. e164.arpa
Tier 1	Level in the tiered architecture corresponding to the E.164 Country Code
Tier 2	Level in the tiered architecture corresponding to the E.164 number. This is the level at which information about the subscriber is held
UKEC	UK ENUM Committee
UKEG	UK ENUM Group

Annex C: Regulatory Impact Assessment

Title of proposal

- C1** Proposed Arrangements for the Management of Electronic Numbering (ENUM) in the United Kingdom

Purpose and intended effect of measure

The objective

- C2** The objective is to establish management arrangements for the UK's part of the proposed ENUM system that will link telephone numbers to Internet names and other Internet related destinations and identities. The management system needs to strike an appropriate balance between allowing for innovation and protecting the rights of individuals with regard to their use of telephone numbers.
- C3** The international arrangements for ENUM require the DTI as the UK Administration to consent within the International Telecommunication Union to the appointment of a single organization as the registry responsible for the ENUM entries that use the UK's country code of +44.
- C4** A group of interested parties has proposed a 'management committee system' for ENUM in the UK that allows for open and fair competition, while also protecting the public interest. It is the form of the management committee system that will select and appoint the registry, and the DTI's recognition of that appointment, that are at the centre of this consultation.
- C5** *Devolution:* This proposal applies to the whole of the UK. Those territories outside the United Kingdom which are covered by the UK telephone numbering plan, ie Jersey, Guernsey and the Isle of Man will decide whether to use ENUM facilities provided through the UK, or make separate provisions.

The background

- C6** ENUM is an international distributed database service, which any party can interrogate with the telephone number of an ENUM subscriber and the database will return a list of identities and Internet related destinations that are associated with that subscriber. Examples are the subscriber's email

address, mobile telephone number or web page. These identities can then be used to establish various forms of communications with the ENUM subscriber, e.g. the party can send an email to an ENUM subscriber having initially known only their telephone number. The ENUM database can be used both by human users and by electronic processes (applications) that are providing other forms of communications services. It is intended primarily to be used by applications that will provide electronic communications service to other users who want to communicate with the ENUM subscriber.

- C7** The ENUM international framework for ENUM has been established through cooperation between the International Telecommunication Union (ITU) and the Internet Engineering Task Force. At the national level the DTI, which, in cooperation with Ofcom, is the UK administration in ITU, has to give its consent to the appointment of a registry for the ENUM entries that are made under the UK's country code of "+44".
- C8** Whilst the commercial prospects for ENUM will depend very much on commercial investment and innovation, the DTI considers that it should ensure that a suitable management framework is created for the different players who will need to cooperate with each other, since ENUM is the only generally agreed standard underpinning Internet and telecommunications cross-connectivity.
- C9** A trial of ENUM has been run in the UK during 2003/4 and trials have also been held in various other countries. The UK trial demonstrated the feasibility of the proposed structure and its main successes were in identifying the roles and responsibilities of the entities involved in an ENUM system and issues related to authorisation and accreditation of potential subscribers. However, few applications were run on it and the trial was thus only a test of the mechanism of the system.
- C10** Arrangements for the implementation of ENUM in the UK have been planned over the last 3 years by the informal UK ENUM Group (UKEG), which was established following a workshop on ENUM run by the DTI in June 2001. UKEG, which includes companies such as BT, Vodafone, Cable and Wireless and Nominet, has developed the proposals for the framework for ENUM in UK that are presented in this consultation document.
- C11** The proposal is that ENUM will be primarily a commercial development: the investment and its commercial prospects are commercial issues that will be left to the market players. The main issues of concern to DTI are:

- the appointment of the top level UK registry (the ENUM Tier 1 registry), where the management of the UK's numbering space within ENUM is logically a single monopoly function. This monopoly function will be given to one company, which should be selected in a fair and open manner, and due ongoing safeguards established to ensure effective performance.
- the extent to which the proposed organisational framework allows for open and fair competition without unduly advantaging any particular class of organisation. The DTI is particularly concerned that the arrangements should not allow existing large companies, such as the larger telecommunications operators and Internet Service Providers, to gain effective control particularly at the lower tiers to the detriment of smaller newer companies. The openness and competitive neutrality of the arrangements are therefore especially important.
- the protection of public interests, both the individual interests of the assignees of telephone numbers who may become ENUM subscribers, and the collective interests of the users of the telephone system.

Options

C12 There are three alternative courses of action for DTI in the development of ENUM:

- Do nothing
- Impose regulation
- Establish a system of self regulation

Option 1: Do Nothing

C13 This option would mean that the DTI would

- Consent to any organisation becoming the unique UK Tier 1 registry on a first-come-first-served basis without any particular duties being imposed on the organisation and without limitation on its other commercial activities.
- Not participate at all in the on-going development of the policy and management of ENUM.

C14 We propose to reject this option because we consider that if ENUM develops into an important service that becomes the basis of other services then:

- The scope for discrimination and cross subsidy between the unique UK Tier 1 registry and the other roles in ENUM is too great and the organisation winning the UK Tier 1 could abuse its role to the detriment of its competitors, ENUM subscribers and users of services based on ENUM. For example, the registry could charge monopoly prices
- There would be no guarantees that numbers would be entered into ENUM only after suitable authentication (identification and validation) checks, and so third parties could associate their identities with numbers that "belong" to other people and so "steal" their incoming traffic. Third parties could also enter unallocated numbers into ENUM and so damage its integrity by undermining future allocations of numbers within the telephone system.

Option 2: Impose regulation

C15 This option involves two possibilities:

- DTI would introduce primary legislation that would establish the management framework for ENUM and set out the duties of the different players. In practice this might mean establishing a licensing system specifically for the different roles in ENUM.
- Ofcom would consider what regulation it would be appropriate to place on ENUM providers.

C16 We propose to reject these options because:

- The procedures to establish relevant regulation are lengthy and expensive. They are disproportionate and would delay the implementation of ENUM.
- There are too many uncertainties, especially commercial ones, about how ENUM will develop and the use of regulation would be too inflexible
- UK policy is (and is set to remain) not to regulate the allocation and use of Internet identifiers including domain names such as the ENUM DNS entries that contain telephone numbers
- The trend under the new European Directives and the Communications Act 2003 is away from regulation and towards greater liberalisation and self-regulation.

Option 3: Establish a system of self regulation

C17 This is the proposal on which we are consulting.

C18 The proposal has been developed by interested parties and consists of establishing the 'UK ENUM Committee (UKEC),' consisting of two UK ENUM boards, a Policy Board and a Supervisory Board. These boards would be responsible for:

- Selecting and appointing the UK Tier 1 registry for a fixed period as a result of an open competitive tendering process (DTI would recognize the selection made by the UK ENUM Committee)
- Setting requirements for the UK Tier 1 registry
- Setting a Code of Conduct for ENUM registrars and any other roles involved in ENUM
- Establishing appropriate authentication procedures for ENUM subscribers to safeguard the rights of individual assignees of telephone numbers and the integrity of the telephone numbering system
- Developing future policy.

C19 We consider that this option offers the best combination of low costs, flexibility, scope for innovation and protection of the public interest. This option does not preclude the use of regulation at a later date in the unlikely event that it proves necessary, as new regulatory requirements could be introduced when a period of appointment of the Tier 1 registry expires.

Risk assessment

C20 We now assess the risks involved in the proposed strategy of self-regulation. They are as follows:

- *Failure to establish the UK ENUM Committee.* There is a risk that the stakeholders may not agree with each other sufficiently to establish the committee or to agree its policies. Given that these proposals have been developed with many of the main stakeholders whose input takes account of their commercial interests, the risk that they will fail to reach agreement and jeopardise the prospects of ENUM is low.
- *Domination of the system by a few large players.* DTI is concerned to see the development of ENUM provide an efficient and innovative basis for

new services and believes that the best way to achieve this is to encourage participation by viable businesses regardless of size. The membership of the ENUM boards has been chosen to represent a wide range of stakeholder interests and to avoid opportunity for domination by larger companies.

- *Abuse of ENUM that affects the public interest.* ENUM could become a vehicle for fraud and misrepresentation if there is not adequate authentication of entries. Great attention has been given to authentication and the proposals should minimise the risks of abuse.
- *Non-cooperation by the major telephone service providers that impedes the development of ENUM.* This is a risk because the authentication of ENUM subscribers involves matching the information that the subscriber claims with the allocations made by the telephone service providers. Whilst direct involvement of the telephone service providers would be helpful it is not essential and UKEG has developed checks based on the UK directory enquiry database and the number portability process, checking against bills and call-backs to the number concerned that avoid direct dependence on the telephone service providers.
- *Delay in the establishment of ENUM.* At present, the UK has a leading position in the development of ENUM and this should provide good commercial opportunities for the development of services based on ENUM. Undue delay would jeopardise these services but the proposed system of self- regulation gives the stakeholders who have the incentive to make it work the opportunity to make it work.

C21 We regard self- regulation based on consultation as the best means of minimising the risks.

Benefits

Of self regulation

C22 The proposed approach to establish self-regulation for ENUM in the UK avoids the need for legislation and its associated costs (and delays) and lets the system develop on a commercial basis that allows for open and fair competition while protecting the public interest.

Of ENUM

- C23** ENUM enables enterprises including small and medium businesses to offer new Internet-based communication services such as reading emails to telephone users. ENUM offers a standard that provides something for manufacturers and other stakeholders to work around. It enables everyone to work in a defined way internationally and the standard is sufficiently detailed to ensure interoperability between systems developed independently but in compliance with the standard in other countries. It is too early in the international development of ENUM to provide examples of its use although a limited service is now in operation in Austria.
- C24** While the trial was carried out on only a limited number of applications, it was encouraging that more ENUM-based applications emerged towards the end of the trial and their numbers are growing. These could attract very large numbers of future registrations.

Of Proposals aimed at Ensuring Fair Competition

- C25** The approach we propose is designed to make the system equitable. Our aim is to ensure that the Invitation to Tender for Tier 1 (the monopoly business) is prepared and issued by an independent body and the business is awarded in a transparent and accountable way. Tier 2 will operate on a multiple level and both large and small companies will be selected through competitive tender. This could be facilitated by offering different sized blocks of numbers/domains.

Costs

Compliance costs

- C26** This is not a regulatory proposal and therefore there would be no regulatory compliance costs. The proposed self-regulation allows flexibility for the stakeholders to establish procedures that minimise costs. The competition for the role of UK Tier 1 registrar should create pressure to minimise registration costs and the competition between organisations for other roles will also minimise costs.

Other costs

- C27** This will be an 'opting-in' service and subscription will be a voluntary cost. Businesses and the public will not be bound to use it or subscribe to it. The

service will develop according to the perceived benefits it brings to users and providers of other services.

Equity and Fairness

C28 The purpose of consultation is to provide in an agreed and transparent way for a management committee that will preside over a fair and open market. Thus, the Tier 1 Registry would be appointed by the UK ENUM Committee as a result of competitive tender and evaluation by an independent panel. The consultation document proposes a system of checks and balances to ensure the market is fair and open.

Competition Assessment

C29 Our aim is to maximise competition while maintaining standards and recognising the uniqueness of the role of the UK Tier 1 registry. The proposed approach of appointing the Tier 1 Registry by public tender with competition at the Tier 2 registrar level is intended to foster fair competition and innovation. There would be a number of constraints for the Tier 1 operator, including a set duration of contract, separation of the policy formulation function from the Tier 1 organisation and a ban on operating at the Tier 2 level.

C30 The outline of our proposals has been discussed with OFT who agreed that they presented a fair and equitable way of providing the ENUM service in the UK.

Enforcement and sanctions

C31 Methods of enforcement and sanctions are yet to be developed by the proposed UK ENUM Committee.

C32 Sanctions for breach of the code of conduct by registrars could be based ultimately on deleting numbers serviced by the registrars from the UK registry.

C33 At the top level, in the very unlikely event that the arrangements fail or are badly abused, DTI could ask the ITU to disconnect the links in DNS to the UK Tier 1 registry.

Monitoring and review

C34 There will be review by the UK ENUM Supervisory Board, at which both DTI and OFCOM will be observers, to ensure that the public interest is being protected and that a fair market is developing. This review will make DTI

aware of any negative developments and the solutions proposed. Ultimately, it will inform DTI's determination of what, if any, further action needs to be put in place.

Consultation

C35 The list of organisations consulted at Annex E to the consultation document covers contacts and organisations that DTI has either identified for direct approach because of their potential interest in aspects of ENUM or because of their involvement in ENUM to date through organisations such as UKEG or UKETG and expressed wish to be consulted. In addition, a public workshop will be held when the consultation document has been released to allow for more detailed discussion.

Summary and recommendation

Summary

C37 ENUM is an international distributed database service, which any party can interrogate with the telephone number of an ENUM subscriber and the database will return a list of identities and Internet related destinations that are associated with that subscriber. Examples are the subscriber's email address, mobile telephone number or web page. These identities can then be used to establish various forms of communications with the ENUM subscriber, e.g. the party can send an email to an ENUM subscriber having initially known only their telephone number. The ENUM database is intended primarily to be used by applications that will provide electronic communications service to other users who want to communicate with the ENUM subscriber.

C38 A number of telecommunications companies have been involved in the development of ENUM in the UK to date as part of the informal UK ENUM Group (UKEG) in which DTI has also participated. The group is now proposing a framework, based on self-regulation, for the commercial development of ENUM in the UK including proposals to ensure fair and open competition and protection of the public interest.

C39 DTI is consulting on accepting the proposals from the UK ENUM Group based on self-regulation.

Recommendation

C40 The recommendation is therefore to move forward on the basis of self-regulation following consultation.

Annex D: Code of Practice

The Consultation Code of Practice Criteria

- D1** Consult widely throughout the process, allowing a minimum of 12 weeks for written consultation at least once during the development of the policy.
- D2** Be clear about what your proposals are, who may be affected, what questions are being asked and the timescale for responses.
- D3** Ensure that your consultation is clear, concise and widely accessible.
- D4** Give feedback regarding the responses received and how the consultation process influenced the policy.
- D5** Monitor your department's effectiveness at consultation, including through the use of a designated consultation co-ordinator.
- D6** Ensure your consultation follows better regulation best practice, including carrying out a Regulatory Impact Assessment if appropriate.

The complete code is available at the Cabinet Office's website address -

www.cabinet-office.gov.uk/servicefirst/index/consultation.htm.

Comments or complaints

If you wish to comment on the conduct of this consultation or make a complaint about the way this consultation has been conducted, please write to:

Nick Van Benschoten,
DTI Consultation Co-ordinator,
Room 723,
1 Victoria Street,
London,
SW1H 0ET,

or email him at: Nick.van_benschoten@dti.gsi.gov.uk

Annex E: Organisations consulted

This consultation document has been sent to the following organisations. We would welcome suggestions of others who may wish to be consulted.

Alcatel Telecom Ltd

AOL (UK) Ltd

Atlas Advanced Internet Solutions Ltd

Avaya

Bango.net Limited

BTextact Technologies

Cable & Wireless plc

CBI (NI)

Centrica plc

Cisco Systems Ltd

Communication Workers Union

Consumers' Association

Defence Interoperable Network Services
Authority

Department for Constitutional Affairs

Department of Enterprise, Trade & Investment

Energis Communications Ltd

Equality Commission for Northern Ireland

Global Name Registry Limited (.name)

Hotsip AB

Hutchison 3G Limited

ICB plc

ICSTIS

Information Commissioner's Office

Inmarsat Limited

Intellect

InterConnect Communications

Internet Services Providers' Association, UK (ISPA)

Internet Society of England

InTUG

ITSPA

Kingston Communications (Hull) PLC

Liberty

London Internet Exchange Ltd

MCI

mmO2

NHS Information Authority

National Consumer Council

Network Brokers Ltd.

Neustar

Nominet UK

ENUM

Nortel Networks

Northern Ireland Chamber of Commerce and Industry

Ofcom

Office of Fair Trading

Orange Personal Communications

Police Information Technology Organisation

Poptel Ltd (.coop)

Privacy International

T-Mobile (UK) Ltd

Telco Electronics Limited

Thus Plc

UKCTA

UKERNA

Verisign UK Limited

Vodafone

Wanadoo

Yahoo!

