SUBSCRIBE TO TMCnet   Follow   **G+1**   ABOUT US | SERVICES | SUBSCRIPTIONS | LOGIN | SIGNUP   Type here to Search TMCnet

COMMUNITIES   CHANNELS   PUBLICATIONS   EVENTS   TECHNOLOGIES   MORE NEWS   BLOGS   MORE

MARKETS »   **NFV**   **HTML5**   **WEBRTC**   HOT TOPICS »   **CALL RECORDING**   **UNIFIED COMMUNICATIONS**   **VIRTUAL PBX**

RESOURCE CENTER -   AWARDS | WHITE PAPERS | WEBINARS | EBOOKS | TMCLabs | VIDEOS | MEDIA KIT

CHANNEL BY TOPICS

| **Call Center/CRM** |
| **Info Tech/Cloud** |
| **IP Communications** |
| **Mobile** |

QUICK LINKS

- ✉ Subscriptions
- ✉ White Papers
- ✉ eNewsletters
- ✉ Webinars

ADVERTISE WITH US | TMCNET HOME

September 2007 | Volume 10 / Nuber 9

Feature Articles

Internet Telephony Magazine Table of Contents

ENUM Slowly Makes Its Mark

By Richard Grigonis

ENUM (TElephone NUmber Mapping or "electronic numbering") is a protocol suite designed to unify the standard E.164-format telephone numbering system with the Internet addressing system (DNS, or Domain Name Service). The phone number is used to obtain NAPTR (Naming Authority Pointer) DNS records in a DNS database. The ENUM process thereby stores phone numbers in the public DNS and transforms your 15-digit telephone number into a sort of universal identifier for sending calls to various trusted devices and applications - voice, fax, mobile, email, text messaging, IMS applications such as Push-to-Talk, location-based services and the Internet.

Arbinet (http://www.arbinet.com) provides an electronic trading platform where 900+ fixed and mobile service providers buy, sell, deliver and settle 12+ billion minutes per year. Steve Heap, Arbinet's Chief Technology Officer, says, "The IETF originally conceived of ENUM for a world without service providers. Someone with a VoIP phone could have put their phone number and its IP address in some ENUM registry or database. Then, some other person in the world trying to call them would just directly query this registry in some way, get the IP address of the distant person, and set up the call through the public Internet with no service provider being needed. This became known as Public ENUM and a few countries have done trials of it, but to me these are going nowhere. It's too much of a geeky-paradise idea with no
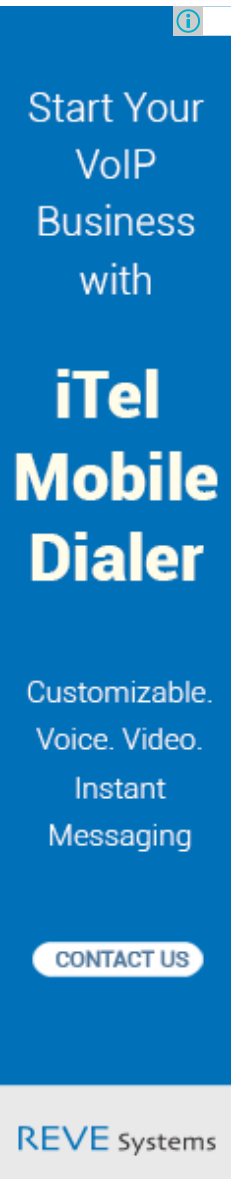
business model, so most customers don't have the slightest interest in it."

"The basic concept of ENUM however is good," says Heap. "The originating service provider can find and set up the call or the session to the terminating service provider. That idea of peering one provider with another is what really interests the industry, since it establishes a connection between both users and providers, and the provider can then collaboratively generate some 'incremental service' capabilities on top of that connection, be it better quality codecs or, in the cable TV world, the caller's name appearing on the TV. And the quality of the call should be better because there are not intermediary translations from one technology to another. And of course you've cut out all of the intermediate PSTN carriers that currently get involved in a call along with the costs they incur."
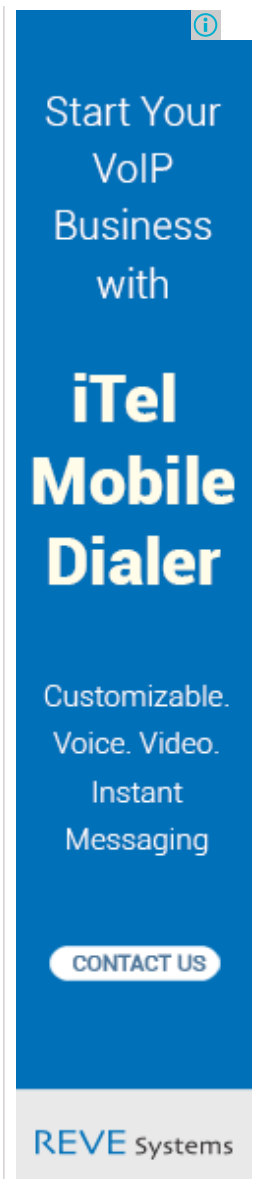
To really fathom the mysteries of ENUM you should find yourself a DNS expert, so Yours Truly rang up Nominum (http://www.nominum.com), known for their carrier-class, scalable, reliable and secure DNS and DHCP (Dynamic Host Configuration Protocol) servers and Layer 5 to 7 networking solution sets.

George Smine, Senior Director of Product Marketing at Nominum, says, "ENUM started as an IETF protocol and then it made its way into the ITU and then into some regulatory bodies across European countries and even in America. We realized that ENUM initiatives were going take much longer to achieve reality than anyone had thought. You see a bit more activity in Europe where there have been some trials of public ENUM."

"Right now we see the industry converging towards something that's called Private ENUM or Carrier-ENUM," says Smine. "There are multiple reasons for that. The first concerns the transfer and the ownership of the data sets in a public ENUM space. Imagine having your telephone number being stored out there in the Internet. How do you teach consumers that that's how they can manage their phone numbers? This would be a case of what people sometimes call End User ENUM. Or, think of carriers' reluctance to divulge their numbering plans or how they have some advantages of routing a phone call across the complex web of interconnects and settlement agreements and termination rates that they have with other providers. Having a single converged view of every telephone number out there in the public Internet is not something that's very conducive to their operations. Why should every carrier share their 'crown jewels' and put that information out there, thereby helping anybody with a SIP phone a way

to bypass the traditional carrier? Questions also arise as far as opting-in and opting out, and this is where you see many lawyers entering the game. Moreover, how do you really facilitate the end user's interaction in all of this and manage it? And what is the Quality of Service [QoS], what is the expectation by an end user in having a phone call delivered to their handheld device if they're the ones managing that phone number?"

"ENUM thus raises a lot of issues and that's why we've seen ENUM take different courses and paths," says Smine. "The basic idea of ENUM sounds great, putting all of these phone numbers in a public DNS, but it's going to take a while for it all to happen. You may see some grassroots efforts and some countries may be able to achieve that a bit faster than others. The U.S., because of its size and the number of carriers and the number plans that are very big here, may take longer than some other countries for ENUM to fully materialize. Instead, we're seeing more Carrier-ENUM implementations taking hold, which are private databases being managed internally as part of the network, like any networking element, and independently done by each carrier on their own."

"Nominum saw how the Infrastructure ENUM or Carrier-ENUM was used and the glaring need for having operators interconnect with each other," says Smine. "We saw how ENUM serves a purpose in serving as a database on IP. Not exactly like a signaling control point in SS7, but something akin to that. Products such as Acme Packet's Session Border Controllers and things such as softswitches can rely on the database to retrieve and do the number translation - not so much just being able to find a mechanism for mapping a phone number to DMS and resolving it, but also to figure out what the possible routes a carrier can use to interconnect to other providers. What's interesting about this is that, when we look at VoIP growth, very often we tend to look at VoIP at the edge. We compare it with Skype, Yahoo broadband, consumer VoIP growth and adoption by cable providers, and in a way we measure this usually by what's going on at the edge. VoIP is not just happening on the consumer front, it's happening on the business front with such things as IP PBX adoption. But there it's a bit harder to gauge the numbers because although enterprises have IP PBXs, they may still connect to carriers via TDM lines."

"What's interesting is that interconnects are moving to IP," says Smine, "so large and even small carriers who interconnect with other carriers and some enterprises are noticing that many of their interconnections should be moved from TDM to IP. So there's a move towards IP interconnects as the core of networks between wholesalers and retail carriers, which makes the network now look more like a doughnut, where at the core you're getting an IP explosion, and, at the edge, you have this erosion of Class 5 switches that are serving traditional TDM customers who are now moving to IP. That's where we

saw the move to ENUM growing and so we launched our product Navitas, what we call an ENUM routing directory. It's a database that sits in the network and its main task is to store a very large set of numbering plans, be they based on prefix routing, number portability, or whatever. Navitas is very scalable and can store a massive amount of data, and it can serve as the main repository for facilitating the interconnect routes and managing traffic between carriers and even for retail telcos. This has placed us in a state where we're serving data that helps carriers achieve least cost routing or what we call Best Path Routing, wherein a call is delivered not only based on the cost, but also based on the quality of the call in conjunction with the cost and based on the bandwidth capacity available on the network or on particular routes."

ENUM Keepers

VoEX, Inc., is a VoIP managed-service provider offering a global peering infrastructure. VoEX maps phone numbers to resolvable IP addresses by combining a carrier-grade VoIP peering infrastructure with the world's largest (250 million+) Carrier ENUM registry.

VoEX's Cyril Matthews, Director of Registry and Network Services, says, "In terms of the Private versus Public ENUM view of things, we're taking a more private, or 'carrier ENUM' approach, using it to facilitate specific peering relationships of ours, both for our customers, those who use us for termination services, as well as for those folks who we have relationships with who have their own end users and have us interconnect to them and then we terminate calls to them. So we're mediating from that standpoint."

"We view ENUM as a technology that facilitates business arrangements," says Matthews. "One key thing we've done in our ENUM deployment is that we're using it not just to facilitate peering between ourselves and other VoIP-based providers, but we're using it to peer between those folks and the PSTN. So, as we've done over the years in our traditional telecommunications-based business, we're supporting TDM carriers as well as IP-based carriers. We believe ENUM's value is not just mapping VoIP-to-VoIP but VoIP to the PSTN. What we've done as a part of our offering is that we've gone out and negotiated relationships with traditional TDM carriers as well as VoIP carriers. Of the 250 million members that we have in our ENUM database for routing, most of those are TDM-based endpoints and there are many wireless carriers represented. The advantage is that by using us for an interconnect, we're really able to cut out a lot of the traditional intermediaries in the telephony network."

"There's a fear that Private ENUM can lead to walled gardens, but, in effect, everybody ends up peering

with everybody else," says Matthews. "We break down those walled gardens because if you have carriers that are, say, TDM-based, you can get to them through the PSTN. But those that are IP-based are not always as easy to get to. So by taking both the TDM-based folks and IP-based folks and connecting them to VoEX and what we call our peering grid, both these groups can reach one another. We break down those walls. Rather than having a carrier create their own walled area and then devolve back to the PSTN as your 'least common denominator' form of interconnect, we're using ENUM and our VoIP infrastructure to provide that interconnect, and it's a more direct form of peering in many cases."

Not-so-Hard Hardware

Ideally, telecom services providers such as VoEX should be able to call upon hybrid network-friendly equipment that encompasses private, Carrier-ENUM.

It just so happens that NetNumber Inc. (http://www.netnumber.com) offers the Transactional IP Telephony Addressing & Numbering (TITAN) platform, a flexible, carrier-grade, multi-protocol, next-gen addressing infrastructure that service providers and interconnect carriers license to support multiple IP and SS7/C7 address resolution services.

NetNumber's Founder and Chief Strategy Officer, Douglas Ranalli, says, "We're a provider of addressing and routing technology to the communications industry. As such, addressing and routing in a converged network involves many protocols. You've got all of the SS7/C7/SIGTRAN protocols such as AIN 0.2, INAP, PCS1900, IS-41, CAMEL, and so forth. So you've got that whole world of existing circuit-switched addressing and routing and then you have the new IP protocols; from an addressing and routing perspective, those would be ENUM, SIP and DNS. NetNumber builds the addressing and routing platforms called TITAN, which is essentially a converged addressing and routing platform. It supports existing SS7/C7 protocols and all of the emerging IP protocols, to allow carriers to actually perform addressing and routing appropriately, in a converged network."

"So, we're a provider of technology to participants at every level of the industry," says Ranalli. "We license our technology directly to service providers; some of our biggest customers are AT&T Cingular, British Telecom and Level 3. We also license technology to networking 'intermediaries' or companies that do the routing of voice calls - VoIP transport companies such as Arbinet and VoEX, and we license to content providers, companies that deliver content to, say, mobile phones. The mobile industry is a leader in the convergence of telephony with IP because mobile networks today have associated parallel data

networks. There's lots of interesting work going on in the mobile space regarding the introduction of IP services, but yet mobile devices are fundamentally telephony devices, so they have some interesting routing and addressing requirements."

"For example, if Yahoo has an SMS message that it wants to deliver to a mobile phone," says Ranalli, "given a dial telephone number, how do you actually find out which carrier 'owns' that phone number? In order to deliver that text message to the mobile phone, a 'pure IP' company such as Yahoo needs to access classic telephony data. They need to know from a portability perspective who presides over a given telephone number. Fortunately, our TITAN platform provides Yahoo that addressing and routing service so that they can accurately deliver text messages to mobile phones. Cisco has licensed our TITAN software for global distribution, and Motorola has licensed it too."

"We double our revenue every year, so from our perspective we see a very nice growth rate in next-gen technology and such things as ENUM," says Ranalli. "I would say it's more interesting than merely 'steady growth' but we believe that we're still at the very early stages of this industry. We anticipate that the industry will unfold over the next 10 to 20 years. This is a long-term, very exciting growth space. The convergence of the telephony world with the IP world in general is a transition that will take another 20 years to complete. For us, that creates lots of interesting opportunities that we see our customers pursuing."

Another device that finds itself dealing with ENUM is the session border controller (SBC), such as those made by Acme Packet, one of the premier SBC vendors in the industry.

Acme Packet's Seamus Hourihan, Vice President of Marketing and Product Management, says, "Our service provider platform enables providers to use their own ENUM registry to make IP-to-IP calls without the need for PSTN connections."

"Back in April 2006 we announced that we support ENUM on our platform to make queries to ENUM registries, or as our partner Nominum calls, them, IPRDs or IP Routing Directories," says Hourihan. "We do a lot of work with the VPF [Voice Peering Fabric] group of companies that has an ENUM registry, such as Telcorida, Neustar, VeriSign and XConnect. Many of the VPF members use the ENUM registry. Not all VPF members put their numbers into that registry and exchange calls for free, but an increasing number do."

Acme's Director of Solutions Marketing, Kevin Mitchell, says, "We recently held a webinar about the role of ENUM and session border controllers in enabling wholesale carriers to provide services. Our equipment can be found in some cable operators where ENUM is either being tested or is in early pilot trials. Pretty much all of our cable operator customers have ENUM plans."

"An SBC is deployed at an IP network border," says Mitchell. "In an interconnect or peering environment where ENUM is generally going to be used, the SBC is the ingress/egress point for signaling media. At that point you can make the determination of where this call and its signaling should be forwarded to for the next 'hop' and you can query into an essential database that has this type of information. It can do a translation from traditional phone numbers so you don't have to change your dialing scheme. ENUM makes a lot of sense. This basically augments local routing policies that are SBC also has. You can't just simply forward a call on to the next hop without knowing what the state of the network is or how it's performing, so we have mechanisms that measure QoS from the signaling and media perspectives and these contribute to the overall routing decisions."

So, perhaps in the not-too-distant future the entire human population will carry around ID cards, each displaying the "universal identifier" - a single 15-digit phone number. They may be a bit too long for automobile license plates, however. IT

Richard Grigonis is Executive Editor of TMC's IP Communications Group.

» **Internet Telephony Magazine Table of Contents**

Today @ TMC

Headlines

- Department of Veterans Affairs Awards Leidos Prime Contract

- IGT Honored in Casino Journal's Top 20 Most Innovative Gaming Technology Products Awards

- Japan Infusion Systems

Upcoming Events

ITEXPO West 2012
October 2- 5, 2012
The Austin Convention Center
Austin, Texas

MSPWorld
The World's Premier Managed Services and Cloud

Corporate News

IoT Platforms Compete to Be Named the Best at IoT Evolution Expo

5 Startups Join IDEA Showcase to Pitch the Latest Technologies to a Live Audience

Snapshots

Skype

Vonage

Linksys

Sprint North Supply

Market 2016-2020 - General
Purpose or Volumetric Pumps /
Syringe Drivers / Patient-
Controlled Analgesia Pumps /
Ambulatory Pumps - Research
and Markets

- Latin America Mobile Voice &
Mobile Broadband Statistics
(Tables Only) - Research and
Markets

- Australia Mobile Broadband
Market Services & Apps
Report 2016 - Analysis,
Technologies & Forecasts -
Key Vendors: BigAir,
EnergyAustralia, Ericsson -
Research and Markets

view more…

Computing Event
Click for Dates and
Locations

Mobility Tech Conference &
Expo
October 3- 5, 2012
The Austin Convention
Center
Austin, Texas

Cloud Communications
Summit
October 3- 5, 2012
The Austin Convention
Center
Austin, Texas

view more…

IoT Evolution Expo which
has Consistently Voted as a
Top Conference Kicks-Off
Next Week

IoT Evolution Expo
Announces Industry
Influencers as Judges for
Battle of the Platforms

Oracle's Darko Vukovic and
James Steadman to
Keynote All About the API
Conference

IoT Evolution Expo
Highlights Industrial IoT as a
Major Focus for Las Vegas
Event

Tony Jamous, President of
Nexmo, a Vonage
Company, to Keynote All
About The API Event

Microsoft API Architect
Gareth Jones to Deliver
Keynote at All About The
API in Las Vegas

view more…

NICE Systems

IP Multimedia Subsystem

Siemens

Verizon

Hewlett-Packard

Nokia

Telefonos de Mexico

Avaya

Alcatel-Lucent

Microsoft

Google

Motorola

Comcast

FCC

Spatializer Audio Labs

AT&T

view more…

The World's Largest Communications And Technology Community

Technology Marketing Corporation,
800 Connecticut Ave, 1st Floor East, Norwalk, CT 06854 USA
Ph: 800-243-6002, 203-852-6800; Fx: 203-866-3326
General comments: tmc@tmcnet.com. Comments about this site: webmaster@tmcnet.com.
» About » Contact » Advertise
Technology Marketing Corp. 1997-2016 Copyright . Privacy Policy Sitemap

- CHANNELS
- COMMUNITIES
- INDUSTRIES
- VERTICALS
- TMCNET SERVICES
- FREE ENEWSLETTERS
- NEWS ALERTS
- PUBLICATIONS
- CUSTOMER MAGAZINE

- IT MAGAZINE
- NGM MAGAZINE
- CLOUD COMPUTING MAGAZINE
- WHITE PAPER LIBRARY
- VIDEOS
- PODCAST
- WEBINARS
- EVENTS
- FORUMS
- CONTRIBUTORS