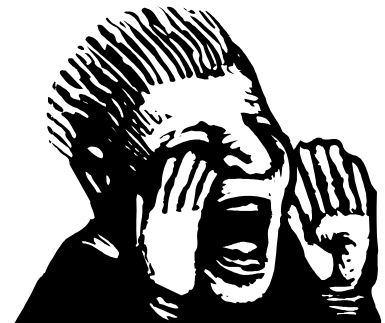

IETF – ENUM and Internet Directory Services

**Richard Shockey
ENUM WG co-chair**

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Problem Statement

- ◆ How do callers find service(s) on the Internet if you only have a telephone number [E.164]?
- ◆ How can subscribers define their preferences for incoming communications?
- ◆ How do you make this simple, easy to use, without “reinventing the wheel”?



Solution Proposal – ENUM / Directory Services

- ◆ Put telephone numbers into the global domain name system [DNS]
- ◆ ENUM WG formed and operating in the Internet Engineering Task Force
 - Use DNS NAPTR (Naming Authority Pointer) Resource Records to find
 - IP address
 - E-mail addresses
 - Voice over IP SIP
 - VPIM
- ◆ Link DNS-RR to LDAP directories for White Page data !!

How Does ENUM Work?

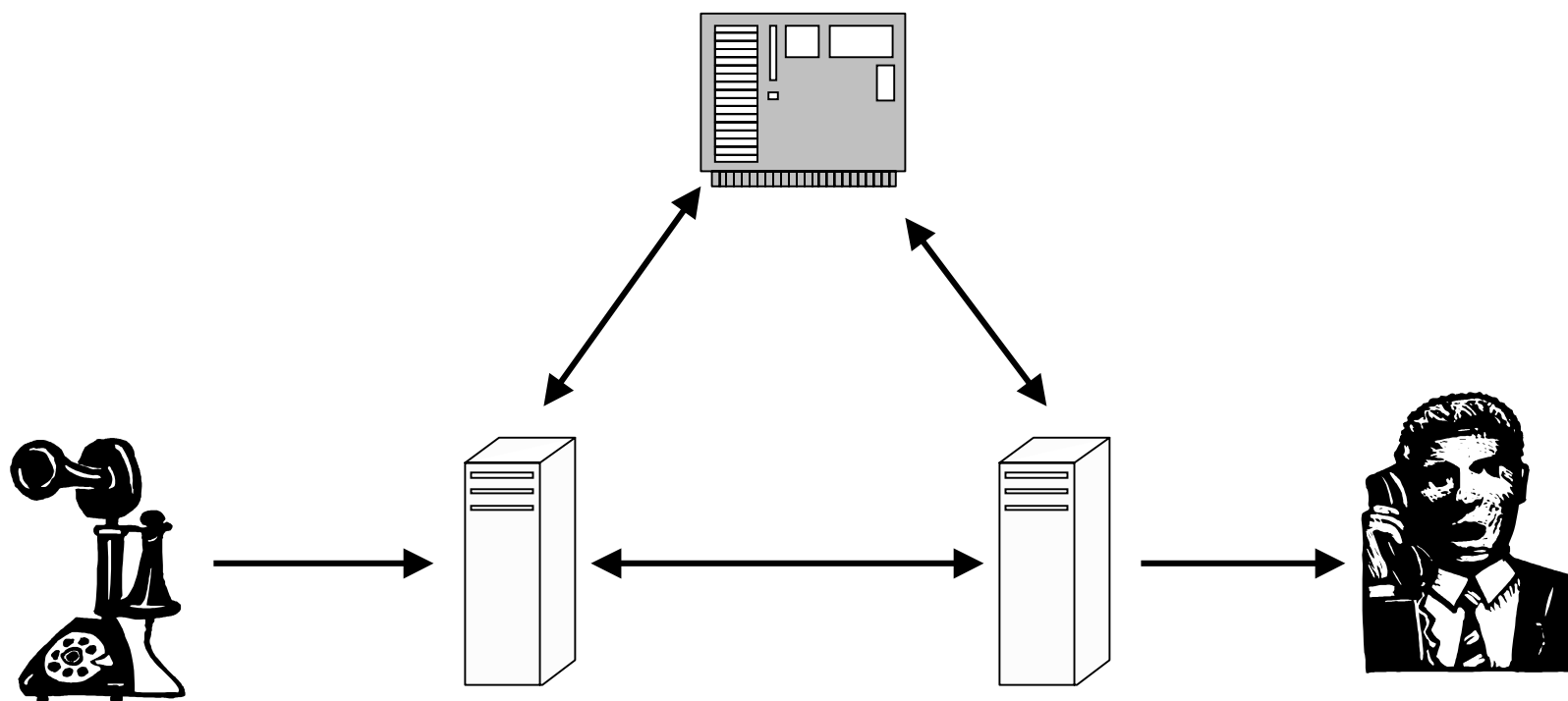
- ◆ Take a fully qualified E.164 telephone number and create a DNS entry in a single highly defined and structured domain.
- ◆ The search for resources on the internet associated with 1-314-918-9020 becomes a DNS look up to: 0.2.0.9.8.1.9.4.1.3.1.e164.arpa
- ◆ Each digit becomes a definable and distributed “zone” in DNS terms
 - Zones such as country codes and area codes can be delegated
 - “Authoritative Name Servers” for telephone numbers can be delegated to enterprises

Simple Enum Flow Chart

ENUM Global Directory (DNS)

Equates 1(314) 503-0640 to sip:rich.shockey@wcom.com

Or 1 (314) 503-0640 to vpim ldap.mycarrier.com



SIP Proxies /VPIM Servers

How Does ENUM Work?

◆ NAPTR RR response to query for

\$ORIGIN 4.3.2.1.6.7.9.8.6.4.e164.arpa [Sweden]

In this response the preferred contact method is SIP

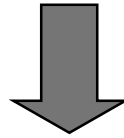
	ord	pr	fl	service	re replacement
IN NAPTR	10	10	"u"	"sip+E2U"	"!^.*\$!sip:paf@swip.net!" .
IN NAPTR	102	10	"u"	"mailto+E2U"	"!^.*\$!mailto:paf@swip.net!" .
IN NAPTR	102	10	"u"	"tel+E2U"	"!^.*\$!tel:+4689761234!" .

How Does ENUM Work?

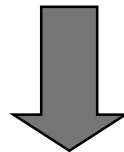
3 Level Resolution Model

From e164.arpa

1. Delegation DNS Server [National]



2. Service Provisioning DNS Server



3. Service Specific LDAP Server
(optional)

How Does ENUM Work?

Who is the subscriber designated authority for a given phone number?

1. Delegation DNS Servers

1.e164.arpa [1 US cc]

4.4.e164.arpa [44 UK cc]

Point to domain of authority first

How Does ENUM Work?

- ◆ What services are available for a specific phone number

2. Service Provisioning DNS Server

0.0.2.2.1.6.5.2.0.2.1.e164.bigco.com

- ◆ Use DNS resource records to “provision services”
- ◆ ENUM is a Service Selection Point for subscriber control of their IP telephony

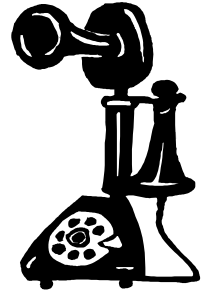
ENUM in VPIM

- ◆ ENUM enables carrier and enterprise voice mail systems to find each other, interoperate and exchange messages
- ◆ Linkage to LDAP directory services adds functionality like “spoken name”
 - White page directory services
- ◆ Retrieve voice mail from anywhere in the world with a local call
- ◆ Project trials under consideration
 - Short Term



ENUM in VoIP Gateways

- ◆ ENUM allows VoIP gateways to find each other
 - ENUM enables both *intra* and *inter* domain VoIP call setup
 - ◆ Private numbering plans handled internally to domain
 - ENUM is not for routing calls
 - ◆ ENUM is for “declaring” the ability to accept certain applications
 - ◆ ENUM is a “opt-in” system
- ◆ ENUM is not specifically about toll bypass it about consumer choice and consumer creation of new services



ENUM Resources

ENUM Charter –

<http://www.ietf.org/html.charters/enum-charter.html>

ENUM Core Protocol – IESG Last Call

<http://www.ietf.org/internet-drafts/draft-ietf-enum-dns-e164-03.txt>

ENUM Operations Issues- Under Active Discussion

<http://www.ietf.org/internet-drafts/draft-ietf-enum-operation-01.txt>

ENUM WG Requirements – Near WG Last Call

<http://www.ietf.org/internet-drafts/draft-ietf-enum-rqmts-01.txt>

ENUM Resources

DNS zone redirection (DNAME)

<http://www.rfc-editor.org/rfc/rfc2672.txt>

SRV

<http://www.rfc-editor.org/rfc/rfc2782.Txt>

NAPTR

<http://www.ietf.org/internet-drafts/draft-ietf-urn-naptr-rr-04.txt>

DDDS

URI Resolution using the Dynamic Delegation Discovery System

<http://www.ietf.org/internet-drafts/draft-ietf-urn-uri-res-ddds-00.txt>

Dynamic Delegation Discovery System (DDDS)

<http://www.ietf.org/internet-drafts/draft-ietf-urn-ddds-00.txt>