

A Glance at ENUM

AP* Retreat

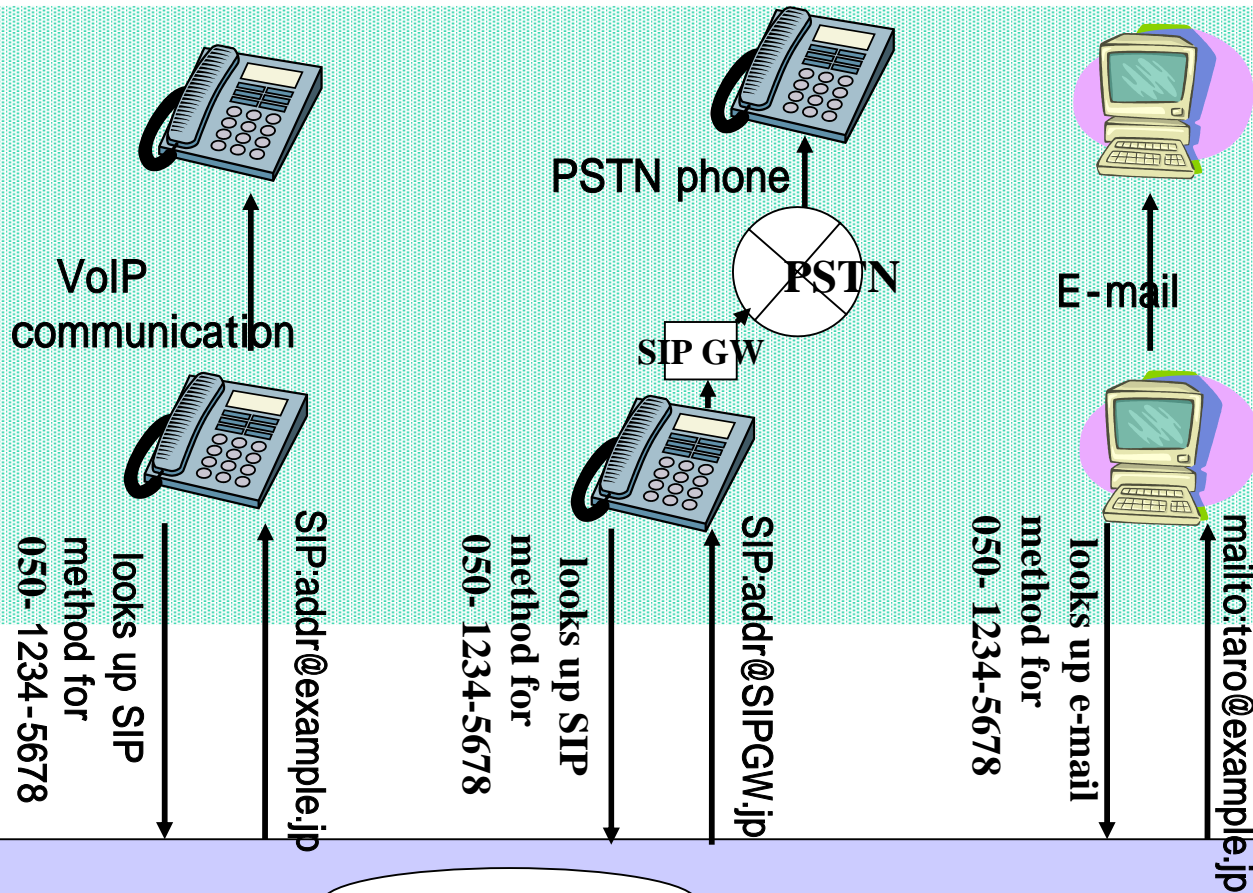
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What is ENUM?

- **ENUM is a mechanism for mapping telephone (E.164) numbers to Internet resource address(es)**
 - 1 to many
- **Internet resource address(es) are specified as URI(s).**
- **Mapping is**
 - Registered using NAPTR records in DNS
 - referred to by DNS lookup
- **End users (Applications) can select URI(s) according to their preference**

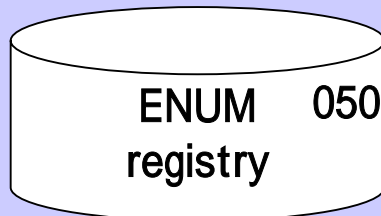
What is ENUM used for?



Communication service

- Vocal
 - PSTN
 - VoIP
- iFAX
- E-mail
- messenger
- voicemail
-

ENUM infrastructure



050-1234-5678 ==> sip:addr@example.jp
 ==> mailto:taro@example.jp

Technology

- **Standardization is being done in**
 - **IETF** : protocol
 - **ITU** : procedure of national operation
- **Standardization in IETF is almost done**
 - **RFC2916bis**
 - draft-ietf-enum-rfc2916bis-07.txt
 - being reviewed by IESG
- **RIPE NCC manages e164.arpa for formal ENUM DNS space in cooperation with ITU-T**
- **Several countries/economies are doing ENUM trials**
 - **Subspace delegated to countries/economies**

E.164 number to domain name conversion

1. **Check if E.164 is complete.**
 - **Ex. +81-3-5297-2571**
2. **Remove all non-digit except for leading '+'.**
 - **+81352972571**
3. **Remove leading '+'.**
 - **81352972571**
4. **Put dots (“.”) between each digit.**
 - **8.1.3.5.2.9.7.2.5.7.1**
5. **Reverse the order of the digits.**
 - **1.7.5.2.7.9.2.5.3.1.8**
6. **Append the string “.e164.arpa” to the end.**
 - **1.7.5.2.7.9.2.5.3.1.8.e164.arpa**

ENUM Services

- **Must be published as RFC and registered to IANA.**
- **Expected ENUM services, protocols.**

Service/Protocol	service field	URI Scheme (EX)
SIP	E2U+sip	sip:info@sip.jprs.co.jp
H.323	E2U+h323	h323:info@h323.jprs.co.jp
InternetFAX	E2U+ifax	mailto:fax@fax.jprs.co.jp
Telephone	E2U+tel	tel:+81352972571;svc=voice
FAX	E2U+fax:tel	tel:+81352972571;svc=fax
Email	E2U+email:mailto	mailto:info@jprs.co.jp
WEB	E2U+web:http	http://jprs.jp/

Issues

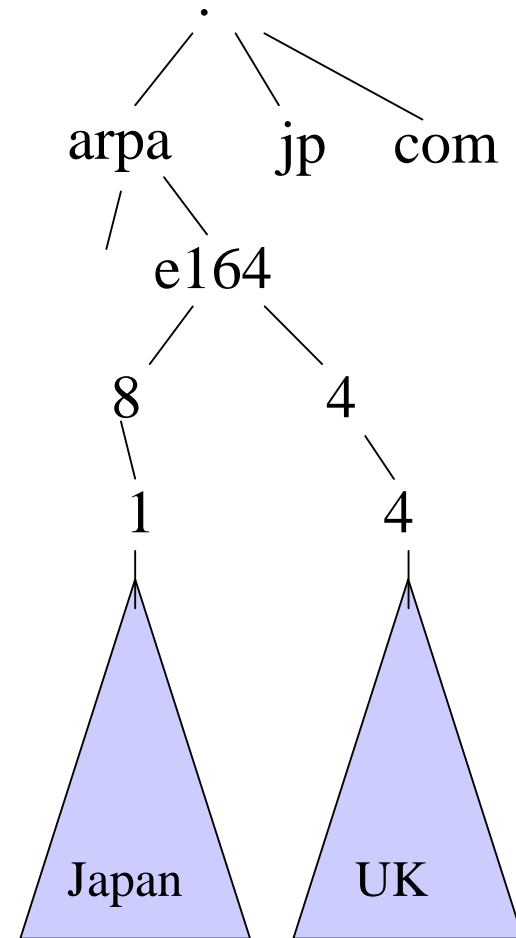
- **Future vision, business model**
 - **Operator ENUM / User ENUM / other models?**
 - **Management Entity, responsibility**
 - **Charge**
- **DNS operation**
 - **Tier structure**
 - **DNS server distribution**
 - **Provisioning of NAPTR records**
- **Application software development**
 - **ENUM client**
 - **Relation with other applications, such as E-Mailer, SIP phone, etc**

Issues (cont.)

- **Security**
 - DNS data
 - ENUM provisioning
 - User communication (application level)
- **Privacy**
 - End user data (whois)
 - Trace of the user behavior
- **Regulation**
 - ENUM numbering plan
 - Guarantee of quality of service

What is Delegation?

- **Delegation of a Telephone number space for ENUM Trial**
 - Telephone numbers under a country code (ex. 81 for Japan) shall be delegated to and managed by some organization authorized by the corresponding government
- **Procedure**
 - An organization negotiates with the government to become a delegee of the number space
 - The organization sends a request for delegation to RIPE NCC
 - RIPE NCC asks ITU-T for authorization to make such delegation (= NS delegation) under e164.arpa
 - ITU-T asks the corresponding government for endorsement of the delegation
 - The government endorses the delegation
 - Delegation is reflected (under e164.arpa) on DNS



Delegations to countries/economies

as of Feb.20, 2004

E.164 CC	Country	Delegee	Date of Approval
246	Diego Garcia	Government	12/08/02
247	Ascension	Government	12/08/02
290	Saint Helena	Government	12/08/02
31	Netherlands	Ministry	23/05/02
33	France	DiGITIP (Government)	28/03/03
358	Finland	Finnish Communications Regulatory Authority	26/02/03
36	Hungary	CHIP/ISzT	15/07/02
374	Armenia	Arminco Ltd	11/07/03
40	Romania	MinCom	10/12/02
41	Switzerland	OFCOM	01/10/03
420	Czech Republic	Ministry of Informatics	24/06/03
421	Slovak Republic	Ministry of Transport, Post, and Telecommunications	04/06/03
423	Liechtenstein	SWITCH	21/10/03
43	Austria	Regulator	11/06/02
44	UK	DTI/Nominum	16/05/02

Delegations to countries/economies (continued)

E.164 CC	Country	Delegee	Date of Approval
46	Sweden	NPTA	10/12/02
48	Poland	NASK	18/07/02
49	Germany	DENIC	16/05/02
55	Brazil	Brazilian Internet Registry	19/07/02
65	Singapore	IDA (Government)	04/06/03
86	China (c)	CNNIC	02/09/02
878 10	(a)	VISIONng	16/05/02
971	United Arab Emirates	Etisalat	13/01/03
991 001	(b)	NeuStar	02/02/01

Notes:

- (a) This is a Universal Personal Telephony (UPT) code.
- (b) This is a trial code granted to NeuStar for a limited period. The period expires on 28 May 2004.
- (c) This is a temporary authorization for ENUM global TLD trial and evaluation. This delegation will end on 30 June 2004. If the ITU Interim Procedure is discontinued before then, or if the Recommendation E.A-ENUM is approved before 30 June 2004, the delegation will be turned into an objection.

http://www.itu.int/itudoc/itu-t/enum/enum-app_ww9.doc

Delegations (summary)

- **24 delegations**
 - **Europe: 15**
 - **Asia: 2 (Singapore and China)**
 - **Middle east: 1**
 - **Latin America: 1**
 - **Islands, archipelago: 3**
 - **Beyond-CC experiment: 2**

Patterns of Trial Organizations

Intuitive classification

- **Led by organization created for the trial**
 - Registry, regulator, telco, vendor, ISP, ...
 - Austria, UK, Netherlands, Sweden, Japan, ... (many)
- **Led by ccTLD**
 - ccTLD plays the leading role of the trial
 - Germany, Korea, ...
- **Led by regulator (government)**
 - Registry, telco, and others are members of the trial
 - China, Singapore
- **Led by a company entrusted by regulator (government)**
 - Armenia, islands,
- **Led by entrusted ccTLD registry of another country**
 - Lichtenstein (led by .ch registry SWITCH)

Activities in Europe

- **2 trials very often exposed**
 - **Austria**
 - **Leading technology trials**
 - **ENUM tutorials and demonstrations in RIPE/CENTR/IETF/...**
 - **Support for ENUM implementation in Asterisk (IP PBX)**
 - **UK**
 - **UKEG and UKETG for study and trials**
 - **Telcos, registries, DNS providers, ...**
 - **Members from inside and outside of UK**
- **Netherlands. Sweden, Germany, Poland, ...**

Activities in Asia Pacific

- **Many countries/economies are doing some activities**
 - **Korea**
 - **China**
 - **Taiwan**
 - **Japan**
 - **Singapore**
 - **Australia**
 - (sorry.... I'm sure I miss someone else)
- **ENUM BoF : 6-9pm on Wednesday Feb.25**

Summary

- **Standardization in IETF is almost done**
- **Trials are under way in many countries/economies**
 - **Especially in Europe and east Asia**
 - **Commercial operation is about to start in a few countries**

URIs

- **IETF ENUM WG**
 - <http://www.ietf.org/html.charters/enum-charter.html>
- **ITU-T ENUM Web page**
 - <http://www.itu.int/ITU-T/inr/enum/>
- **National trials**
 - Austria : <http://enum.nic.at/>
 - UK : <http://www.ukenumgroup.org/>
 - Taiwan : <http://www.enum.org.tw/>
 - Korea : <http://www.enum.or.kr/>
 - Japan : <http://etjp.jp/>