

« networking the networkers »



APAN 37th Meeting
Unified Communications Working Group
20 January, 2014
Bandung, Indonesia

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**Enabling Global Voice and Video
Collaboration**



ENUM: DNS lookup service

ENUM Global Directory (DNS) Equates +1-202-555-1234 to sip:name@domain.com to enable Voice over IP using SIP

1. The caller simply dials the person's normal telephone number

Dial
+1-202-555-1234

2. Calling party proxy UAC queries DNS for location of end point

Query
4.3.2.15.5.5.2.0.2.1.e164.arpa?



DNS-Server

3. DNS returns NAPTR record containing SIP URL

Response
sip:name@domain.com



Sip
Sip:name@domain.com

Sip Proxy



"Call Setup"



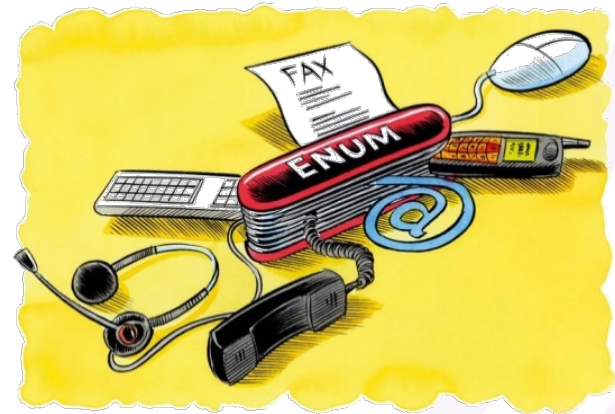
Sip Proxy

4. Calling party UA connects the call



Not about free calls, but new services

- › Get back with URI:
 - › ENUM with SIP
 - › ENUM with H.323
 - › ENUM with Telepresence



- › Principles:
 - › ENUM will not affect PSTN application level functions such as call routing and signaling
 - › ENUM facilitates the discovery of resources associated with a telephone number, and does not impact how applications operate
 - › ENUM will not change the existing right-to-use rules and principles for telephone numbers



ENUM query by VoIP client

**ENUM Global Directory (DNS) Equates
+1-613-555-1234 to
sip:jmce@domain.com to enable VoIP
over IP using SIP**

2. SIP UAC queries DNS
location of end point

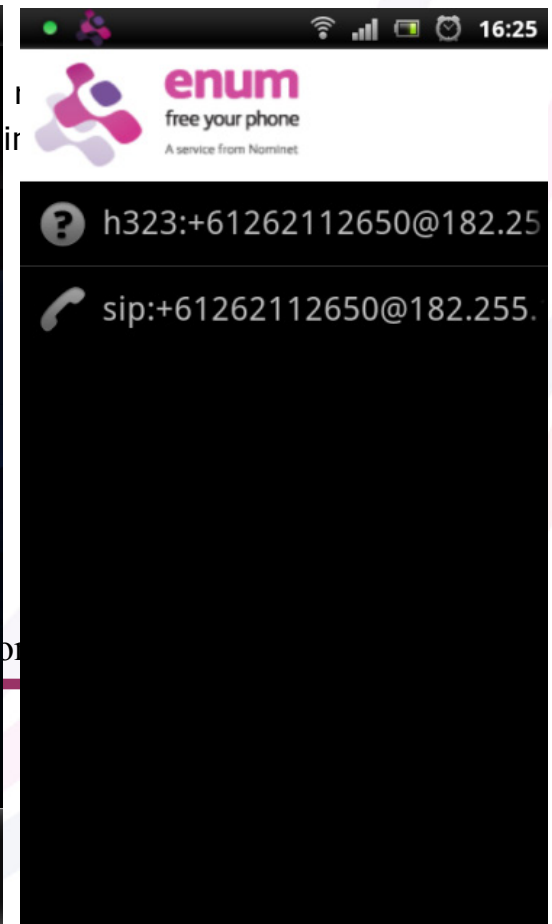
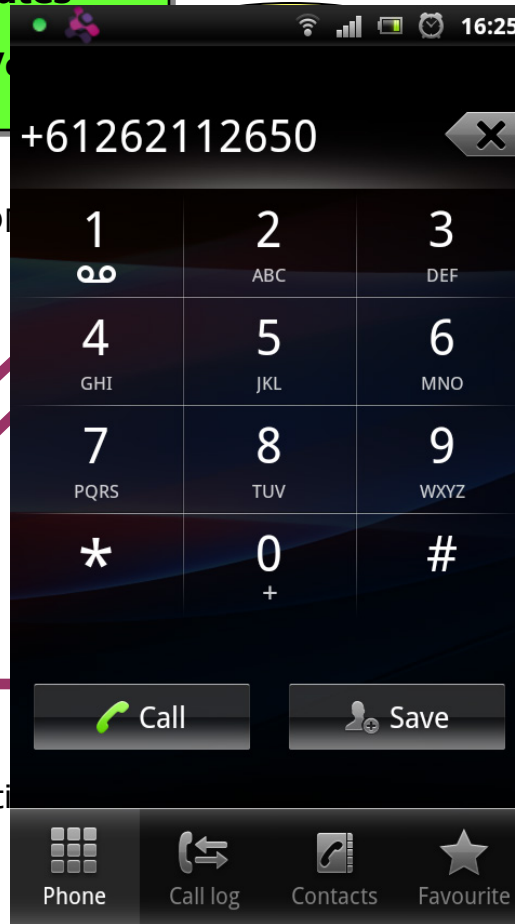
Query
4.3.2.1.5.5.5.3.1.6.1.e164.arpa?

1. Caller dials normal
phone number

Dial
+1-613-555-1234



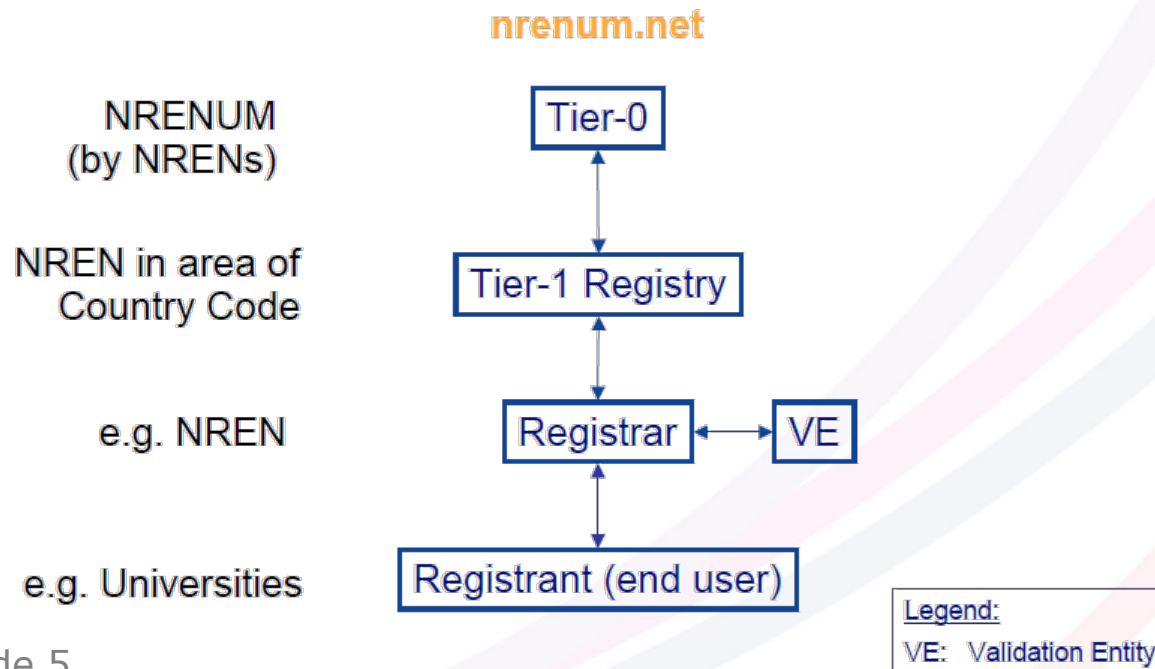
4. Caller's UA initiates





Global service coordinated by TERENA

- › ENUM service for academia
 - › Mapping E164 telephone numbers to URIs using standard DNS lookup
 - › Facilitates seamless dialing between infrastructures
 - › Operated and governed by NRENS
 - › Recognized by RIPE ENUM WG (e164.arpa)





Service milestones



NRENum.net

- › August 2006 – NRENum.net came into operation
- › May 2008 – Became a community service
- › March 2012 – Service went global
- › September 2013 – Global governance

Service policy can be downloaded from

<https://confluence.terena.org/display/NRENum/Service+policy+v.0.62>



Global service coordinated by TERENA

› Global NRENum.net Governance Committee (GNGC)

- › Tim Boundy Janet, UK
- › Erik Kikkenborg NORDUnet, Nordic countries in Europe
- › Ben Fineman Internet2, USA
- › Alex Galhano Robertson RNP, Brazil
- › Bill Efthimiou AARnet, Australia
- › Praveen Misra ERNET, India

› NRENum.net Operations Team

- › Mihaly Meszaros NIIF, Hungary
- › Daniel Stirnimann SWITCH, Switzerland
- › Rui Ribeiro FCCN, Portugal
- › Bartłomiej Idzikowski PSNC, Poland
- › Jan Ruzicka CESNET, Czech Republic
- › Kewin Stoeckigt ACM
- › Bernie Hoeneisen Ucom.ch

› DNS server locations

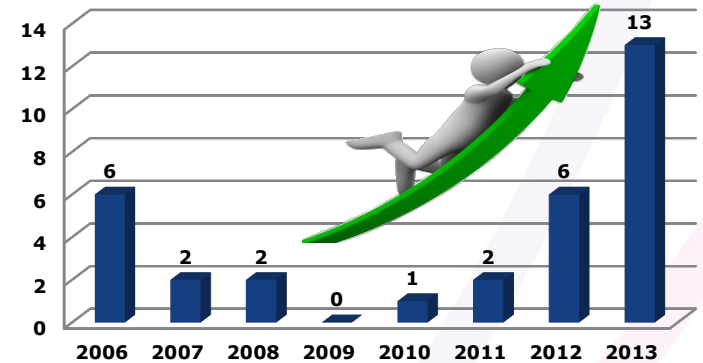
- › Budapest, Hungary
- › Zagreb, Croatia
- › Zürich, Switzerland
- › Stockholm, Sweden
- › Ann Arbor, Michigan, USA
- › Washington DC, USA
- › Indianapolis, Indiana, USA
- › Palo Alto, California, USA
- › Sydney, Australia
- › Perth, Australia



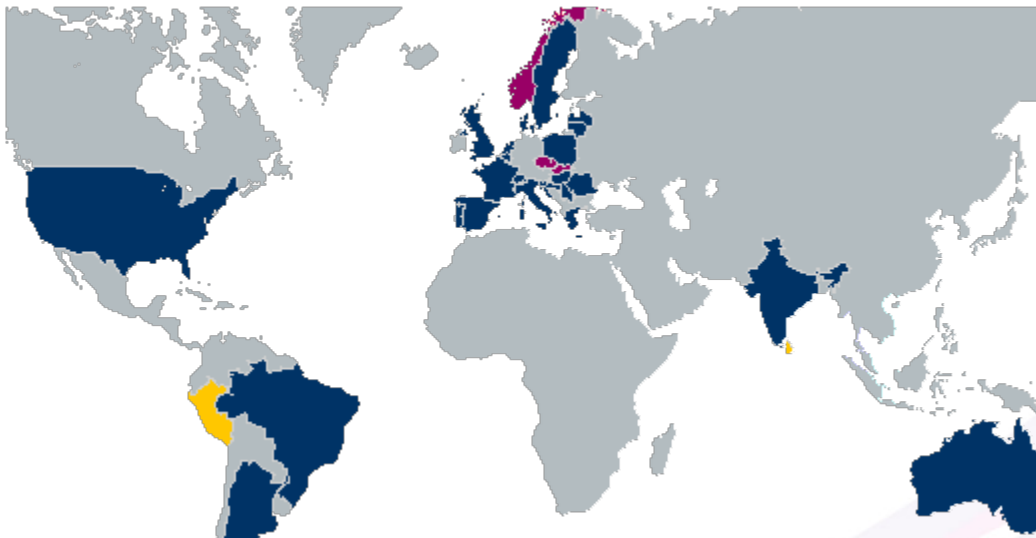
NRENum.net participants

- › 32 Country Codes delegated
 - › 6 of them also in e164.arpa
- › ~185.000 ENUM numbers
 - › Practically larger than e164.arpa

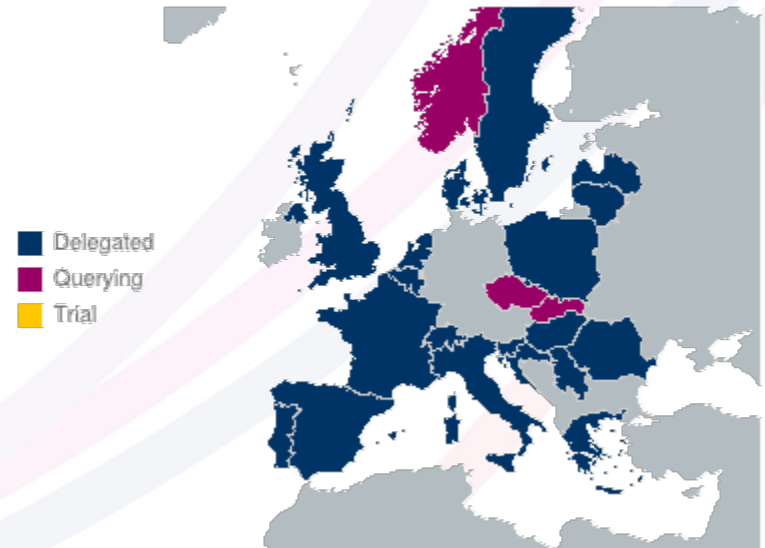
Number of CC delegated per year



NRENum.net participants



NRENum.net in Europe





DNS Crawler results

<https://crawler.nrenum.net/>

searching nrenum.net for NAPTR sets

This is a DNS-based crawler which crawls through nrenum.net, the top level domain designated to this ENUM service. Specifically, it looks for NAPTR resource records sets and tries to discover the whole NREnum.net tree.

Status: 185472 ENUM numbers (containing 187478 NAPTR records). Crawling speed: 205 numbers in the last minute.

What is the ENUM crawler?

The ENUM crawler uses certain properties of the nrenum.net namespace to discover all numbers for which ENUM entries (NAPTRs) exist. A full crawling round takes a little longer than a week, currently, so that new numbers should appear after approximately that delay. However, certain nameserver implementations might prevent the crawler to discover all enum-enabled numbers.

top country codes

#	country name	E.164	ENUMs
1.)	Hungary	+36	58350
2.)	Portugal	+351	45805
3.)	Switzerland	+41	31301
4.)	Croatia	+385	25784
5.)	Brazil	+55	10048
6.)	Spain	+34	6904
7.)	Argentina	+54	3267
8.)	Australia	+61	1678
9.)	Italy	+39	1039
10.)	Greece	+30	901
11.)	North American Numbering Plan	+1	209
12.)	United Kingdom	+44	49
13.)	New Zealand	+64	31
14.)	Netherlands	+31	27
15.)	India	+91	22
16.)	Latvia	+371	21
17.)	Hong Kong	+852	15
18.)	Belgium	+32	11
19.)	France	+33	8
20.)	Romania	+40	1
21.)	Poland	+48	1

recently discovered

[+1 4087407256](#) (11 hours ago, 1 NAPTR)
[+1 408740725](#) (11 hours ago, 1 NAPTR)
[+1 40874072](#) (11 hours ago, 1 NAPTR)
[+1 4087407](#) (11 hours ago, 1 NAPTR)
[+1 408740](#) (11 hours ago, 1 NAPTR)
[+1 8882402560](#) (11 hours ago, 1 NAPTR)
[+1 888240256](#) (11 hours ago, 1 NAPTR)
[+1 88824025](#) (11 hours ago, 1 NAPTR)
[+1 8882402](#) (11 hours ago, 1 NAPTR)
[+1 888240](#) (11 hours ago, 1 NAPTR)



Global initiatives to be supported by ENUM dialling



- › Global Video Alliance (GVA)
 - › Internet2, AARnet, RedCLARA, NORDUnet, Janet, CESNET

- › Global RealTime Communications exchange (GRTC)
 - › CEO Forum – led by AARnet

- › GÉANT eduCONF
 - › GN3+ - led by Janet




How to participate...

- › Want your county code to be delegated...
 - › Talk to Bill Efthimiou, AARnet
 - › Contact Peter Szegedi, TERENA
 - › Website: <http://www.nrenum.net>
 - › Send your request to <delegations@nrenum.net>
 - › Join the mailing list at discussion@nrenum.net

- › in Europe, talk to TERENA
- › in North America, talk to Internet2
- › in Latin America, talk to RedCLARA



Conclusions

- › Skype works fine but locks you in...
- › What you need is:
 - › Free, rich media calls
 - › Seamless dialing between infrastructures
 - › Global, interoperable, multimedia services
 - › Facilitated by  NRENum.net
 - › Scalable, secure, trusted routing of calls
 - › SBC-based next generation multimedia architecture