| | ENUM Project | |
|---|---|---|
| Author(s) :<br>Dieterle/Blank | Subject:<br>ENUM Day, 16 March 2004 | Page:<br>1 of 11 |
| Current status: | Created from:       Replaces: | File: |

# Report on the 2nd ENUM Day held on 16 March 2004 in Frankfurt am Main

The purpose of the ENUM Meeting was to provide a platform for an exchange of information on the subject of ENUM between the various interested groups, to establish what progress had been made in the trial and to stimulate further interest among participants.

Before the meeting, a "pre-reader" had been sent out to all registered participants (http://www.denic.de/media/pdf/enum/veranstaltungen/ENUM-Pre-Reader.pdf). Its intention had been to prepare them to deal with the substance of the topic, placing the emphasis on the question of "how does ENUM work?"

At the technical meeting itself, the main focus was on the most recent developments in applications, scenarios and technologies.

On the day, 120 participants attended the ENUM Meeting, at which ten presentations were made, and these were supplemented with discussion sessions.

The various slide series used by the speakers are available at:
http://www.denic.de/en/enum/veranstaltungen/denic_enum-tage/index.html#TM_16_03_2004.

Agenda:

1. Welcome and introductory summary
2. Technical background
3. Projects
4. Applications
5. Technical background
6. Standardization within Europe
7. Numbering plan
8. Validation

The following sections of this report record some of the most important statements made by the speakers in the course of their presentations.

## 1. Welcome and Introductory Summary

…to the ENUM Meeting in the context of the Technical Meeting: *Sabine Dolderer* as a member of the Executive Board and *Petra Blank* on behalf of the ENUM project group.

### Presentation1: Progress made on the ENUM Project at DENIC – Stefan Dieterle, DENIC eG, ENUM Project Group

*As ENUM project manager, **Stefan Dieterle** presented an overview of the project activities that had been taking place during the preceding three months as well as the prospects regarding the next steps for the ENUM trial.*

Validation: At that time there was no sign that a general solution was emerging. Two procedures were undergoing evaluation in the trial.
One of these was a procedure based on a PIN brief. It performed authentication by invoking a validation server called by the registrant. This required a PIN, which should have been received beforehand, to be entered through a multi-frequency dialling procedure.
The second procedure was T-Com's validation agency, which is explained in item 8 of this report.

Standardization: DENIC had participated in ETSI's plug-test workshop for ENUM on 24-25 February 2004 (www.denic.de/media/pdf/enum/berichte/Bericht_ETSI_-_ENUM_WS_2004.pdf). DENIC announced that it would like to use the workshops planned for later that day to provide the trial participants with further information, especially about the plug test itself.

VoIP: DENIC had already set up a VoIP installation of its own with a view to gaining experience with it, but also with the intention of deriving direct benefits from it. The SIP server was Iptel.org's SER. The presentation focused especially on this solution and its benefits, such as the low costs for adding new functions onto the telephony ones – for instance, voice mail and answering machine. The intention was to continue to extend the installation so that it could be made available to several DENIC employees.

Data protection: The meeting was told about the exploitation of contact data that had been rendered anonymous. The use of aliases made it possible to protect individual privacy, even if the data was made public in the DNS.

ENUM@Home: Many Internet users already had a DSL connection available to them. That provided a more-than-adequate bandwidth for VoIP. On the basis of first-hand experience, it was certainly possible to recommend the use of VoIP from a person's own home. The greatest added value from ENUM in that respect was that subscribers were also accessible via their PSTN telephone number from IP terminal devices. The presentation included a five-point plan for the use of VoIP with ENUM support.

One of DENIC's activities for the three months to follow was to be its active involvement in the Freenum project. This involved providing gateways from the IP network to the PSTN network for 0180 numbers (i.e. free-phone numbers).

*Question:*     *Was exactly is the plug test?*
*Dieterle:*     *It is an interoperability test for the purpose of which researchers and developers (some of whom may well be working for companies in competition with one another) come*

*together to test a standard or its draft or its implementation. A plug test is an open event. Anyone who has anything at all to do with the implementation is welcome to turn up and join in.*

*Question:*   *How are pseudonym SIP addresses used to ensure data protection?*

*Dieterle:*   *A user logs in to a free SIP service, such as Iptel.org, using an alias. When the SIP phone logs on to Iptel's registry server, it uses the anonymized user name.*

## 2.   Technical Background

### SIP and SER applications: experience report for 2003/2004 - Jiri Kuthan, Iptel, http://www.iptel.org

*Jiri Kuthan set up Iptel in 1995. Its status is that of a working group at the Fraunhofer FOKUS Institute and it is mainly concerned with IP telephony. He is the manager in charge of technical development. One of Iptel's products is the SIP Express Router (SER), one of the leading SIP servers. The solution DENIC has set up for VoIP is based on SER.*

Juri Kuthan began by taking a brief look back over the preceding two years spent on developing the SIP protocol and the SIP server, SER. He reported that the design phase had been completed and that the application phase was about to commence.

A number of key technical hurdles had been overcome; for instance, there were now solutions for penetrating firewalls with symmetrical NATs, and there were various devices in conformity with the standard. The SIP server, SER (www.iptel.org/ser) had an adequate scalability, and the price of the SIP telephones had already been brought down below USD 100.

He went on to present a number of different types of application:

- telephony services provided for a charge
- low-cost telephony services from freenet and sipgate
- use of ADSL without a PSTN connection, for instance in Norway
- new third-party services at VozTelecom
- simple infrastructure, migration from Centrex to IP services at Yale University

The next most important step was therefore to perfect SIP:

- simpler plug-and-play for SIP devices
- seamless interface to the PSTN through ENUM
- further work necessary on security (spam)
- further progress to be made on interoperability

Juri Kuthan concluded by reporting that the rate of penetration was continuing to improve. The main underlying reason was cost efficiency, and the entry costs, in particular, were very low.

The market was shifting from its traditional hardware focus to paying more attention to the services on offer.

*Question:*   *Does Iptel now have a new business model as regards the open-source SIP server, SER?*

*Kuthan:*   *SER itself is to continue to remain free. However, charges will be levied for SER add-ons and consultancy services from Iptel.*

*Question:*      *What about Ipv6 for SIP applications?*
*Kuthan:*      *The mass market is going to be for Ipv4.*

## 3.     Projects

**Launch of VoIP services for all students at the UdS (Saarland University, *Universität des Saarlandes)* – Edgar Scherer – UdS,**
*http://www.rz.uni-saarland.de/projekte.*

*The VoIP project was set up in summer 2000 jointly by **Edgar Scherer**, head of the project at the UdS computer centre, CISCO and Deutsche Telekom. What had to be done at the outset was to link individual locations (such as Kaiserslautern and Saarbrücken) to one another, but the project's focus had meanwhile moved on to offering VoIP services to students too, in a broader setting. ENUM was being used successfully for that purpose. Edgar Scherer covered two topics in a single presentation:*

### *VoIP at the UdS*

The first part of the presentation introduced the VoIP project as it had been in operational use for UdS students since March.

The requirements profile for the solution stipulated:
- audiovisual communication
- low-cost communication
- ubiquitous accessibility
- communication in support of teaching and research

This solution's innovations included:
- convergence of voice and data networks
- SIP and ENUM in use in the production environment – stability, scalability
- PSTN/SIP gateway functionalities
- realtime communication via the Internet with SIP
- no dependence on particular telecommunication providers, thanks to open-source software
- integration in the existing telephony landscape

It included the functions:
- Internet-Internet calls
- calls from the Internet to the UdS's PBX
- PSTN-Internet calls
- WLAN access from laptops
- voice box (not yet released)
- ENUM lookup (DNS query)
- e-mail address = telephone address

The solution had been implemented using the following components:
- SER SIP proxy (4000 switching operations per second, user database MySQL, www.iptel.org)

- ENUM DNS server (Bind9, srv entries for the stud.uni-saarland.de and rz.uni-saarland.de domains)
- Asterisk PBX (ENUM server, open-source PBX based on Linux, "Swiss army knife")
- Radius server (radiator): the Radius accounts for all the students had been set up as an independent service provided by the computer centre
- Cisco 3620 voice gateway and Asterisk gateway
- ENUM registrar (denic.de test bed)

Edgar Scherer summed up this part of his presentation as follows:

With the service described here, the UdS computer centre is able to meet up to the specified requirements and to offer a modern form of communication in support of teaching and research.

*Question:* What sort of reaction has there been?

*Scherer:* So far, several hundred students have been using the service, and the numbers are continuing to increase.

*Question:* What is the voice quality like?

*Scherer:* The call quality is very good with the codecs actually used.

*Question:* How does SIP manage to penetrate the firewall?

*Scherer:* Access from the outside is via a VPN tunnel. That also makes it possible to identify users in the event of abuse.

In his second presentation, with the title "**New approaches to call routing with ENUM**", Edgar Scherer described in detail how call routing is handled by means of ENUM with the use of Asterisk PBX software, www.asterisk.org, and the SIP SER server, www.iptel.org/ser.

Modern call routing exploiting the ENUM records in the DNS was also being used by a number of German higher-education establishments for central call routing in a VoIP network. This approach represented a modern alternative to the longer-standing practice of central call routing by means of a gatekeeper. The big advantage of this solution presented was to be seen in its scalability.

## 4.    Applications

**Deutsche Telekom's ENUM Trial Project – Jürgen Eder – T-Systems Nova,** http://www.ENUM trial.de

*Deutsche Telekom is one of the most active participants in the ENUM trial. **Jürgen Eder** makes sure that the other trial participants are kept constantly informed of advances in his project. For this purpose, Deutsche Telekom publishes its own project newsletter. This is located at: www.ENUM trial.de.*

The project highlights up until that time had been:
- support and operation of the ENUM registrar
- provision of a public Internet ENUM lookup interface
- provision of a public Internet ENUM administration interface
- provision of application examples
    o ENUM configuration client for FolloweME scenarios on PCs
    o ENUM-enabled SIP servers (NIST) with mailboxes
    o ENUM configuration client for iPAQ (to be ready soon after); presentation at an international media colloquium.

- o ENUM configuration client for Java mobile phone (to be ready soon after)
- provision of technical descriptions
- description of SOAP interfaces
  - o description of ENUM client
  - o administrative help for ENUM domain
  - o description of ENUM mobile-phone client (to be ready soon after)
- provision of ENUM trial telephone hotline operation (PSTN and IP) as well as an e-mail information service

Validation:

Validation as practised at that point in time was based on the invoice sent to the holder of a given telephone connection combined with authentication by means of a passport, transmitted by telefax or similar. This procedure had already been shown to be clumsy and laborious, which was why an interface had been set up to T-Com's validation agency. The drawback of this procedure, however, was that it increased the outlay on registering and looking after ENUM domains.

Activities for 2004:

- planning and setting up a modular ENUM service provider; separation of the functions and processes of registrars and service providers
- carrying out tests and performance analyses; checking the impacts of ENUM on the DNS infrastructure and on server behaviour
- analysis of the use of TSIG and DNSSec
  - o operation of the DNS ENUM server with TSIG
  - o operation of the DNS ENUM Server with DNSSec

Further development of the validation options; cooperation with T-Com's validation agency

*Question:*      *What objectives is Deutsche Telekom pursuing with ENUM?*
*Eder:*          *No commercial objectives to date, just evaluation of the technology.*


5.    <u>Technical Background</u>

**Asterisk, IAX2 with NAT, integration of existing infrastructure – Klaus Peter Junghanns – Junghanns.NET GmbH** http://www.junghanns.net

*Klaus Peter Junghanns is general manager of Junghanns.Net, a limited company (GmbH) involved in the provision of Internet services and software development. He is an acclaimed expert in the configuration and further development of software telephone installations. One example is chan_capi, a common ISDN API 2.0 driver for Asterisk, which comes from him.*

This presentation dealt with the potential of the Asterisk software telephone system, which was commonly referred to as the "Swiss army knife" of the telephone sector and could be scaled from a simple answering machine to use in a larger carrier network.
Asterisk provides transparent connections between various technologies, such as E1, T1, S0, FXS, IAX2, SIP, MGCP, H.323 and SCCP and also provides the codec translation for VoIP channels, such as:
g.711a-> gsm, g.729a -> iLBC.

Some of the applications supported by Asterisk are ENUM, conference switching, voice mail, queuing and so on.
Many of the PBX's advantages are due to the Asterisk Exchange Protocol Version 2 (IAX2).

- Signalling and media data are both routed through a single known UDP port. That means that solutions with Asterisk are also very NAT-friendly;
- In addition to the low overhead, further bandwidth is saved by bundling several IAX2 connections between two hosts.

One example presented by Klaus Peter Junghanns was how a company operating at three different European locations is able to save costs by routing its internal calls via the Internet. This can be done without needing to modify the configuration of the traditional installation.
He went on to show some of the properties of his telephone installation using a demonstration system he had brought with him (Mini-ITX computer with eight S0 ports, one ISDN and one ISDN DECT Basis with a mobile component behind a firewall with NAT) and demonstrated impressively how simple it was to use his solutions in an environment in which many other VoIP applications found themselves in difficulty.

*Question:* *Where can I acquire ISDN cards for Win NT*
*Junghanns:* *From www.junghanns.net and elsewhere*

**Report from the Telephony Summit – Martin Schulte – German Unix User Group (GUUG),** http://www.guug.de

*Martin Schulte chairs the German Unix User Group. It was in this capacity that he also arranged the Free Software / Open-Source Telephony Summit, a workshop for developers and users, which took place in the week of 16-20 January 2004*

Martin Schulte introduced GUUG as a body organizing fairs/exhibitions and congresses concerned with Linux. Every spring it organized colloquiums for specialists and every autumn it staged the annual Linux Congress, the largest and most important Linux event in Europe. Earlier in 2004, it had also arranged a congress on Internet telephony for the first time, and Martin Schulte gave a brief account of that particular event. The congress had lasted five days, of which three had been organized for developers to exchange ideas, one had been for an advanced seminar and one for a conference. Given the massive response and the highly topical nature of the subject, he announced that GUUP was intending to organize a follow-on event in spring 2005.

*Question:* *Where can I get hold of more information?*
*Schulte:* *On GUUG's homepage (going online shortly afterwards).*

## 6. Standardization within Europe

**ENUM activity at ETSI plug tests - Patrick Guillemin – ETSI,** www.etsi.org

*Patrick Guillemin is the technical coordinator at ETSI and responsible for the ENUM workshop and the ENUM plug test.*

*ETSI is an independent, non-profit organization with the mission of creating telecommunication standards for today.*

ETSI had been in existence for 15 years. The acronym stands for "European Telecommunication Standard Institute" (www.etsi.org). It was set up in response to pressure from the European Commission. ETSI's members are administrations from within the European Union, European manufacturers and research institutes. Standards issued by ETSI are abbreviated to "ETS" (European Telecommunication Standards). It has its headquarters in Sophia Antipolis (south of France). Its participants are manufacturers, network operators, ISPs, research facilities, governments and users. At the time of the ENUM Meeting, it had 699 members from 55 countries.

Patrick Guillemin reported that the ETSI plug test was a service that had already been on offer for four years. The concept for the plug test had come originally from the IETF, which arranges similar events under the name of "bake-off".

Plug tests were essentially tests of interoperability. Their aim was to improve the interoperability of the products by improving the quality of the standard. He gave the address for further information as www.etsi.org/plugtests.

In the course of the preceding four years, ETSI had organized 44 events, which had been attended by a total of 2500 technical specialists and 890 companies. These events were dedicated solely to technical issues; there was no selling and no marketing. The plug tests were run at breakeven and were financed by contributions from participants (less than EUR 1000), sponsors and grants from the European Commission.

- Organized events in connection with the ENUM plug test:
- 24-25 February 2004, first ETSI ENUM plug-test workshop. DENIC had also produced a report on this [subsequently superseded by newer documents].
  www.denic.de/media/pdf/enum/berichte/Bericht_ETSI_-_ENUM_WS_2004.pdf
- 5-6 October 2004, second ETSI ENUM plug-test workshop – in parallel with the TISPAN project meeting
- 29 November – 3December 2004, plug tests for IP communications (SIP/H323/ENUM)
- ETSI ENUM plug-tests workshop in the first quarter of 2005

*Question:*       *Is there a bake-off event for ENUM from the IETF?*
*Guillemin:*      *The ETSI ENUM plug test has been coordinated with the IETF and is supported by ETSI TISPAN, IETF/enum, ITU and RIPE*


## 7.   Numbering Plan

**Use of telephone numbers for VoIP services – proposed rules for national subscriber numbers – Mirko Paschke – RegTP,** www.regtp.de

*Mirko Paschke holds a senior post ("Assessor") with RegTP and is responsible for policy principles in questions concerning the numbering plan*

Mirko Paschke presented his organization by stating that RegTP was the regulatory body that had been set up in the context of the liberalization of the post and telecommunications markets and had succeeded the former BMPT (Federal Ministry of Post and Telecommunication) and BAPT (Federal

Office of Post and Telecommunication) in 1998. The legal basis for its regulatory activity was Germany's telecommunications law ("TKG"). §43 of that law transferred the numbering plan as a sovereign responsibility to RegTP. This function includes structuring the numbering plan as well as administration and supervision of the number space. The aims of the numbering plan are:

- to ensure the proper functioning of public telecommunications
- to administer resources in a way that does not impinge on competition
- to implement international duties and recommendations

One of the most hotly debated issues concerning the numbering plan at that time was the use of (telephone) numbers for VoIP services. Mirko Paschke recommended reading a number of analyses regarding the starting situation for VoIP contained in EU studies published shortly beforehand:
- http://europa.eu.int/information_society/topics/telecoms/regulatory/studies/documents/nna_final _15sept.pdf
- http://europa.eu.int/information_society/topics/telecoms/regulatory/studies/documents/regulator y_implications_execsum.pdf
- http://europa.eu.int/information_society/topics/ecomm/doc/useful_information/library/studies_ext _consult/ip_voice/401_28_ip_voice_and_associated_convergent_services.pdf

These studies, CEPT's continuing coordination efforts, the FCC hearing on VoIP and RegTP's own hearing on the (0)32 range of numbers all confirmed the exponential growth in the need for numbers for services based on VoIP, whose typical intended uses did not correspond to conventional types of telephone number (such as telecommunications on the move with mobile telephony and static physical network connections for telephone numbers tied to geographic-area codes).

It might prove possible to relieve the situation with the proposed new number ranges for telephone numbers without geographic constraints. The hearing on the proposed set of rules to govern this type of number (17 December 2003 – 28 January 2004), which had produced 14 reasoned opinions that were undergoing evaluation at that time, was being accompanied by another more broadly based hearing on the general positioning of VoIP in telecommunication law (28 April 2004 – 18 June 2004 (http://www.regtp.de/reg_tele/start/in_05-17-00-00-00_m/index.html). Once a stable situation had been reached, possibly with modifications to the proposed set of rules, the intention was to publish the access rules and to make the resultant telephone numbers available.

*Question:* *What tariffs are to be charged for the numbers?*
*Paschke:* *It is expected that the tariff structures will have a similar pattern to those for geographic areas.*

*Question:* *Is it possible to use 032 numbers for information and added-value services?*
*Paschke:* *These numbers are to be used explicitly for addressing (final) subscribers. Siphoning arrangements, such as those underlying "added-value services" are explicitly excluded.*

*Question:* *Is it permissible for an ISP to extend an 11-digit telephone number of their own accord for internal usage?*
*Paschke:* *The situation will be comparable to that of geographic-area networks, and such a practice will not be declared inadmissible. However, from the network perspective, there will be no technical guarantee of the complete transmission of the extended telephone numbers, especially not across network boundaries.*

*Question:*      *Has a timetable been fixed yet?*

*Paschke:*      *Experience with hearings has taught us that while the procedure is still running it is too early to attempt any really reliable forecasts as to when it will be brought to a conclusion. The regulatory authority is, nonetheless, doing its best to get agreement from all those involved on the market and to stabilize the access rules as efficiently as it can.*

*Question:*      *Who is to issue the 032 numbers?*

*Paschke:*      *Again, this is intended to be similar to the geographic-area numbers, in that the rights to use numbers in the 032 range will be issued in a two-stage procedure. The regulatory authority will issue blocks of a thousand numbers at a time to network operators, and these will assign numbers to their final customers, in accordance with needs, either directly themselves or through service providers working with them (which is comparable, for instance, with the Debitel model for mobile telephony).*

*Question:*      *What requirements have been laid down by the security authorities?*

*Paschke:*      *The specific requirements depend very much on the transmission technology actually used, which is not laid down in the access rules for the 032 number range, whose wording is technology-neutral. Insofar as an IP-based network technology is used, the European Commission's analytical study considers it worth attempting to introduce uniform pan-European standards for the necessary technical preconditions, in order to minimize the cost element.*

## 8.    Validation

**T-Com's validation agency – Jürgen Kopelke – T-Com,** http://www.validierung-enum.de/

*Jürgen Kopelke works in T-Com's inquiry-services and data-editing department.*
*This unit's job is to maintain the directory data for the telephone directory and the inquiry services.*
*He was the person who drafted the concept for the validation agency and is now building this up for T-COM.*

T-Com had been involved in the ENUM field trial since 10 December 2003. With its validation-agency project, it was working actively on the so-far unresolved problem of telephone-number validation.
T-Com was setting out to validate public telephone numbers on the telephone network. This was a function that all ENUM registrars were allowed to test free-of-charge in the context of the field trial. Up until then, however, the validation agency had only been providing its service for one ENUM registrar, namely NIC-Oldenburg.

The targets set for the validation agency were:
- generation of an automated validation procedure
- top-quality verification of legitimate usage rights
- bringing down costs for the registrars
- testing and optimizing the procedures
- customized adaptation of the product on offer.

It was not one of the project's aims to provide nationwide validation throughout Germany and covering all carriers.

Jürgen Kopelke presented a series of diagrams as detailed illustrations of the validation process as well as the data formats used.

*Question:*      *Are you currently validating against contract data?*
*Kopelke:*      *Individual cases, such as shared flats, are not being considered yet.*

*Question:*      *Is possible for all Germany's geographic-area numbers to be validated?*
*Kopelke:*      *For the time being, there is no validation service for any customers not with T-Com.*

*Question:*      *Does incorrect data get corrected?*
*Kopelke:*      *For the time being, there is nothing to be gained from correcting incorrect address data.*
     → *hard validation: errors in syntax are displayed.*