



ENUM

Overview – July 2003

[The ENUM Objective]

- Mapping PSTN addresses into the IP world
- ENUM allow any IP device to establish whether an E.164 telephone address is described by an Internet Service Point address
 - And ... what the preferred Internet Service Point actually is
 - And ... what IP address, protocol address, port address and application address should be used to contact the preferred Service Point

What is ENUM?

- ENUM is part of the extension of the PSTN into the Internet
 - ENUM is defined by the Internet Engineering Task Force (IETF) and translates an E164 number into Internet Service Points; [RFC 2916, September 2000]
- Defines the use of Domain Name System (DNS) resource records to map a telephone number into a collection of service addresses, including :
 - SIP / H.323 VOIP addresses
 - IP FAX servers
 - Voice Mail servers
 - PSTN services (redirect)

Why ENUM?

- Each VOIP-based PABX is a stub network hanging off the PSTN
- Each VOIP PABX gateway must use the PSTN to reach all other VOIP PABX extensions

= continued toll revenue for the telco

ENUM is a way to link up *'islands of VoIP in the PSTN sea'*

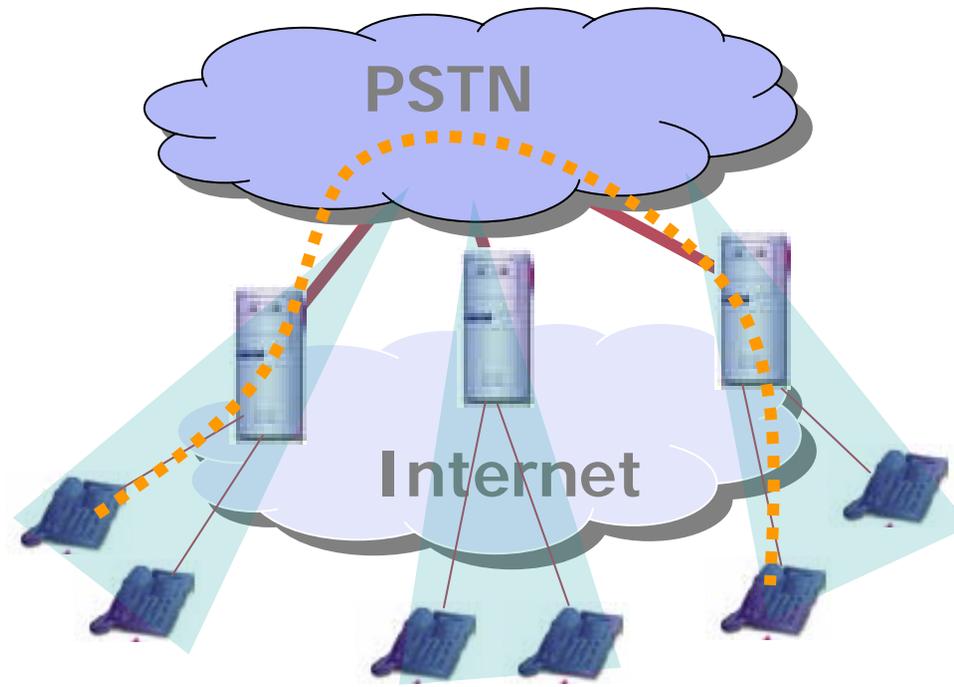
- ENUM allows each VOIP PABX gateway to discover all other gateways, as required
- VOIP gateways can pass calls to other VOIP extensions via VOIP, bypassing the PSTN completely

= declining toll revenue impact for the telco

- ENUM capability for PSTN originated calls are unclear

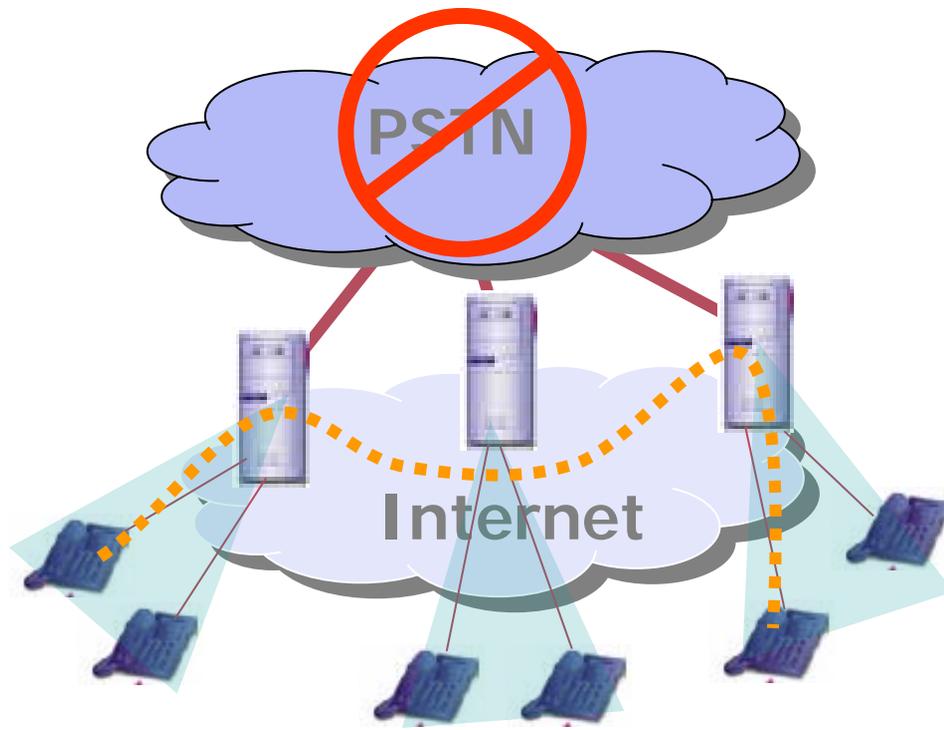
The multi-Gateway VOIP World

- The PSTN is used as the inter-VOIP network
 - Obvious implications of revenue protection for PSTN operators
 - More subtle implications for extended private VOIP networks



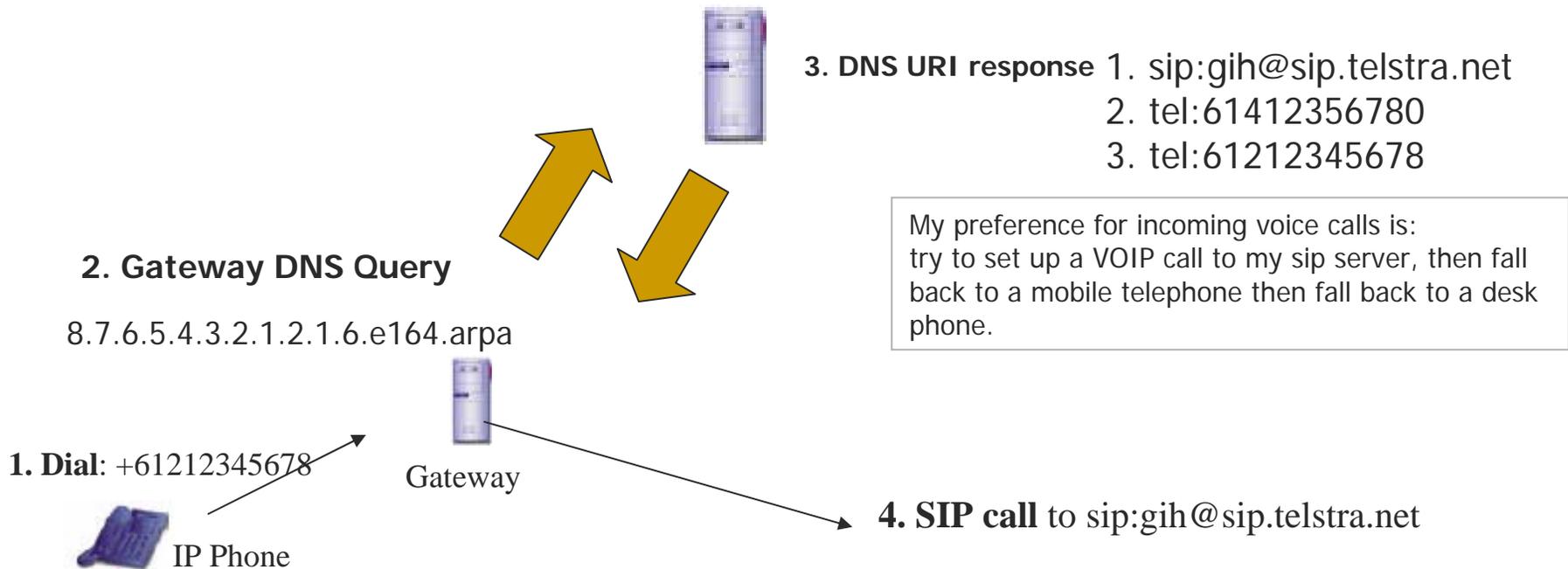
VOIP + ENUM = PSTN Bypass

- How can a VOIP gateway find out dynamically
 - If a telephone number is reachable as an Internet device?
 - And if so, what's its Internet service address?



How does ENUM Work?

- A ENUM VOIP Gateway first uses a ENUM DNS call to see if the dialled number is reachable via an IP service
- The DNS response is an ordered collection of Service URIs (NAPTR records)
- If there is a response, the Gateway selects the most preferred matching service to complete the call request



What is the Potential with ENUM?

- ENUM can also map a phone number to an email address, a web address, or any other form of service address, specified by a URL
- ENUM is about the potential to recycle phone numbers as Internet service identifiers
 - Allows the use of a traditional telephone number in the context of different communication media, e.g., e-mail addresses, instant messaging, personal web pages, and therefore could facilitate the penetration of new applications into the mass market easily
 - One person, One number, multiple services

E.164 as a common identity substrate?



fax:+61 2 62486000

mailto:gih@telstra.net

http://www.jd.com

tel:+61 2 12345678

sip:jd@sip.telstra.net

ENUM

Use this number for any service:

+61 2 12345678



Opinions about ENUM

- ENUM itself has no value. Its how you use it!
- ENUM represents a potential revenue threat to established PSTN operators.
- Some promote it for user simplicity:- “One number addressing eliminates need to remember multiple, complex, provider-based addresses”
- Some promote is a means for ISPs to enter into the PSTN market as a VOIP-only provider
- Revenues may be driven by new value-added services and applications enabled by using phone numbers as a ubiquitous digital identity token
 - Although this revenue may not necessarily head towards the telco
- Some believe there will be new services revenues from PSTN-IP Telephony and expanded reach into the Internet

How ENUM is Organized

- The IETF and the ITU have agreed on, and implemented, an ENUM mapping of PSTN numbers into the DNS
- It uses a unique top level domain (e164.arpa), populated with E.164 country codes as the first point of delegation
- ITU Member States have the choice as to the delegation of their E.164 country code into the ENUM DNS hierarchy
- Each ITU Member State (ACA in Oz) may administer their DNS mapped E.164 resources as they see fit

ENUM Privacy Considerations

- Registrant Choice (opt-in/out)
- Privacy Analysis
- Open Disclosure of Registrant Information in DNS
- Information Handling During Registration and Provisioning
- ContactInfo
- Fair Information Practices

ENUM in Australia (1)

- ACA wishes to complete their part of requirements
 - Public Discussion Paper - Jan 2003
 - Information workshop, l'nat speakers – March 2003
 - National Discussion Group Mtg1 – April 2003 (monthly)
 - Pushing hard... seem to think it ends with Tier-1 Registry

- PSTN carriers are evaluating the idea
 - Busy evaluating NGN and VoIP implementation
 - What are the new customer valued applications?
 - How to handle transition and maintain the revenue stream?

- VoIP carriers are probably supportive

[ENUM in Australia (2)]

- Strongly supported by potential Registry/Registrar operators (CSIRO/AARNet, Melbourne-IT etc)
- Strongly opposed by privacy advocates, some consumer representatives, and conspiracy theorists
- Other Groups (eg disabilities) want ENUM to address their agendas

Regulatory considerations of ENUM

- ENUM will take time as it raises many regulatory issues:
 - Which phone numbers can be used in this way?
 - New 'personal' numbers?
 - Existing 'geo' numbers?
 - Existing mobile numbers?
 - Can the Numbering Plan regulate "number-only" services?
 - Who gets to put an entry into the DNS to map a phone number to a set of URLs?
 - The telco? (like in-addr.arpa)
 - A nominated monopoly tier 1 registry that uses multiple tier 2 registrars (like .com, etc)
 - Privacy, Emergency, Legal interception, etc
 - Who owns the base number?
 - The customer? The Application provider? A Registrar? The Registry? The Access provider?
 - How can an individual assert exclusive interest in a phone number?
 - Are phone numbers independent of a PSTN service?
 - Will private n/w operators be 'caught' by CSP regulation? If not who is responsible for the Telco obligations?