PHONEWORD

February 13, 2014

Regarding: All-IP Trial Proposal GN 13-5

To the United States Federal Communications Commission (FCC):

Attached is a body of work for consideration as a foundation for an All-IP Transition Trial and Numbering Testbed Experiment.

Please consider this letter and the attached items as an indication of interest for inclusion in the trials and numbering testbed. All items should be viewed as part of a non-binding proposal to participate. This is a response to the announcements made by the Federal Communications Commission on January 30, 2014 at the Open Meeting.

Primarily the trial proposal is contained in the presentation titled "Over-the-Top Naming, Addressing and Numbering".

The proposal features a yet to be built independent Electronic Number Mapping (ENUM) registry for experimenting with various policies, governance, business models and technologies. The proposed platform is inspired by and a derivative of the Free Registry for ENUM and Domains (FRED). This registry will be compliant with the Internet Engineering Task Force RFC 6116 specifications.

The remaining documents and items highlight some of the challenges that End-user Opt-in ENUM has encountered since inception in the late 1990s. The proposed trials present an opportunity for innovation and experimentation to successfully usher in a new age of naming, addressing and numbering without the limitations from the past.

Thank you for opening this opportunity for innovation and collaboration.

Regards,

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Over-the-Top Naming, Addressing and Numbering Trial Proposal

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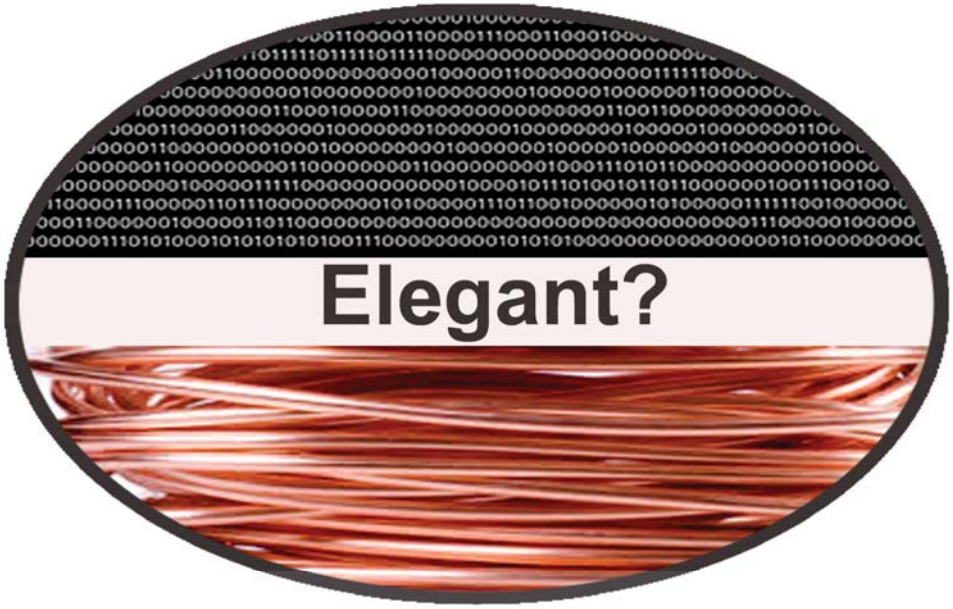
February 13, 2014

Jay Carpenter - PHONEWORD - GN 13-5



Could the all-IP transition be “elegant”?

Could the PSTN be mostly left alone?
“Stay as long as you like however checkout time is 2020”

Jay Carpenter, PHONEWORD, February 13, 2014, GN 13-5, page 3.

Can We
Create and Innovate
Anew?

Jay Carpenter, PHONEWORD, February 13, 2014, GN 13-5, page 4.

Can the Community Create and Innovate Collaboratively?

Jay Carpenter, PHONEWORD, February 13, 2014, GN 13-5, page 5.

Specifics and Details

How can Elegance, Creativity, Innovation and Collaboration Happen During the Trials?

Jay Carpenter, PHONEWORD, February 13, 2014, GN 13-5, page 6.

Basics

- Free Registry for ENUMs and Domains (FRED: http://fred.nic.cz/)
- Open Source and Collaborative - FRED Community is in place
- Peer to Peer
- Fork it if you have a better idea
- Internet Domain Ecosystem Centric with existing PSTN fallback in real time
- Compatible without conflicting with existing registries and databases
  - NPAC
  - LERG
  - SMS/800
- Foundation for Registry, Registrar and Registrant Choice
- Choice of IP or PSTN is made by the End-users in real time
- Technology and Security testbed (web centric)
- Business model testbed including market-based allocation and toll free broadband
- Governance and policy testbed
- Authentication, Authorization and Authority testbed
- Downloadable Application (ENUM Droid available today)
- Browser based dial pad or address entry pad via WebRTC

Details

- Service Experiments are integrated with numbering and addressing
  - NAPTRs allow for rich set of functionality
- Experiments for iTRS/VRS and other enhanced service communities are available
- Zero licensing cost, open source and non-proprietary software
- All Internet without modification to the Public Switched Telephone Network ecosystem
- Data can be gathered and reported as usage occurs
  - FRED has data collection functionality
  - Reporting is available
- Community is already in place for collaboration
  - http://www.nic.cz/
  - http://fred.nic.cz/
  - In use in over 6 countries
  - 2006 was the year FRED was placed into operation for the Czech Republic
- Timeline - FRED centric trial platform could be operational within 30 days of trial launch
- Hackathon compatible

Data to be measured

- Number of active users at different points in time
- Demographics of users
- Number of NAPTRs provisioned per ENUM
- Number of businesses requesting a toll free broadband ENUM
- Voluntary user surveys and feedback responses
- Number of complaints
- Number of active developers participating in platform enhancements
- Number of registrars
- Number of registrants
- Number of alternative registries that are forked during the all-IP trial
- GitHub activity
- Google Analytics
- Twitter and other social media activity
- Number of enhanced services created for communities like the hearing impaired
- Businesses created from the FRED inspired testbeds
- Employment created fromt the FRED inspired testbeds

Timeline

- Team formation by May 1, 2014 - open invitation
- Cloud based registry operating by May 15, 2014
- Downloadable app is operating by May 15, 2014
- Toll free broadband is operational by (carrier dependent)
- Reporting is available on a monthly basis
- Monthly open community virtual meeting on the third Wednesday of each month
- FRED Registry Inspired trial conclusion by May 15, 2015

Conclusion, Recommendation and Request

- Include at least one FRED inspired registry as part of the All-IP Trials.
- While NG911 might fit well with a FRED inspired registry, we will need to have a registry instance built and tested for this specific purpose. Controlled experimentation with NG911 will be one of the first priorities. In all cases, anyone using a downloadable app associated with this proposal will have the choice to revert to standard PSTN connectivity at any time. Browser dialing using WebRTC will require testing with 911 and NG911 prior to release for trials.
- At this time, no waivers or regulatory relief is requested regarding the FRED inspired registry proposal. We do request the right to request waivers and regulatory relief as the trials progress and if such relief might be appropriate.
- Build FRED inspired registries and then evaluate real world use cases
- Build, Test, Evaluate and Iterate
- This presentation constitutes a non-binding indication of interest and request to include the www.PHONEWORD.org FRED Inspired Registry in the all-IP trials as announced in the FCC order dated January 30, 2014 and filed under GN 13-5.

"***Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand.***" -Albert Einstein

"***No one knows what's next, but everybody does it.***" -George Carlin

Contact Information & Background

- Jay Carpenter contact information
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- Background and experience
  - Future of Numbering Working Group
    - FTN-005 Champion
    - FTN-003 Champion
  - SNAC
  - RespOrg
  - CC1 ENUM LLC Participant
    - TAC Contributor
  - PHONEWORD Forum (http://phoneword.com/phonewordforum.html)
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    - MBA, University of Southern California (cum laude)
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Tier 1B Design: A Market-Based Approach Using Null Registrations

2/13/2014, 5:46:16 PM

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

This proposal has not been endorsed by the full membership of 1-800 AFTA. The author and 1-800 AFTA reserve the right to withdraw or modify the comments in this proposal at any time. This contribution is for discussion purposes only.

CC1 ENUM LLC CONTRIBUTION:

SOURCE: Jay Carpenter, representative for 1-800 AFTA

DATE SUBMITTED: December 19, 2005

TITLE: Tier 1B Design: A Market-Based Approach Using Null Registrations

An alternative approach to:

E.164 End–User Subscriber Authentication & Dispute Resolution

This document is offered to the **ENUM LLC Technical Advisory Committee (TAC)** as a basis for discussion and is not a binding proposal on Jay Carpenter or **The 1-800 American Free Trade Association (1-800 AFTA)**. Jay Carpenter and 1-800 AFTA specifically reserve the right to amend or withdraw the statements contained herein.

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Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

This proposal has not been endorsed by the full membership of 1-800 AFTA. The author and 1-800 AFTA reserve the right to withdraw or modify the comments in this proposal at any time. This contribution is for discussion purposes only.

The following Tier 1B design proposal is intended to address several issues facing practical implementation of Public ENUM in 1.e164.arpa. Primarily this contribution is designed to start discussion regarding an alternative solution to E.164 telephone number end-user subscriber authentication and to minimize potential dispute resolution proceedings. A general position paper regarding a market-based approach to Public ENUM is under development and will further expand upon concepts presented here.

The process for transforming resources once considered commons to resources with private property rights has a long history in the United States highlighted by the Abraham Lincoln signed Homestead Act of 1862. Although telephone numbers have officially existed as commons or a public resource until this time, our society's use of telephone numbers has transitioned to usage that is more akin to private property. Portability of telephone numbers at the direction of the end-user subscriber is one of the biggest factors contributing to rights associated with E.164 telephone numbers effectively moving in this direction (see reference 16). This shift toward subscriber rights becoming private property will take yet another step forward with the advent of the 1.e164.arpa Tier 1B registration process. A body of regulatory and academic work over the past half century cited below documents the advantages of assigning property rights to scarce resources in conjunction with encouraging open markets. This private property rights approach to scarce resource allocation is shown to have multiple societal benefits over maintaining a commons approach to public resource allocation. Ronald Coase won the 1991 Nobel Prize in Economics for his work surrounding a policy paper he wrote for the FCC in 1959 regarding open markets, property rights versus commons and the natural optimal solutions that can emerge to settle disputes. Coase Theorem predicts optimal societal outcome through well defined property rights and open markets for scarce resources.

Based upon the research listed below and my business experience, it is my assessment that acknowledging end-user subscriber rights associated with E.164 telephone numbers and allowing those rights to freely trade in the open market place is the missing piece to usher in the optimal design for society of the Tier 1B and ultimately 1.e164.arpa Public ENUM. Without going into the lengthy details of all aspects of the market-based proposal, this proposition is based upon adding two elements to the Tier 1B design consisting of (A) null records and (B) open markets to trade end-user subscriber rights to E.164 telephone numbers. The following illustrates how the Tier 1B could be designed and how related operational policies could work to solve authentication, dispute resolution and other issues.

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

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A. **Null Records**: On day one of Tier 1B introduction but before actual NAPTR lookup operation (e.g. January 1, 2007, pre-commercial launch), all NANP numbers could be represented by a record in the Tier 1B starting with a default null registration (e.g. John Doe) for the subscriber and an inactive but carrier provisionable NAPTR to enable carrier ENUM. The right for a given carrier to provision the carrier NAPTR associated with any particular “John Doe Null Registrant” number could be tied to existing databases containing carrier-of-record or responsible organization information. Ultimately, choice of the carrier for the number will still reside with the end-user subscriber but the end-user selected carrier for the number could have exclusive rights to provision the carrier NAPTR under all possible states of end-user subscriber Tier 1B registration status.

   Prior to the commercial operation day (e.g. July 1, 2007, commercial launch), the registry could be open for preliminary registration where PSTN subscribers can substitute their subscriber information (publicly or privately) for the "John Doe" registration. For example, as an end-user subscriber, during this pre-commercial launch period I could work with my carrier, ENUM Registrar or both and change the null registration of "John Doe" to Jay Carpenter. This pre-commercial launch registration could appear to the public as either Private Registrant or Jay Carpenter depending on my directive to the ENUM Registrar of my choice. This creates three possible states of registration associated with all NANP E.164 telephone numbers prior to commercial operation of the Tier 1B. Any E.164 NANP telephone number would appear to the public as either, John Doe Null Registrant, Private Registrant or Public Registrant (Jay Carpenter for my telephone numbers if I select public registration). This pre-commercial launch registration would be based upon subjective evidence of subscribership but would buffer end-user subscribers from immediate and possibly disputable objective existence of subscribership as proposed in other authentication and registration methods. This pre-launch period allows all interested parties to view and settle end-user subscribership issues prior to commercial operation of 1.e164.arpa. Authentication in this case is enhanced by time, possible public posting of a claim of subscribership and any registration fees associated with changing the Tier 1B registration from the default state of “John Doe, Null Registrant”.

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

B. **Open Market for Subscriber Rights**: During this period leading up to commercial operation of the Tier 1B, indications of interest for trading subscriber rights could be publicly open for all NANP telephone numbers. For example, during this preliminary period, I might submit an indication of interest to purchase rights to 1-800-746-7288 (1-800-SHOP-AUTOS) or 1-5XX-529-2277 (1-5XX-JAY-CARPENTER) and/or 1-(9XX)-JAY-CARPENTER. Multiple consumers could be interested in the same or similar telephone numbers. For example, by substituting a “K” for the “J” in the prior examples, all the Kay Carpenters in the market might be competing with me and all other Jay Carpenters for the same set of telephone numbers. Therefore, the greater the set of telephone number choices available at the outset, the more efficient and active will be the market. Also, the greater the choices the greater the awareness is likely to be for initiating 1.e164.arpa.

On day one of commercial operation (e.g. July 1, 2007), all incumbent NANP E.164 subscribers could have the choice to accept an indication of interest to purchase the subscriber rights to their telephone number or continue to be the end-user subscriber for the number. Subscribers accepting a bid for the subscriber rights will be entitled to receive payment less any transaction fees and/or government assessment. The Tier 1B registration would then transfer to the successful bidding subscriber after an appropriate transition or aging period. This aging period can be designed to serve as a safeguard to further protect incumbent end-user subscribers from unauthorized public ENUM registrations and provisioning.

In the examples above, the subscriber for 1-800-746-7288 (1-800-SHOP-AUTOS) might choose to accept my offer (less tax and transaction fees) and transfer the telephone number to me or ignore all bids and continue using the number. The default position for all subscribers would be to do nothing and continue using their telephone numbers as they have in the past. Any or all NANP subscribers could be oblivious to the process or choose to ignore the introduction of 1.e164.arpa under this model and communication would carry on as in the past but with the addition of carrier ENUM service through 1.e164.arpa (private ENUM is well underway today without involvement by end-users). There would however be at a minimum a strong set of incentives in place for all to take notice of the process. My opinion is most subscribers will understand the announcement "your telephone number might have worth and here is where you can find information about its value (i.e., 1.e164.arpa)". Under

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> today's public ENUM proposals, the message to the consumer is closer to "we are rolling out a new set of high tech services but you have to register your telephone number first, pay fees, pay taxes and tell us what you want before you can enjoy them".

This model addresses many of the inherent stumbling blocks associated with the transition from the subjective state of subscribership under commons that exists today in the PSTN environment to the objective state of subscribership that is necessary for the IP centric public ENUM system to function. This proposal represents a break from the past. The list of academic and regulatory references below addresses how a transition to a market-based model for scarce numbering resources that were allocated on a commons model can occur and can result in advantages and opportunities for all. Designing the Tier 1B with a market-based approach using null registrations can be win-win-win...

(see general references on the next page)

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

General References:

Reference item summaries are offered to provide relevance to the topic under consideration and are listed in chronological order. All summaries are an interpretation by this contribution author or a web link selected by this contribution author, Jay Carpenter.

[1] Abraham Lincoln and the 37th United States Congress Session II 1862, "Homestead Act of 1862", (1862)

Reference item summary:
The Homestead Act of 1862 represents a clear model and successful application of resource transfer from the public domain to private property rights. (http://www.nps.gov/home/Homestead%20Act%20of%201862.htm)

[2] Coase, Ronald H. "The Federal Communications Commission", *2 J. Law & Econ.* 1-40 (1959)

Reference item summary:
http://reason.com/9701/int.coase.shtml

[3] Coase, Ronald H. "The Problem of Social Cost", *3 J. Law & Econ.* 1-44 (1960)

Reference item summary:
http://www.daviddfriedman.com/Academic/Coase_World.html

[4] Arthur S. de Vany; Ross D. Eckert; Charles J. Meyers; Donald J. O'Hara; Richard C. Scott, "A Property System for Market Allocation of the Electromagnetic Spectrum: A Legal-Economic-Engineering Study." *Stanford Law Review, Vol. 21, No. 6* (Jun., 1969), pp. 1499–1561.

Reference item summary:
http://www.arthurdevany.com/archives/2005/07/free_spectrum.html

[5] Cramton, Peter, Evan Kwerel and John Williams, "Efficient Relocation of Spectrum Incumbents" *41 J. Law & Econ. 647-675* (1998)

Reference item summary:
This paper examines models for new license holders to relocate incumbents to make efficient use of the radio spectrum. The paper concludes that incumbent license holders can be relocated efficiently when the new entrant is given the right to move the incumbent with compensation. This model can reduce

negotiation costs and promote efficiency when there is private information about spectrum values but good public information about the cost of relocating the incumbent. At the time the paper was published, Professor Peter Cramton was with the Department of Economics at the University of Maryland and Evan Kwerel and John Williams were with the FCC Office of Plans and Policy.

http://www.cramton.umd.edu/papers1995-1999/98jle-efficient-relocation.pdf

[6] Hazlett, Thomas W. Secondary Markets in Radio Spectrum "Wireless Craze, The Unlimited Bandwidth Myth, The Spectrum License Faux Pas, and the Punchline to Ronald Coase's 'big joke'" FCC Forum presentation (2000)

Reference item summary:
http://www.fcc.gov/realaudio/presentations/2000/053100/hazlett.ppt

[7] Hazlett, Thomas W. "Wireless Craze, The Unlimited Bandwidth Myth, The Spectrum License Faux Pas, and the Punchline to Ronald Coase's 'Big Joke'" (paper)" Working Paper (2001)

Reference item summary:
http://www.aei-brookings.org/admin/authorpdfs/page.php?id=463

[8] White, Lawrence J. "Propertyzing the Electromagnetic Spectrum: Why It's Important, and How to Begin" *The Progress & Freedom Foundation Telecommunications Reform Project* (2000)

Reference item summary:
http://www.stern.nyu.edu/eco/wkpapers/workingpapers00/00-08White.pdf

[9] Webbink, Douglas W. "Communications Convergence, Spectrum Use and Regulatory Constraints, or Property Rights, Flexible Spectrum Use and Satellite v. Terrestrial Uses and Users" *International Bureau Federal Communications Commission* (2001)

Reference item summary:
http://arxiv.org/ftp/cs/papers/0109/0109016.pdf

[10] Faulhaber & Farber, "Spectrum Management: Property Rights & Commons (presentation)" 2002 Faulhaber & Farber, "Spectrum Management: Property Rights & Commons (written comments)" 2002 [1] Gerald R. Faulhaber and David Farber, "Spectrum Management: Property Rights, Markets, and the Commons." Telecommunications Policy Research Conference Proceedings, 2003.

Faulhaber was Chief Economist of the FCC from 2000-2001, and Farber was Chief Technologist of the FCC during those same two years.

Reference item summary:
http://www.fcc.gov/oet/tac/june12-02-docs/NEW_SPECTRUM_MANAGEMENT_1.ppt

http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6513282647

[11] Kwerel, Evan & John Williams, "A Proposal for a Rapid Market Transition to Market Allocation of Spectrum" *FCC Office of Plans and Policy Working Paper Series* (2002)

Reference item summary:
http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-228552A1.pdf

[12] Leslie Selzer, "Market-Based Allocation of Toll-Free Numbers" *FCC Common Carrier Bureau* (2002)

Reference item summary:
http://www.fcc.gov/wcb/tapd/toll_free/LS_comments.ppt

[13] Knisbacher, Mitchell, Jay Carpenter "FCC Forum on Toll Free Number Administration" *Presentation to the FCC* (2002)

Reference item summary:
http://www.fcc.gov/wcb/tapd/toll_free/AFTA.doc

[14] Spectrum Allocation: Property or Commons? Stanford Law School, Stanford, California, March 1st and 2nd, 2003.

Reference item summary:
http://cyberlaw.stanford.edu/spectrum/

[15] Manheim, Karl and Lawrence Solum, "The Case for gTLD Auctions: A Framework for Evaluating Domain Name Policy" *Loyola Law School (Los Angeles) Public Law and Legal Theory Research Paper No. 2003-11,* (2003)

Reference item summary:
http://ssrn.com/abstract=388780

[16] Haucap, Justus "Telephone Number Allocation: Property Rights Approach" *European Journal of Law and Economics, 15: 91-109,* (2003)

Reference item summary:
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=313339

[17] Carpenter, Jay "SNAC Issue 2617 Task Force Anti-Slamming Informed End-User Subscriber Model" *SMS/800 Number Administration Committee (SNAC)* (2003)

[18] Marcus, B.K. "The Spectrum Should Be Private Property: The Economics, History, and Future of Wireless Technology" (2004)

Reference item summary:
http://www.mises.org/fullstory.aspx?Id=1662

[19] Carpenter, Jay "Market-Based Allocation of Toll-Free Numbers" Presentation to the FCC Numbering Symposium (2004)

Reference item summary:
http://www.nanc-chair.org/docs/nowg/800_Filing.pdf

[20] Qtel, Telephone Number Auction Webpage 2005

Reference item summary:
http://www.qtel.com.qa/english/index.php?page=Press%20Releases&section=6&mode=fulltxt&nid=131

[21] MegaFon Phone Number Auction Webpage 2005

Reference item summary:
http://www.megafonmoscow.ru/english/about/news/2005-10-12_17_58_42.html

[22] IDA Singapore ENUM Auction Website 2005

Reference item summary:
http://www.ida.gov.sg/idaweb/marketing/infopage.jsp?infopagecategory=&infopageid=I3579&versionid=1

[23] Australian Telephone Number Auction Website "Smartnumbers" 2005

Reference item summary:
http://www.smartnumbers.com.au/app/action/auctions

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[24] Stastny, Richard "Addressing & Numbering Strategy in IMS World" blog entry for Saturday, December 17, 2005

Reference item summary:
This blog entry highlights the need for a numbering strategy that is simplified for the consumer yet accommodates IP communication.
http://voipandenum.blogspot.com/

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North American Numbering Council Future of Numbering Working Group Contribution:

SOURCE: Jay Carpenter, representative for 1-800 AFTA

DATE SUBMITTED: December 13, 2006

TITLE: Transaction Examples and Considerations Surrounding an Open Market Pricing Model for E.164 Telephone Numbers

or

Aunt Bee Buys and Sells Telephone Numbers.

An Alternative Approach to the Historic Commons Model for Telephone Number Administration and Allocation

This document is offered to the **North American Numbering Council Future of Numbering Working Group (FoN WG)** as a basis for discussion and is not a binding proposal on Jay Carpenter or **The 1-800 American Free Trade Association (1-800 AFTA)**. Jay Carpenter and 1-800 AFTA specifically reserve the right to amend or withdraw the statements contained herein.

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Transaction Examples Using Open Market Telephone Number Pricing

A. Introduction

The following hypothetical examples and scenarios use fictitious characters from a popular television series of the 1960s to illustrate how open market pricing and a property rights model for E.164 telephone numbers (ITU compliant public telephone numbers) might function in the United States or North America. Actual data and marketing information from countries that currently have established open market pricing of E.164 telephone numbers is included to demonstrate how open market pricing with private property rights for telephone number subscribership have been implemented. Highlights within this contribution include the benefits of transitioning to an open market model in the administration of telephone numbers as well as allocation and optimization of telephone number resources. The private property model associated with an open market pricing model for telephone numbers will be contrasted with the commons model of telephone number subscribership that we have inherited from the historic and singular platform of the Public Switched Telephone Network (PSTN). Also, the recurring issue of end user subscriber authentication that is critical to Next Generation Network implementation is addressed through property rights and a proposed homesteading process to establish and register those rights in existing telephone number assignments. The premise of this contribution is that a private property model of open market tradable subscribership rights to E.164 telephone numbers is the missing piece to a workable Next Generation Network of mass communication and media delivery.

B. Open Market Pricing Dynamics

1. **Service Opportunity (page 6):** Open market pricing and a private property model creates the need for communication provider services to facilitate transfers of telephone numbers among end users.

2. **Incentive for Awareness and Action (page 14):** Open market pricing creates awareness and interest in telephone number attributes. Open market pricing also creates incentive for end users to take action to move their telephone number into Next Generation Network readiness.

3. **Incentive to Register (page 14):** End users have incentive to register subscribership once monetary value is associated with their subscribership interest.

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4. **Homestead Process (page 15):** This is a time tested process to ferret out the authentic subscriber into an objective form. Objective subscribership is fundamentally different from the subjective state of user rights as we currently have with the commons model of telephone number assignment.

5. **Incentive for Data Accuracy (page 16):** Once property rights are associated with subscribership of a telephone number, the subscriber has incentive to assure data accuracy for registration information.

6. **Incentive to Transfer (page 16):** Open market pricing encourages transfers to the highest and best user of particular telephone numbers. By economic definition, this results in efficiency and optimization of this scarce resource.

7. **Incentive to Optimize or Conserve (page 20):** Open market pricing encourages scarce resource conservation.

8. **Trust Established (page 21):** Open market pricing fosters trusted identification and authentication of end user subscribers.

9. **Value Created for Private and Government Purposes (page 21):** Open market pricing unleashes value that is not fully expressed in telephone numbers today. Part of that value could be a future funding source for the USF.

10. **E911 Enabler (page 21):** Market driven registration creates data that could be used as an enhancement for other planned Next Generation Network E911 purposes.

11. **CALEA Enabler (page 22):** Market driven registration creates data and validated connections that could be used as an enhancement for Next Generation Network CALEA purposes.

12. **Dispute Resolution Alternative (page 23):** Market based transfers can be substituted for inefficient dispute resolution processes.

13. **Personalization (page 23):** Open market pricing of telephone numbers offers another value proposition for end users to personalize their communication services. This form of personalization could have

a similar appeal as the largely unforeseen popularity of personalized ring tones. Telephone number personalization via greater consumer choice of specific E.164 telephone numbers could have a profound impact for communications and media delivery far beyond the impact of ring tones.

14. **Location Enabler (page 24):** The market driven registration process inherent in an open market exchange of telephone numbers should hasten the gathering of end user data. Part of this data could be used as a replacement for the geographic association of today's telephone numbering.

15. **State Jurisdiction Enabler (page 24):** The market driven registration process with address information associated with the end user could provide a pathway for state regulators to claim jurisdiction over telephone numbers regardless of NPA.

16. **Legacy Compatible (page 26):** Open market pricing creates an incentive to take action regarding an end user registering their subscriber rights but this action is purely voluntary. All end users that take no action will be unaffected.

17. **Technology Neutral (page 27):** Open market pricing of telephone numbers is completely technology neutral. Pricing becomes a dynamic governing factor that takes into account changes in technology on a real time basis.

18. **Communication Service Provider Neutral (page 27):** Open market pricing shifts numbering resource allocation directly to the end user with the communication service provider taking the role of an administrative facilitator. This creates a level playing field for all communication service providers regarding numbering resources. It is also likely to open a greater selection of consumer services from multiple providers.

19. **Service Neutral (page 27):** Under open market pricing and ENUM, telephone numbers become service agnostic. A telephone number becomes free to accept all communications and media. Telephone numbers become pure electronic addresses for any electronic communication/media service. The dual numeric and phrase nature of

telephone numbers could provide end users with a best of both worlds electronic address for communications and media convergence.

20. **Dynamic in Real Time (page 28):** Price set by an open market becomes a singularity reflecting all available information at any given moment. This opens the ability for the marketplace to immediately react to changes in technology, population, culture or other factors that are impossible to predict by fiat.

C. Cast of TV Characters Living in Mayberry, North Carolina U.S.A.

- **Aunt Bee Taylor** – Age 70 – Homemaker and blue ribbon apple pie baker
- **Millie** – Age N/A - Aunt Bee's friend and confidant (Millie fibs about her age)
- **Opie Taylor** – Age 10 – 4th grader and Next Generation Network wizard
- **Barney Fife** – Age 40 – Deputy Sheriff and aspiring chef
- **Andy Taylor** – Age 45 – Sheriff of Mayberry, Aunt Bee's nephew and Opie's father
- **Howard Sprague** – Age 45 – Book store owner and entrepreneur
- **Gomer Pyle** – Age 25 – U.S. Marine and crooner
- **Floyd Lawson** – Age 40 – Barber and amateur philosopher
- **Mayberry Telecom** – Communications provider, Mayberry, North Carolina
- **Mount Pilot Telecom** – Communications provider, Mount Pilot, North Carolina

D. Open Market Transaction Examples and Considerations

Let's assume an open market for telephone numbers is introduced for the North American Numbering Plan. The introduction of open market pricing for telephone numbers is a fundamental change from the current commons model for telephone numbers where telephone numbers must be issued on a first-come, first-serve basis, exchanges from one subscriber to another are prohibited and telephone numbers must be returned to the spare pool without compensation to the end user once a telephone number is disconnected.

Aunt Bee Taylor has used the same telephone number for over 40 years. Let's assume the number is 1-336-555-2665 and can be configured in the following forms:

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

Numeric form……1-336-555-2665
"BOOK" Phrase form……...1-336-555-BOOK
"COOK" Phrase form ……..1-336-555-COOK
"COM5" Phrase form…….1-336-555-COM5 (misdial for 1-336-555-COMB) (see additional configurations below)*

Aunt Bee is unaware of various phrase attributes of the telephone number and has no use for these particular phrase configurations of the number. Aunt Bee is quite content to continue using the telephone number forever and she would be very upset if she had to change her telephone number involuntarily. Aunt Bee would also be upset if she started receiving a large volume of misdials. Aunt Bee's communications provider is Mayberry Telecom.

Service Opportunity (Item B.1 Elaboration):

Three basic items are chosen by the consumer when communication/media service is established today. At the outset of service, the customer is asked:

i. What **equipment** do you want (cell phone, Smartphone, etc.)?
ii. What **service package** do you want (long distance, text messaging, data, television delivery, etc.)
iii. What **telephone number** do you want (i.e. pick from a list in our pool of numbers)?

Service providers or communication providers currently build their business models on providing two of the three essential ingredients for the communication/media needs of the customer. An open market in telephone numbers opens the possibility of a telephone number based business model for services associated with assisting the consumer with the third component (i.e., telephone number selection, exchange and administration).

Let's assume that communications providers such as Mayberry Telecom and Mount Pilot Telecom launch a marketing campaign on January 1, 2008 to offer services surrounding assisting their customers who choose to engage in the free trade of their telephone numbers for a market price. These communication provider services might include assisting end users with contacting other end users to negotiate price, assuring a smooth transfer from subscriber to subscriber and guarding against fraudulent sales of telephone numbers by entities posing as the valid end user. Service opportunities for communication providers surrounding telephone number market transactions might very well resemble services currently associates with real estate transfers (title insurance, brokerage

services, escrow, etc.), automobile transfers (title transfer, brokerage, insurance etc.) or online auctions (eBay etc.). In addition, although Aunt Bee might initially become interested in the value and possible trade of her telephone number, her inquiry to Mayberry Telecom regarding "how much is my telephone number worth" could be her introduction to Next Generation Network services that would be available after she registered her subscribership into an official database such as ENUM.

This could open a pathway for service providers to shift from transmission-centric business model strategies to electronic address-centric business model strategies. Providers could shift from transmission or line competitive edge to electronic or address competitive edge. Communication service providers should be allowed to "own" telephone number subscription rights just as other general end users "own" telephone number subscription rights and offer these rights for sale in the open market or to the service provider's customer base. Any end user that is currently assigned a telephone number should be recognized as the authentic end user subscriber through the homesteading process as outlined below.

If service providers listen to this proposal as one for them to sell telephone numbers and telephone number exchange transaction services (brokerage, title insurance, listing services, etc.) to end users, then this could be an exciting opportunity to leverage existing customer relationships that are currently one of their competitive edges over competitors from outside the traditional telecommunications industry (MSN, Yahoo, Skype, Youtube, etc.). The shift to open market pricing of subscribership rights opens an opportunity to sell services surrounding exchanges of telephone numbers. This proposed transformation from the legacy commons model to a contemporary private property model could open a new business model and opportunity for communication service providers if it is viewed as such.

Australia is one of the first countries to embrace and open market for subscriber rights to telephone numbers. The dominant telecommunications provider in Australia, Telstra, is active in facilitating the exchange and providing specific telephone number offerings in the marketplace. Telstra is a partner in all transactions noted as "1300 Australia Pty Ltd" in the listing below. A view of the services provided by Telstra involving specific telephone numbers can be found at:

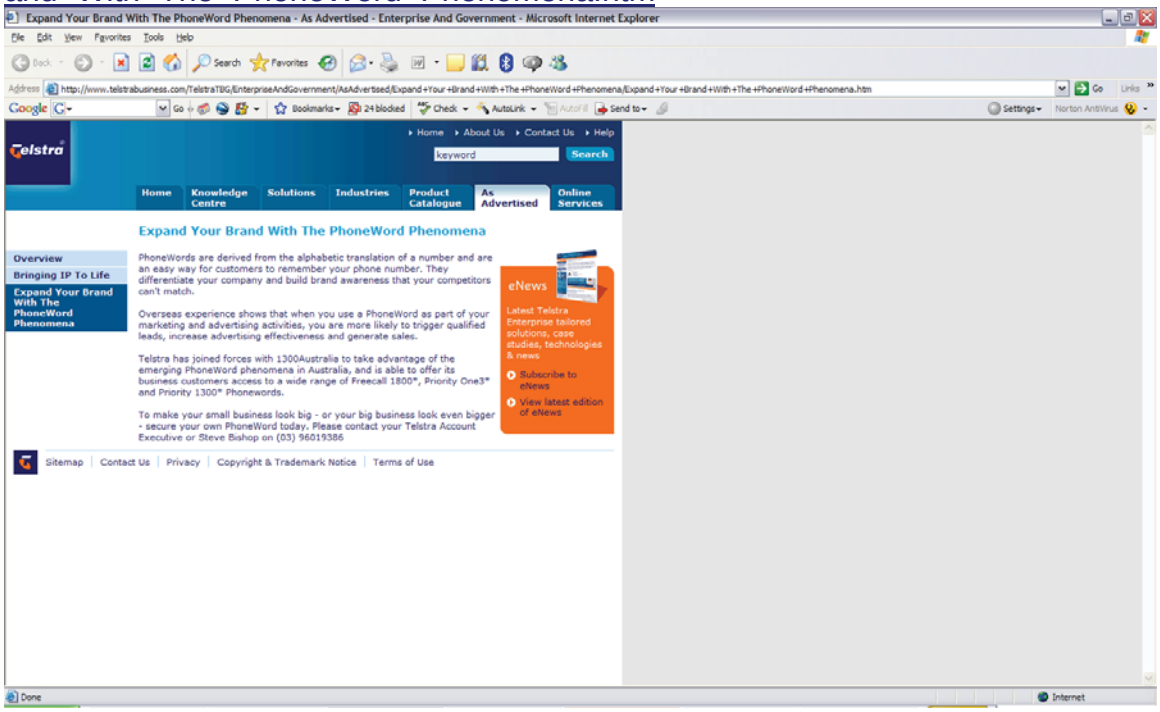
Transaction Examples Using Open Market Pricing for Telephone Numbers

2/13/2014, 5:45:31 PM

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

This proposal has not been endorsed by the full membership of 1-800 AFTA. The author and 1-800 AFTA reserve the right to withdraw or modify the comments in this proposal at any time. This contribution is for discussion purposes only.

http://www.telstrabusiness.com/TelstraTBG/EnterpriseAndGovernment/AsAdvertised/Expand+Your+Brand+With+The+PhoneWord+Phenomena/Expand+Your+Brand+With+The+PhoneWord+Phenomena.htm



http://www.telstrabusiness.com/TelstraTBG/RetailWholesale/LatestOffers/Promotions/Phonewords.htm

Transaction Examples Using Open Market Pricing for Telephone Numbers

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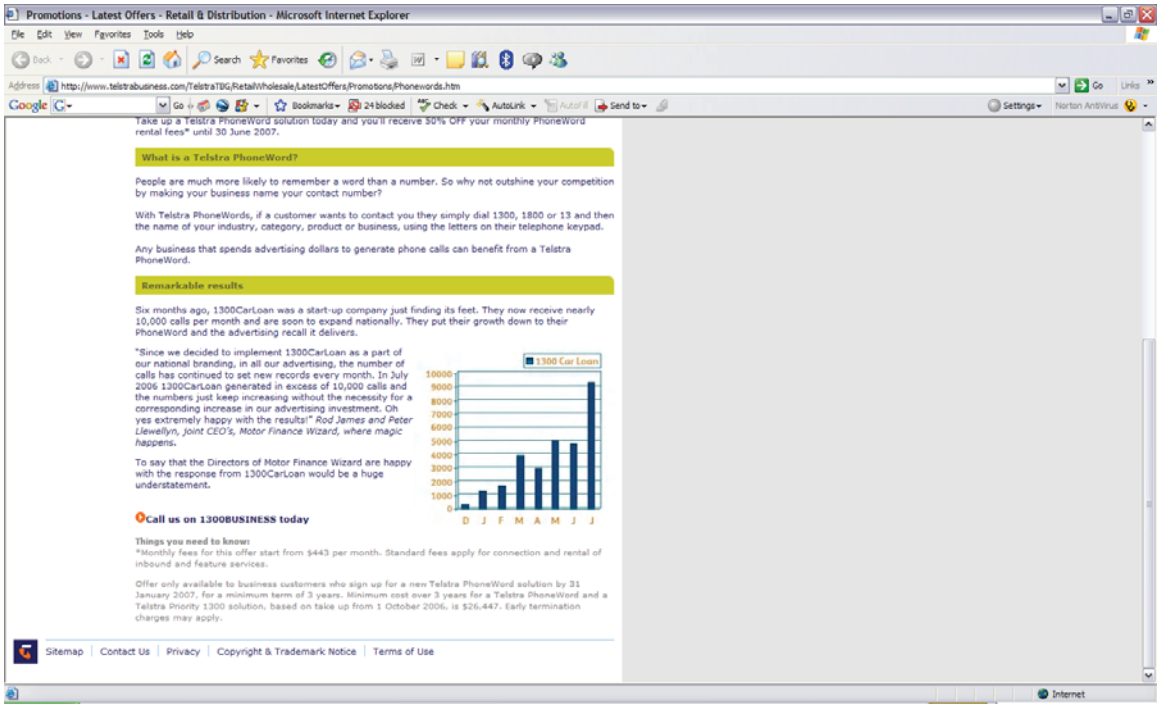

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http://mcwebs.com.au/resource-centre/free-articles/smart-phone-word-numbers-give-business-a-2nd-chance-at-domain-name-registration.html

Smart Phone Word Numbers Give Business a 2nd Chance at Domain Name Registration

Many small businesses fail to realise that domain names are registered on a first in, first served basis.

When registering a domain for a client, we often run into the problem that the domain name that they want for their business is already taken.
If you are a business in Australia ideally you want the .com.au domain name.
If it was already registered business owners had very little choice but to either:

- register a .net.au address or
- .com address.

Until Now.

Phone Words

The increase in the number of companies marketing their phone numbers using phone words provides a new opportunity to businesses.
So what are phone words? From the Australian Communications and Media Authority (ACMA) website:
Phonewords are made up from the letters of the alphabet that appear on a telephone keypad. These letters can be used to form a word, or a part word/part number combination, which can then be dialled as a telephone number to access a particular service. One example is '1300 FLIGHT'. Every phoneword has a primary underlying phone number, or in some cases more than one number, used by the telecommunications network as an 'address' for delivering the call.
Some Examples:

- 1300 FOXTEL would be 1300 369 835 and 1300foxtel.com.au
- 1800 THRIFTY would be 1800 847 4389 and 1800thrifty.com.au
- 1300 CARLOANS would be 1300 2275 6262 and 1300carloans.com.au

The branding and customer recall benefits from a single brand, website and phone number are obvious.

Free Tools:

There is a great tool that you can use to check domain name availabililty and upcoming Phone Words auctions.

Source:

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

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http://www.acma.gov.au/ACMAINTER.1900810:STANDARD::pp=DIR2_10,pc=PC_1682

Consumer Fact Sheet

Phonewords

This fact sheet describes what phonewords are, how they work, and their use in Australia. The aim of this fact sheet is to provide you with information to ensure you are able to make best use of services accessed by dialling phonewords.

What are phonewords?

Phonewords are made up from the letters of the alphabet that appear on a telephone keypad. These letters can be used to form a word, or a part word/part number combination, which can then be dialled as a telephone number to access a particular service. One example is '1300 FLIGHT'. Every phoneword has a primary underlying phone number, or in some cases more than one number, used by the telecommunications network as an 'address' for delivering the call.

The types of numbers that are most commonly used for phonewords include those beginning with the prefixes '1300', and '1800', which are 10 digits in length, and numbers beginning with '13', which are generally six digits in length.

How can I obtain a phoneword?

Businesses and individuals may purchase the rights of use to any freephone (1800) or local rate (13 or 1300) number through ACMA's **smart**numbers® system. This is an online auction system which enables efficient and equitable access to available freephone and local rate numbers. For more information visit www.smartnumbers.com.au.

Top 100 Australian Telephone Number Auction Transactions

Source: http://www.smartnumbers.com.au/app/action/viewHome

Number	Winning Bidder Organisation	Winning Bid Amt
138294	Managed Performance Pty Ltd	$1,005,001.00
1300842538	Viajet International Pty Ltd	$300,000.00
135466	ACCESS COMMUNICATIONS NET PROPRIETARY LIMITED	$252,500.00
138973	ANZ Wheels	$210,000.00
1300254637	1300 BLINDS PTY LTD	$200,000.00
1300346262	1300 Australia Pty Ltd	$173,000.00
1300356937	Australian Phone Names Registry Pty Ltd	$152,500.00
135626	1300 Australia Pty Ltd	$150,000.00
132886	1300 Australia Pty Ltd	$127,500.00
134473	1300 Australia Pty Ltd	$102,500.00

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1300468357	Rockford Hotels	$100,000.00
1800842538	Viajet International Pty Ltd	$100,000.00
137673	Paramount Australia (Vic) Pty Ltd	$92,500.00
135327	1300 Australia Pty Ltd	$85,000.00
1300872835	AOT Group Pty Ltd	$80,000.00
133637	Easy Words PTY LTD	$77,500.00
1800872835	AOT Group Pty Ltd	$73,240.00
1300356747	F W ASH & SONS PTY LTD	$72,500.00
137499	Stephen James Gethin	$67,500.00
1300347328	krumpet no 10 p/l	$67,500.00
1300633422	Managed Performance Pty Ltd	$67,500.00
1300287743	AHL Investments Pty Limited	$57,500.00
1300025463	Damo Vass	$55,000.00
1300246447	Easy Words PTY LTD	$54,374.00
135627	Regent Personnel Pty. Ltd.	$53,500.00
137246	Managed Performance Pty Ltd	$53,240.00
137678	AUSTRALIA POST	$50,001.00
134663	1300 Australia Pty Ltd	$50,000.00
1800869682	Dicta Pty Ltd	$49,304.00
137665	Garry Bradd	$47,263.00
1300253264	1300 Australia Pty Ltd	$45,000.00
134222	1300 Australia Pty Ltd	$44,000.00
138255	Australian Phone Names Registry Pty Ltd	$42,350.00
1300465432	1300 Australia Pty Ltd	$42,350.00
137767	Managed Performance Pty Ltd	$40,263.00
137368	1300 Australia Pty Ltd	$40,000.00
1300101010	Tamawood Limited	$40,000.00
1300123456	Capital Guaranteed Investments Limited	$40,000.00
1300646464	1300 Australia Pty Ltd	$40,000.00
1300749927	tomorrow marketing	$40,000.00
132729	1300 Australia Pty Ltd	$39,658.00
1300727235	1300 Australia Pty Ltd	$37,000.00
135363	1300 Australia Pty Ltd	$36,603.00
1300467873	1300 Australia Pty Ltd	$36,603.00
1300354448	Turkad Consulting	$35,000.00
1800354448	Turkad Consulting	$33,000.00
1300668437	1300 Australia Pty Ltd	$32,000.00
133784	Hudson Property Investments	$30,613.00
138723	1300 Australia Pty Ltd	$30,500.00
134444	KDV	$30,250.00
139283	1300 Australia Pty Ltd	$30,250.00
1300637724	1300 Australia Pty Ltd	$30,250.00
136663	1300 Australia Pty Ltd	$30,000.00
137278	1300 Australia Pty Ltd	$30,000.00

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137377	Douglas Scott	$30,000.00
1300276537	1300 Australia Pty Ltd	$30,000.00
1300356677	Sydney Flooring Pty Ltd	$29,700.00
1300468737	M & C ANGILLEY	$29,282.00
1300869682	Cassco Pty Ltd	$29,261.00
1300432584	Liposuction Australia Pty Ltd	$28,678.00
1300465336	Jacaranda Pacific Pty ltd	$28,618.00
1300267769	Turkad Consulting	$28,500.00
1800363743	1300 Australia Pty Ltd	$28,000.00
131212	Transport Administrative Services Pty Ltd	$27,500.00
132277	1300 Australia Pty Ltd	$27,500.00
133456	Setamex	$27,500.00
134646	Shannons Limited	$27,500.00
135353	1300 Australia Pty Ltd	$27,500.00
135555	Kirfman Pty Ltd	$27,500.00
135625	Jacty Pty Ltd	$27,500.00
136633	Thomson Playford Services Pty Ltd	$27,500.00
136666	Air Paradise International	$27,500.00
139999	sheen panel service[vic] pty ltd	$27,500.00
1300774687	Primus Telecommunications Pty Ltd	$27,500.00
1800276537	Jacaranda Pacific Pty ltd	$27,500.00
1800742737	ASX Perpetual Registrars Limtied	$27,500.00
1300949273	Australian Phone Names Registry Pty Ltd	$27,286.00
138367	1300 Australia Pty Ltd	$27,000.00
1300776787	Turkad Consulting	$26,500.00
1300926242	1300 Australia Pty Ltd	$25,724.00
1300247266	1300 Australia Pty Ltd	$25,000.00
1300267437	1300 Australia Pty Ltd	$25,000.00
1300288672	1300 Australia Pty Ltd	$25,000.00
1300372678	1300 Australia Pty Ltd	$25,000.00
1800627463	1300 Australia Pty Ltd	$25,000.00
1300527867	1300 Australia Pty Ltd	$24,200.00
1300252767	1300 Australia Pty Ltd	$22,385.00
1800874368	1300 Australia Pty Ltd	$22,385.00
135296	Whitech Pty. Ltd.	$22,000.00
136744	Easy Words PTY LTD	$21,296.00
135000	Silver Top Taxi Service Ltd	$21,223.00
1300746637	Turkad Consulting	$21,175.00
1800272237	1300 Australia Pty Ltd	$21,000.00
1300246423	HOSTPLUS Pty Ltd	$20,900.00
134722	Damo Vass	$20,365.00
137467	Bob Jane T-Marts	$20,132.00
136683	1300 Australia Pty Ltd	$20,000.00
137867	1300 Australia Pty Ltd	$20,000.00

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1300394287 1300 Australia Pty Ltd $20,000.00

The total number of Australian telephone numbers reported in the auction results is currently 12,574 transactions. Most of the transactions (approximately 10,000) were for $1,000 (Australian dollars) or less.

Incentive for Awareness and Action (Item B.2 Elaboration):

Aunt Bee could become curious regarding how much 1-336-555-2665 is worth from a number of sources. Let's assume Aunt Bee recently talked to her friend Millie and discovered that Millie had sold her telephone number for enough money to pay for Millie's plane ticket to Hawaii. After speaking with Millie, Aunt Bee is likely to contact Mayberry Telecom to inquire about the exact value of her telephone number. She is also likely to be interested in learning the procedure to entertain offers for 1-336-555-2665. The Mayberry Telecom customer service representative tells Aunt Bee that the first step to finding out what her telephone number is worth is to list 1-336-555-2665 for open bidding by registering her interest as the official subscriber of the telephone number. Aunt Bee could set a reserve for her telephone number to assure that the number must receive a minimum amount before she would be willing to change her telephone number.

Incentive to Register (Item B.3 Elaboration):

If telephone number subscriber such as Aunt Bee is interested in entertaining offers for her telephone number, she must register her subscribership interest in a database (1.e164.arpa for example). She is concerned about publicly revealing her name and address in the registration but the customer service representative assures her that the registration can be either private or public. Private registration would be similar to an automobile registration where the title holders' name and address is protected from unauthorized access. The customer service representative from Mayberry Telecom also tells Aunt Bee that additional services are available such as sending pictures of Opie to Millie via 1-336-555-2665 after the telephone number is registered. These services are associated with a new term for Aunt Bee which is end user opt-in ENUM. Aunt Bee is told that the new ENUM services will work immediately if Aunt Bee is interested in having these new multi-media services associated with 1-336-555-2665.

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Homestead Process (Item B.4 Elaboration):

Aunt Bee is told however that there is a waiting period before 1-336-555-2665 could be transferred to another customer and as long as no one disputes that Aunt Bee is the correct subscriber, she will be free to trade the number after the waiting period. This is the equivalent of a homestead process to move from a subjective to an objective subscribership status for Aunt Bee's interest in 1-336-555-2665. Let's assume the waiting period is six months after the initial registration and there is no waiting period for a transaction if Aunt Bee has had 1-336-555-2665 registered for longer than six months. In addition the customer service representative tells Aunt Bee that if she is offered a price she is willing to take for the number, Mayberry Telecom has a program to assure that the transfer will go smoothly. The customer service representative tells Aunt Bee that Mayberry Telecom charges a fee to handle the registration of 1-336-555-2665 and a fee to list the telephone number for sale. Aunt Bee agrees to pay the registration fee and listing fee and she directs the registration to be in a private form so her name and address will be safeguarded.

Transformation from Subjective to Objective Subscribership; This method of homestead has a significant consequence for communication providers such as Mayberry Telecom. As currently proposed, it will be solely the responsibility of the communication provider to designate the authentic subscriber of a given telephone number. This creates a **subjective** state of subscribership. If the question must be posed to someone or some entity "who is the subscriber for this telephone number" then the state of subscribership rests within the judgment of the entity being asked the question and the subscribership is subjective. If there exists a database where the subscribership information resides and the database can be queried by authorized parties to match subscribership information to end user identification and no third party needs to be asked to make a judgment then **objective** subscribership exists.

Mayberry Telecom could benefit from an objective process to filter out authentic subscribership. A process to transform telephone numbers from a subjective state of subscribership to an objective state of subscribership could relieve Mayberry from the potentially problematic process of sorting through whom is the rightful subscriber for a given telephone number. For example, if Aunt Bee's nephew Andy Taylor has taken over paying Aunt Bee's telephone bill, it is likely that Andy's name and address would appear on the monthly invoice. In this case, Andy Taylor could appear as the subscriber for Aunt Bee's telephone number. If Aunt Bee and Andy have a dispute regarding the rightful subscriber to the telephone number, Mayberry Telecom will be stuck in the middle and must

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assume the role of arbiter to solve the dispute. With an objective process similar to the time tested homesteading process, Mayberry Telecom's role as arbiter fades away as time passes and end users stake claim to subscribership rights by registering their interest in their telephone number in a publicly available database that can still mask specific subscriber information.

Incentive for Data Accuracy (Item B.5 Elaboration):

Because Aunt Bee anticipates a monetary transaction involving her telephone number, her incentive to populate the registration information increases. Just as she would be concerned with the accuracy of the title to her automobile or the title to her home containing accurate spelling of her name and address, the same incentive would apply to her telephone number once monetary value is associated with the telephone number. Under a commons model where she has no property interest in the telephone number, she might not be as concerned if the registration contains a misspelling of her name such as "Bea Taylor", "Be Taylor" or "Bee Tayler". The telephone number will work no matter how her name is spelled on the monthly telephone service invoice. Also, she might have reason to register the telephone number in both her name and her nephew's name Andy Taylor. This dual registration could be a part of her planning for her care in the event she became incapacitated and she wanted assurance that Andy would be able to intervene on her behalf to provision her communications if she was unable to. The significance of this safeguard could increase as financial transactions become tied to telephone numbers (see mobile e-wallet initiatives). This incentive for data accuracy becomes an important factor in bolstering the integrity of the registration database. Other dynamics and applications of the registration database such as E911, e-wallet, spam prevention, CALEA etc. could be enhanced by this inducement to accurately populate the registration information. These points will be covered in greater detail later in this document.

Incentive to Transfer (Item B.6 Elaboration):

Aunt Bee sells her telephone number subscriber rights to Barney Fife:

Now that Aunt Bee has met the proposed homesteading requirements to establish her subscribership interest, she is ready to entertain monetary offers for 1-336-555-2665. Let's assume that 1-336-555-2665 has been registered for the required six month holding period without challenge to her subscribership position. Since the telephone number is registered into the Tier 1B ENUM

database for country code 1, Opie could check via the Internet to see if anyone has indicated an interest in purchasing Aunt Bee's subscriber rights. Opie will probably go to a site such as 1.e164.arpa/marketplace to check for any bids. Let's hope the eventual domain will have a little more marketing appeal. Opie might see that two bidders are interested in Aunt Bee's telephone number. Barney Fife is interested because he is planning to open a cooking school in Mayberry and he would like to use the number as 1-336-555-COOK. Howard Sprague is interested in the number because Howard operates a book store in Mayberry and he is interested in the telephone number because it can spell 1-336-555-BOOK. This telephone number would be easier for Howard's customers to remember and would communicate more in his bookstore advertisements. Barney continues to bid for 1-336-555-2665 until Aunt Bee accepts his bid and contacts Mayberry Telecom instructing them to go ahead with the sale of 1-336-555-2665 to Barney.

Floyd the barber could be another party interested in Aunt Bee's telephone number if Floyd heavily advertises his totally distinct telephone number of 1-336-555-2662 (1-336-555-COMB). If Floyd and Aunt Bee discover that many customers are mistakenly dialing a 5 instead of a 2 at the end of the call attempt when they are trying to reach Floyd, Aunt Bee (1-336-555-COM5) will be receiving many calls that were intended for Floyd. If this is the situation, it might be in the best interest of all for Floyd to purchase Aunt Bee's 1-336-555-COM5 telephone number and terminate it in the same way as 1-336-555-COMB is terminated. With an open market pricing model for subscriber rights to telephone numbers, this transaction where all parties win will be possible. This telephone number misdial scenario is analogous if not identical to radio spectrum interference scenarios. A great deal of academic, regulatory and empirical investigation and experience has pointed to open market pricing of well defined property rights in assets subject to this "interference" as the optimal way to resolve this issue. Coase Theorem which was postulated by the Nobel Economist Ronald Coase (Coase, Ronald H. "The Problem of Social Cost", *3 J. Law & Econ.* 1-44 (1960)) is the source for fundamental reasons why a private property model is more efficient than a commons model in resource utilization by society.

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

Specific examples that exist today where entities operate multiple telephone numbers that closely resemble one another in all likelihood to accommodate misdials are:

Stanley Steemer Cleaning Service:
1-800-STEEMER (main telephone number appearing in advertisements)
1-800-STEAMER (telephone number terminating in the same fashion as above)

Southwest Airlines:
1-800-I-FLY-SWA (main telephone number appearing in advertisements)
1-800-SOUTHWEST (telephone number terminating in the same fashion as above)

Holiday Inns:
1-800-HOLIDAY (main telephone number appearing in advertisements)
1-800-H0LIDAY (telephone number terminating in the same fashion as above)

Aunt Bee buys subscriber rights to a telephone number from Gomer Pyle

Aunt Bee is in need of a new telephone number to replace 1-336-555-2665. She has three basic alternatives:

i. Sale With No Replacement: Keep the proceeds from the sale of 1-336-555-2665 and no longer use a telephone number. This alternative might be viable if Aunt Bee moved into a care facility where she no longer needed a telephone number assigned to her.

   Deposit Characteristics: This also creates a scenario where the price an end user pays for a telephone number operates like a deposit rather than a charge. With the right to sell the telephone number at the end of the period of usage for that end user, there will be an expectation of recovering some or all of the up front price. With inflation or a change in other dynamics, the end user might even experience a gain on the sale of the telephone number at the end of the usage period.

   Price versus Charge: If Aunt Bee where asked to pay a charge upon initially using the telephone number, this charge would be

a sunk cost and would probably be met with resistance. Charging for telephone numbers that have been free for the asking is likely to be resisted unless there is a counter balancing benefit such as the potential for price appreciation or at a minimum monetary recovery at the end of the usage period for Aunt Bee. A model where the charging of fees is assessed initially for the use of a telephone number will perform much differently than an open market pricing model. Charging could have a deterrent affect while opening telephone numbers to market pricing could unleash value (e.g. 1-336-APPLE-PIE) that actually encourages greater usage and consolidation of communication modes for individual end users under individual telephone numbers.

ii. Non-Descript Telephone Number at Nominal Price: She can buy a new telephone number for a nominal price that spells no phrases and has no repeating digits. An example of a nominal value telephone number might be 1-336-555-1230. When this nominal value telephone number is assigned to her, the same opportunity exists to create a subscribership registration even though the price Aunt Bee would pay for the new telephone number would be nominal.

iii. Specialized Telephone Number With Value: She might be interested in buying a telephone number that spells something meaningful to her like 1-336-APPLE-PIE. Aunt Bee has been told by her nephew Andy Taylor that her apple pies are the best he's ever tasted and Aunt Bee has won a blue ribbon at the County Fair for her baking skills. 1-336-APPLE-PIE is also appealing to Aunt Bee because her phone number will be prominently displayed in the new set of ENUM related services that give her a social networking presence. These characteristics represent value for Aunt Bee. Currently let's assume 1-336-277-5374 (1-366-APPLE-PIE) is assigned to Gomer Pyle. Gomer might not be aware of this attribute of the telephone number and probably this configuration would have little or no value to Gomer anyway. Therefore, the current prohibition of open market exchange of telephone numbers results in value that would otherwise be expressed going to waste. This special telephone number might even be an

opportunity for Andy Taylor to purchase 1-336-APPLE-PIE for Aunt Bee as a present for her 70th birthday.

Provider to Provider Transaction: Let's assume that Gomer Pyle is the end user subscriber for 1-336-APPLE-PIE (1-336-277-5374). Andy or Aunt Bee could contact Mayberry Telecom to handle the purchase from Gomer Pyle who is a Mount Pilot Cable telephone service customer. In this case, the respective providers would have an opportunity to assist their customers in both the sale and purchase of telephone numbers while maintaining and possibly strengthening those customer relationships.

Customer to Customer Within Provider Transaction: Perhaps Gomer is a Mayberry Telecom customer. In this situation the transaction would occur as an internal transaction within the Mayberry Telecom customer base.

1-NXX-APPLE-PIE Alternatives: Perhaps Aunt Bee would be willing to look outside the 1-336 NPA to find the phrase "APPLE-PIE" associated with her new telephone number. If so, this will create a more dynamic and efficient market for telephone numbers.

Incentive to Optimize or Conserve (Item B.7 Elaboration):

Open market pricing encourages scarce resource optimal allocation and conservation. Once open market pricing of telephone numbers is introduced, the concept of exhaust disappears. Price will eclipse the notion of exhaust. In the above example, both telephone numbers (1-336-555-2665 and 1-336-277-5374) are simultaneously in use and yet always available for new users. The flexible mechanism shifts to a real time process of constantly evaluating what user values a given telephone number the most. With open market pricing, anyone that values 1-336-555-2665 or 1-336-277-5374 more than Aunt Bee or Gomer will be free to offer them an amount that could make it worth while to change their telephone numbers.

Any given set of telephone numbers could serve the communications needs of North America or the world. At the extreme, only one telephone number is needed for the entire world. Consider that this one hypothetical telephone number would operate like the main number to a switchboard or PBX that has an

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

infinite number of extensions. Of course this one universal telephone number is an unrealistic solution to today's communication needs but it does help illustrate that the notion of exhaust is a problem created by factors outside of today's technology or economic supply and demand. In the above example, market pricing serves as the catalyst to pair 1-336-APPLE-PIE with the end user that will derive the most societal value from the telephone number. Without open market pricing, this societal value optimization will not be present.

Trust Established (Item B.8 Elaboration):

Open market pricing and property rights foster trusted identification and authentication of end user subscribers. Because end users will have monetary incentives to accurately populate registration information associated with their telephone numbers, an element of trust and integrity will be introduced into the telephone numbering system that is not present today. Also, under the public notice of the existence of a registration associated with Aunt Bee's telephone number, Aunt Bee has incentive to maintain a clean record of usage associated with her telephone number. This is similar to the registration of an automobile. If the automobile you drive was unregistered to you and you do not have an ownership interest in it, your concern for who you might allow usage of the automobile and what they do with it might be of no consequence to you. On the other hand, because your automobile is registered to you, there is incentive on your part to assure the automobile is always driven responsibly regardless of whoever might be driving at any given time. This framework of incentives and accountability for trust could apply to issues currently under consideration surrounding Sarbanes-Oxley compliance and fraudulent telephone record access via pretexting. This area in Next Generation Network design is called "shared trusted resources" (Richard Shockey, Neustar, presentation to the ATIS Strategic Advisory Group – Technologies Forum Opportunities, October 25, 2006).

Value Created for Private and Government Purposes (Item B.9 Elaboration):

Open market pricing unleashes value that is not fully expressed in telephone numbers. As mentioned above, open market pricing of telephone numbers unleashes value that is suppressed under today's commons model of telephone number administration and allocation. Once this value is allowed to come forward through open market pricing and the introduction of a bundle of property rights for end users of telephone numbers, part of that value could be captured as a future funding source for the USF, capital gains taxes from transfers and other possible sources of governmental revenue.

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E911 Enhancement (Item B.10 Elaboration):

Although end users might have other incentives to register their telephone numbers, market driven incentives could significantly increase the likelihood that subscribers will register property rights associated with the telephone number(s) they use. Registration creates data for E911. When Aunt Bee registers her telephone number for a potential market driven transfer, she simultaneously creates a source of end user information that could theoretically be used as an enhancement for Next Generation Network E911 purposes. Although Aunt Bee might be enjoying her trip to Hawaii when she experiences a surfing accident, her newly registered telephone number 1-336-APPLE-PIE might contain a series of contact information references similar to the ICE (In Case of Emergency) codes that are now encouraged for entry into cell phone contact lists. For example, within the ENUM Tier 1B registry, there could be a provision for populating Andy Taylor's contact information and perhaps Opie Taylor and Barney Fife who would likely be well apprised of Aunt Bee's Hawaii vacation from pictures and blogging she has posted on her MySpace™ like 1-336-APPLE-PIE ENUM enabled site.

Although a solution that would be more precise such as Global Positioning Satellite (GPS) enabled hand sets might be the primary solution for E911 service, ICE embedded registration information for Aunt Bee in the Tier 1B database could be complementary and synergistic with the other E911 methods. For example, even when Aunt Bee is found in medical distress on the beach in Maui, Andy Taylor might be the best source to disclose Aunt Bee's medical history to the Hawaiian paramedics that come to her aid. Andy will no doubt be needed to coordinate and authorize Aunt Bee's medical care while she is in Hawaii. Even when Aunt Bee is in Mayberry, E911 data could provide a "most likely" location for Aunt Bee if GPS or something more precise is not available.

This market driven solution to E911 data collection and access is elegant in it's neutrality to communication technology and transport (PSTN or IP network). The registration database (I am proposing the 1.e164.arpa Tier 1B) becomes end user centric with the telephone number providing the gateway for authorized access to specific information about the subscriber.

CALEA Enhancement (Item B.11 Elaboration):

Registration creates data and validated connections for CALEA. Again because of the inherent incentive for end users to safeguard against unauthorized abuse

of their telephone numbers and because a history of trust can be associated with end user registered telephone numbers, the integrity of communications will be enhanced with a combination of open market pricing and property rights for telephone numbers. Consider that market driven registrations will produce something akin to a freeway where some automobiles are displaying a license plate and others are not. This affords an opportunity to distinguish trusted communication connections from unregistered and therefore possibly anonymous calling or called parties. This system of trusted registrations also could be compared to security passes that are starting to be issued to trusted citizens in order to expedite passage through airport security. Monetary incentives associated with open market pricing and property rights for end users creates system integrity that could apply to CALEA needs.

Price paid for telephone numbers could add to the authenticity and trust probability calculation for CALEA purposes. In other words, the higher the price paid for a telephone number, the less likely that number will be used for nefarious purposes.

Dispute Resolution Alternative (Item B.12 Elaboration):

Market based transfers can be substituted for dispute resolution processes. Without an open market to transfer subscriber rights for individual telephone numbers, any dispute that arises regarding subscribership to a telephone number must be settled by dispute resolution which ultimately could involve a costly and time delayed judicial proceeding. Open market pricing could quickly resolve disputes by allowing one contender for a telephone number to pay another contender to relinquish all potential rights to the telephone number. Landmark work by Nobel Laureate Ronald Coase demonstrated that clearly defined property rights in conjunction with the ability to transfer those rights for a price results in the optimal allocation of scarce resources for society (Coase, Ronald H. “The Problem of Social Cost”, *3 J. Law & Econ.* 1-44 (1960)). Being caught in the middle of subscribership dispute resolutions could be a burden for communication providers. Simply allowing one entity to buy out another entities actual or potential interest in the subscribership rights to a telephone number is an elegant and economically efficient way for potential disputes to be resolved.

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Personalization (Item B.13 Elaboration):

Open market pricing of telephone numbers offers another value proposition for end users to personalize and consolidate their communication services. This is similar to the largely unforeseen popularity of personalized ring tones. The creative process for the public to match phrases with telephone numbers can only be estimated. Just as creativity is used to formulate vanity license plates that are unimaginable to anyone other than the person that comes up with the phrase, the same phenomenon could occur with telephone numbers once an open market is in place. Assuming telephone numbers become the electronic address to social networking sites similar to MySpace™ once ENUM is commercially launched, the visual appearance of end user telephone number could take on greater significance. If this is the case, the market for telephone numbers could increase because the value would be greater than the mostly non-visual nature of telephone numbers today.

Location Enabler (Item B.14 Elaboration):

The registration process inherent in an open market exchange of telephone numbers should hasten the gathering of end user data. Part of this data could be used as a replacement for the geographic association of today's telephone numbering. If the data within the Tier 1B of 1.e164.arpa contained a primary location vicinity (zip code, city, county or state could be the levels of privacy) for the end user, functionality of the telephone numbering system that is currently fading away as geographic numbers become non-geographic, could be restored. For example, Aunt Bee might list her home address for the primary or default termination point. Even though Aunt Bee is traveling in Hawaii, calls would be treated as if she were in Mayberry unless a more precise locator would be available such as GPS. While location data gathering is not solely dependent upon monetary value that is inherent in a private property model, a market driven incentive to register telephone number subscribership interest will increase the likelihood the population of this data will occur.

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State Jurisdiction Enabler (Item B.14 Elaboration):

The registration process with address information associated with the end user could provide a pathway for state regulators to claim jurisdiction over telephone numbers regardless of NPA. As telephone numbers become non-geographic because of changes in technology and the way telephone numbers are used (roaming, individual nature of numbers, VoIP sub-assignment of numbers, pre-paid wireless, telematics, etc.), states will find it increasingly difficult to determine what telephone numbers the citizens of their states are using. Registration that is market driven could be an enabler for state regulators to claim jurisdiction over individual telephone numbers independent of the specific telephone number. Let's assume that Aunt Bee is willing to purchase any telephone number that ends in the phrase "APPLE-PIE". Therefore she could shop for the following telephone numbers and be content with any of them:

1-336-APPLE-PIE, asking price: $XXX.00, historical state of jurisdiction, North Carolina

1-602-APPLE-PIE, asking price: $X,XXX.00, historical state of jurisdiction, Arizona

1-212-APPLE-PIE, asking price: $XX,XXX.00, historical state of jurisdiction, New York

1-406-APPLE-PIE, asking price: $XX.00, historical state of jurisdiction, Montana

With an open market for telephone numbers, Aunt Bee might choose the lowest priced telephone number from Montana. Her registration of subscribership assuming she uses her home address in Mayberry, North Carolina would transfer jurisdiction from the state of Montana to the state of North Carolina. This transfer of state jurisdiction would be very similar to the transfer of state jurisdiction when an automobile owner moves from Montana to North Carolina and must re-license the automobile in the new state of residence. Similar analogies can be drawn to end users that are roaming outside their state of residence to when they are driving their automobile outside their state of residence. Also, just as the Motor Vehicle Department of various states maintain a database of automobile owner information including name, address, phone number etc., that is public in existence but private in access, the same public existence with privacy safeguards should be established with telephone number end user data.

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Using our example, let's assume Aunt Bee's automobile is a 1995 Ford Crown Victoria. It is registered in the state of North Carolina in the name of:

Bee Taylor, sole and separate property
123 Anystreet
Mayberry, NC 12345
1-336-555-2665

Or

The Taylor Family Trust
P.O. Box 321
Mayberry, NC 12345
1-336-555-2665

In the case of the automobile, the registration is in public objective existence yet the specific information is privacy protected. Anyone can see that a registration exists for Aunt Bee's 1995 Ford Crown Victoria as she drives around Mayberry with the North Carolina license plate bolted to the rear bumper of the car. Perhaps, anyone can go online and enter the license plate number of Aunt Bee's automobile and see that the registration fees are currently up to date. While online however, they will not be able to access Aunt Bee's specific title information containing registered name, address and phone number. Andy Taylor as Sheriff of Mayberry will be permitted access to this information due to his trusted status as a law enforcement officer. This same public registration existence with privacy protection surrounding specific information is the most likely operation of the registration of private property rights for telephone numbers.

Even if the historic commons model of telephone number administration and allocation continues to exist, this issue of telephone number disassociation with geographic location will continue to grow for state regulators. Although registration incentives inherent in an open market pricing model are not the only way for end users to register their information in a centralized database, unleashing the economic incentives for end users to spend their time and energy to maintain up to date registration is an elegant and time tested way to do so.

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Legacy Compatible (Item B.16 Elaboration):

Open market pricing creates an incentive to take action regarding an end user registering their subscriber rights but this action is purely voluntary. End users who that take no action will be unaffected. Telephone service will not be impacted by those that ignore or choose not to involve themselves in the open market pricing of telephone numbers. Therefore, the open market pricing model as proposed is backward compatible to the historic commons model of telephone number administration and allocation.

Let's assume the private property model is introduced on January 1, 2008. Let's also assume that Aunt Bee has no interest in anything other than baking apple pies. Her telephone number will continue to function as it always has but, her subscribership interest will exist as unregistered and subjective. Any property rights associated with 1-336-555-2665 will remain unclaimed but assigned by the carrier-of-record to Aunt Bee. In the event that an entity attempted to claim Aunt Bee's telephone number, that attempt should be thwarted by the carrier-of-record rejecting the application for registration by the unauthorized party. If Barney Fife somehow registered 1-336-555-2665, Barney's unauthorized registration might constitute a liability for the carrier-of-record since subscribership will be subjectively designated by that carrier.

Technology Neutral (Item B.17 Elaboration):

Open market pricing of telephone numbers is completely technology neutral. Although pricing becomes a dynamic governing factor that takes into account changes in technology on a real time basis, allowing telephone numbers to trade in the open market is independent of the technology associated with a given telephone number. For example, Aunt Bee could sell 1-336-555-2665 and purchase 1-336-APPLE-PIE regardless of how she intends to provision the new number. 1-336-APPLE-PIE will operate on her rotary dial phone or it could be the centerpiece of her new social networking site that is rich with multi-media ENUM enabled services. Wireline, wireless, PSTN or IP network services can all be accommodated by an open market for telephone number end user subscriber property rights without relying upon a technology distinction.

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Communication Service Provider Neutral (Item B.18 Elaboration):

Open market pricing shifts numbering resource allocation directly to the end user with the communication service provider taking the role of an administrative facilitator. This creates a level playing field for all communication service providers regarding numbering resources. It also opens the door for communication service providers to compete on a telephone number service centric basis in addition to a transmission basis.

Service Neutral (Item B.19 Elaboration):

Under open market pricing and ENUM, telephone numbers become service agnostic. A telephone number becomes free to accept all communications and media. Telephone numbers become pure electronic addresses for any electronic communication/media service. A telephone number can serve as the front door for any and all communications and media services available today and in the foreseeable future.

Example:

Aunt Bee can use 1-336-APPLE-PIE to connect to her rotary dial phone and continue to only use traditional PSTN voice service to talk to Millie, Andy and Opie. Using ENUM capabilities that became available to her when she chose to purchase 1-336-APPLE-PIE, she could provision a full spectrum of audio, video and data services so that she or anyone else dialing the number will receive a rich multi-media experience. When dialing the number, Aunt Bee might provision a fully enabled social networking site for herself with the help of Mayberry Telecom. This site might look and feel like a MySpace™ site and could perhaps incorporate an actual MySpace™ site but have additional functionality and more ubiquity because of the universal nature of 1.e164.arpa.

Expanding the nature of service associated with telephone numbers to include a visual experience along with the traditional audio experience (talking to Millie) might result in greater demand for telephone numbers to appear as phrases. When Aunt Bee sets up her social networking site, she will probably prefer showing her phone number as 1-336-APPLE-PIE versus 1-336-277-5374. As Aunt Bee's friends visit her site and see 1-336-APPLE-PIE prominently displayed throughout the site, they might become interested in obtaining a telephone number that spells something of value to them. This could spark a phenomenon similar to the viral spread of ring tones when they were first introduced into the

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telecommunications mix. If the momentum grows for retail consumers to purchase telephone numbers that spell phrases because of the visual element associated with upcoming ENUM related services, the market driven catalyst for registration and provider support services will be strong.

Dynamic in Real Time (Item B.20 Elaboration):

Price set by an open market becomes a singularity reflecting all available information. Price takes into account all the factors listed above and creates one point that governs multiple dynamics at any given point in time. Market pricing instills systemic efficiency that cannot be attained by regulatory fiat.

E. Summary

The open market pricing model for telephone numbers has opened societal value from the following respects:

1. Greater subscriber choice of more useful telephone numbers to individual subscribers. Telephone numbers that serve the exact purpose of the subscriber are likely to be held longer and consolidate a subscriber's communication media.
2. Market transactions that unveil monetary value could support taxing mechanisms for purposes such as the Universal Service Fund.
3. Incentives to optimize scarce resource allocation.
4. Incentive for end users to register telephone numbers into Public ENUM.
5. Once end users have registered a telephone number that has value to them, the registration information is more reliable as a trusted source and the trust strengthens over time. This could reduce unwanted communications such as spam.
6. Data contained within the registration could be used for E911 and CALEA.
7. Data regarding the primary location of the end user that purchases the telephone number could be used by state regulators to claim jurisdiction over individual registrants.

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This could solve the problem for state regulators arising from the trend of telephone numbers no longer being associated with a geographic location.

8. A new business model for existing communication providers to offer their customers.
9. This is a technology neutral model
10. This is a level playing field for all providers
11. Market pricing will react in real time to changes taking place that impact communications and media.
12. Telephone numbers that are acquired in the open market by subscribers are more likely to prevail as the electronic address of choice when competing with other electronic addressing schemes.
13. Dispute resolution while the customer is still primarily using the PSTN. The aging period (six months?) after registration is the time where end user subscribership title to the telephone number is perfected.

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F. Areas to Address

a. Lifting existing regulatory constraints to allow open market pricing of telephone numbers.
b. The potential for telephone number misappropriation by unauthorized attempts to sell Aunt Bee's telephone number fraudulently.
c. Infrastructure development for market place functionality within the 1.e164.arpa Tier 1B.

G. A Proposed Practical Method of Implementing this Market-Based Model

a. Step #1: Implement Property Rights and Open Market Pricing of Telephone Numbers of Toll Free 1-800 Numbers Registered into 1.e164.arpa.
b. Step #2: Implement Property Rights and Open Market Pricing of Telephone Numbers of All Portable Toll Free 1-888, 1-877 and 1-866 Numbers Registered into 1.e164.arpa.
c. Step #3: Implement Property Rights and Open Market Pricing of Telephone Numbers of Select NPAs within the North American Numbering Plan Registered into 1.e164.arpa.
d. Step #4: Full Implementation of a Property Rights and Open Market Pricing Model for All Telephone Numbers within the North American Numbering Plan Registered into 1.e164.arpa

H. Conclusion

The net result is a potential gain for all stakeholders from open market pricing and the establishment of a private property model for E.164 telephone number subscriber rights.

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This proposal has not been endorsed by the full membership of 1-800 AFTA. The author and 1-800 AFTA reserve the right to withdraw or modify the comments in this proposal at any time. This contribution is for discussion purposes only.

Appendix Items and Notes (Listed by Appendix Item #):

Appendix Item 1: "World's Most Expensive Mobile Number is 666 6666"

This is another example of market pricing at work to allocate a valuable electronic address (E.164 telephone number) to the highest and best user. The result is optimization of societal efficiency from the end user and dialing public's perspective. This number of 666-6666 establishes a convenient connection for the public to conduct communication and media services for airline business.

http://www.theregister.co.uk/2006/05/23/mobile_number_sold/

World's most expensive mobile number is 666 6666

By John Oates
Published Tuesday 23rd May 2006 15:19 GMT
The world's most expensive phone number was auctioned for charity yesterday in Qatar.

The number, 666 6666, sold for 10m Qatari riyals or £1.5m. The previous record holder was Chinese number 8888 8888, which sold for £270,000. The Cantonese word for eight sounds very similar to the word for rich. It was bought by Sichuan Airlines.

The auction started at a million riyals and interest quickly narrowed from eight bidders to just two, according to Kuwaiti News Agency (KUNA).

The auction was organized by national telco Qtel, which has run two previous auctions and plans to run another in September. More details here (http://www.kuna.net.kw/home/Story.aspx?Language=en&DSNO=868660). We tried phoning Qtel for more details, but they'd all gone home because it was 6pm...

Having seven sixes as your mobile number might seem devilish to some, but interpretations vary. A brief dip into the weird world of numerology shows 666 is seen as holy in Judaism because it represents six directions - up, down, north, south, east and west. Others equate it with the Arabic word "ellah" meaning God.

On a techy note, the first Apple Computer sold for $666.66, the sixth letter of the Hebrew alphabet is w - so www. shows how evil the internet is. And finally, Viagra has a molecular weight of 666.7g/mol. More nuttiness here (http://www.absoluteastronomy.com/enc3/number_of_the_beast_numerology). ®

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Appendix Item 2: "eBay Auction Has Your Number"

Although this auction was halted by a violation of legacy regulations that currently govern telephone number allocation, the price associated with the auction reflects a demand among the public for unique telephone numbers.

Auctionbytes-NewsFlash, Number 701 - February 16, 2004 - ISSN 1539-5065

eBay Auction Has Your Number

By David Steiner
AuctionBytes.com
February 16, 2004

Looking for a good time? Call 867-5309. Or just type in eBay auction number 3077991790.

While the eBay auction hardly has the same ring to it, it certainly has been ringing up bids - topping $50,000 with more than six days left in the auction. Why is a phone number attracting so much attention?

It might have a little something to do with a 1981 song called "Jenny/867-5309", by a one-hit-wonder band called Tommy Tutone. The song, which hit #4 on the charts in early 1982, was written about a girl that one of the band members was trying to date. The song wreaked havoc with owners of that telephone number, causing many to change their phone number, and some telephone companies to take it out of circulation entirely.

According to the auction, number portability allows the owner of the phone number to sell it and transfer ownership to another person. It's debatable whether having this number is a blessing or a curse, but for the right bid, you can, as the auction description states, "Have 212-867-5309 as your telephone number. Get the greatest number in the greatest city."

Buyer pays any transfer fees to the phone company.

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Appendix Item 3: "Number Portability Problems by Tom Keating"

This blog entry by knowledgeable telecommunications professionals demonstrates the first hand problematic vagaries in today's subjective subscribership existence associated with the commons model of telephone number assignment.

Blog Entry by Tom Keating:
http://blog.tmcnet.com/blog/tom-keating/voip/number-portability-problems.asp

Number Portability problems

September 05, 2006
I never thought that in 2006 I would have number portability problems. Hasn't number portability regulations evolved to the point where it is no longer an issue? Alas, I found out the hard way that number portability is **still very much a political game** by the phone carriers and even the VoIP service providers to hold their customers hostage.

First, let me state that I've been a happy Vonage customer for many years, and used it in two different home addresses with the same exact phone number, which was ported from AT&T/SBC. Thus, I've had the same phone number for about 10 years, which many friends and family know.

Recently, I decided I would drop Vonage in favor of a triple play offering from Charter, which would give me cable TV, high-speed Internet, and "voice over cable" - all at a very reasonable price. My wife and I encountered too many network or Vonage QoS issues which affected our phone service. It was time to port the number to Charter, which advertised that they could port customer's numbers in a mailer we received. When I called to order, they said they could not port my Vonage number since "That Norwalk number (203-854-XXXX) is not in your rate

area" I was told.

I was a bit annoyed Charter couldn't port my number, but I wasn't entirely surprised either. Since my wife and I didn't want to give up our number, we decided to stay with Vonage - held hostage to a phone number that Vonage owned. I should explain that a "rate center" is geographically tied to certain local exchanges. For instance, my current home address in Brookfield has (203-740-XXXX and 203-775-XXXX) as two of its most common local exchanges. Thus, since my current number (203-854-XXXX) wasn't in any of the Brookfield exchanges, they *claim* they can't port the number.

But here is what I don't understand. Why is it that Vonage **was** able to port my Norwalk number and yet they didn't have a geographical footprint in Norwalk - namely a rate center located there. Why aren't they bound by these geographical restrictions? Further, I was able to take my Norwalk number ported to Vonage to my new home address in Brookfield. Obviously, IP packets don't care where they originate, so as long as I had broadband, I can take my 203-854-XXXX number anywhere.

I figured maybe SBC might have better luck at porting if I agreed to sign up for SBC DSL and SBC's voice offering. (Double-play package). They at first said they could port the number and

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even told me that they would take care of cancelling Vonage for me, which is typical when customers move to another phone service provider. I was feeling the 💔. But then they called me back 30 minutes later when they realized that they couldn't port the number since I was outside the rate center. My heart 💔. I was already aware that I could port my Vonage phone number to Sunrocket or Lingo if I so desired, but I'm trying to *move away from "single play" VoIP providers.*

Thus, it would appear that you can port from a phone carrier to a VoIP provider, AND you can port from one VoIP provider to another VoIP provider, BUT you **cannot** port your number BACK to a traditional phone carrier or a cable company. If my interpretation is true, this **clearly gives single play VoIP providers a key 'number porting' advantage** over the traditional phone carriers and cable companies. In fact, I may have to update my controversial Pure VoIP vs. Telephone and Cable VoIP article and add this to Single Plays' list of "Pros" (vs. Cons).

Summary of Porting:
- Carrier/cable to VoIP – Good
- VoIP to VoIP – Good (if the number was originally owned by a phone company & ported. If the number was owned by the VoIP service provider when you signed up, most likely you will not be able to port.)
- VoIP to Carrier/cable – Bad

Back in 2004 I wrote about VoIP2Save.com, and how the VoIP service providers were holding their VoIP customer's "hostage" by not allowing them to port their phone numbers. In 2003, a federal law mandated customers of cellular telephone service be allowed to keep their phone number if they decided to switch carriers. Unfortunately, Internet phone companies were not covered by the law.

In that 2004 article, I wrote in part, "For example, if you started with AT&T, then signed up with Vonage, then wanted to switch to Lingo, you can port your number. However, if you originally started with Vonage and used Vonage's allocated phone number, you will have difficulty porting your number (if at all)." So it would appear that it is even *more difficult* to port your Vonage number if it's a originally-owned Vonage number.

Under the Federal Communications Commission's (FCC's) "local number portability" (LNP) rules, you can switch telephone service providers within the same geographic area and keep your existing phone number. However, if you are moving from **one geographic area to another**, you may not be able to take your number with you. In addition to switching from one wireless company to another, in most cases, you will be able to switch from a wireline company to a wireless company, or from a wireless company to a wireline company, and still keep your phone number.

The FCC's decision to "tie" geography to number portability open a **huge** gaping loophole in the number portability regulations for the phone service providers to exploit. They can now deny to port a defecting customer's number simply based on geography. I should point out that many people move every 3-5 years, which means the phone companies can choose not to port their number. Now, I can certainly see if a person moves to another area code that porting the number should be restricted, but if you are simply moving a few towns over (same area code), why can't the customer keep their phone number? With the advent of VoIP, local exchanges (203-775-XXXX) or the famous 212-XXX-XXXX NYC exchange are **no longer tied** to customers within a *specific* geographic region. I recall an article where a Pakistani living in

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Pakistan (& using VoIP) had a 212-XXX-XXXX number so it could appear he had a New York City address for his business.

In 2004, VoIP2Save.com surveyed many other internet phone companies, including Vonage, Packet8, Voice Glo, Lingo and I-Connect. It found that none of the companies allowed customers to keep a phone number the company assigned to them, if the customer decided to switch to another phone company. I need to confirm whether or not this still holds true for all of them in 2006, but it at least holds true for Vonage, since I tried both Charter and SBC to port my Vonage number.

On KUTV, a SBC affiliate in Salt Lake City, it wrote a recent article (May 2006) stating, that a family couldn't port their Lingo phone number to Vonage and cited the same FCC number portability regulation that I did and pointed out that Voice over Internet companies were not covered by this regulation.

So how is it that VoIP companies can get the traditional phone companies to always port phone numbers for their new VoIP customers? If the traditional phone companies aren't obligated to port any number to any customer "outside" a geographic region, how do the VoIP companies convince the carriers to give up the number?

One theory I have is that since VoIP service providers have no "rate center" (they simply pay/rent the phone numbers from the phone companies), they don't have any geographic limitations. Thus, they can tell the phone company that Customer A wishes to leave and "port" their phone number. If the phone company asks if Customer A is going to be in the same geographic region, the VoIP companies **can lie** and say "yes" even if the customer has moved. Tracking IP packets to a specific location is difficult - not to mention it requires a court subpoena - so how are the phone companies going to "prove" that their defecting customer is still in the same geographic region? Since they can't the phone companies are forced to give up / port the number to the VoIP service provider. In my "phone shopping scenario" with Charter and SBC - they have an obvious geographic footprint, bound by wherever the coax or copper wire is installed, which limits the local exchange numbers they can provide as well as port. I guess that's the beauty of IP which is location agnostic.

This is just a theory, but it seems to be the most logical conclusion. There may be some other law or regulation I am missing, so feel free to post a comment.

What did I end up doing? I went with SBC's "double play" package (voice & data) for $50/month with unlimited voice calling. $25 for voice and $25 for data. Alas, I lost my old 203-854-XXX number and now have a new one. I also dropped Charter cable and went with DirecTV. My bills as a whole will be cut like $55/month, making it worth losing my old number. So yes, I have dropped VoIP entirely in favor of SBC traditional voice - forgive me for my sin. Well, I do still use Skype and plenty of other VoIP products, so I'm still high on VoIP.

So let me just finish this by saying **"number portability my ***(edited by Jay Carpenter)!"**

(Sorry for the profanity, but it had to be said.)

Tags: charter voice, directv, double play, number portability, sbc, triple play, voip, vonage
Related Tags: phone number, number portability, phone companies, service providers, phone company, number

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

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Comments to Number Portability problems

1. RE: Number Portability problems

Michael :

September 5, 2006 03:32 PM

So, you were able to port the number to SBC?? If yes, is that because SBC provides service to the geographic area of you number, whereas Charter does not?

1. RE: Number Portability problems

Tom Keating :

September 5, 2006 04:00 PM

No, I wasn't able to port my number. I lose my number. I clarified my original post.

1. RE: Number Portability problems

Andy :

September 5, 2006 04:50 PM

Tom:

Your frustration with LNP is obvious, but your ire is misplaced and accusing your former company of lying in order to be able to port your number shows a lack of understanding of the LNP process. You blame the VoIP company for the trouble. It actually isn't Vonage that is the problem, it is the phone company that won't (not can't) port your number back. I am not a Vonage fan. I work for a CLEC. The difficulty is not with Vonage lying to SBC in order to get your number ported. Actually, Vonage technically doesn't port your number because they aren't a phone company; they are an "Enhanced Service Provider" (FCC definition) and aren't covered by many of the regulations that phone companies (including CLECs) are, but that's all a different story. In brief, your number was ported to a CLEC underlying carrier for Vonage. The difficulty came about when you wanted to port to another carrier. When you wanted to go to SBC, that carrier has large databases of various types. SBC and the ILECs are in the phone business, but a large part of the phone business is keeping the database accurate, so that efficiencies can be realized. With millions of customers and seemingly almost as many rate plans and products, it is critical to keep some order to the process. So, when you wanted to port a number that is not in the rate center in which you reside, it raised red flags. One of the problems that would have caused for SBC is: how would SBC determine whether a call is a local call or long distance call

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

when the NPA-NXX don't match the central office from which you are currently served and how would the call be routed correctly? This would require special routing and rating just for you. I am sorry to say that you (and I and the rest of us) are just not that special (to SBC). So, the problem is not with the VoIP providers refusing to port your number back (by the way, a company can't port your number *to* another company, it can only port your number *from* another company to themselves), the problem is that SBC wants to keep their databases clean and easy to manage. This will change over the years, because databases have a way of getting messy, but SBC will do all they can to keep that from happening. Sorry to bust the bubble of conspiracy and lying, but it is simply a question of efficiency and how SBC can do things as simply as possible and create the least amount of problems for themselves. In contrast to the ILECs, the VoIP providers (and CLECs) often do not care about rate centers for phone numbers because the VoIP provider or CLEC often use much simpler methods of routing and rating calls than the ILECs. Even though the plan from SBC may look like a simple plan, the underlying routing of the call within and between central offices and the call rating engine for billing is actually pretty complex. Bottom line is that SBC could have done what you wanted from a technical standpoint, they just wouldn't because it was too much trouble from various aspects including a customer service standpoint. It also shows that SBC does not fear the "single-play" VoIP providers at all, otherwise they would have let you keep your number and ported you over! The only thing SBC fears slightly is the cable companies and Charter is still a newbie at this. IMHO, Charter should have ported your number in order to get your business, but missed the boat.

1. RE: Number Portability problems

Tom Keating :

September 6, 2006 10:35 AM

Thanks for your insights Andy.

Andy wrote: Actually, Vonage technically doesn't port your number because they aren't a phone company; they are an "Enhanced Service Provider" (FCC definition) and aren't covered by many of the regulations that phone companies (including CLECs)...

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

Yeah, I realize that the phone companes are bound by several regulations that the pure play VoIP players aren't, but that doesn't explain why Charter, which isn't a LEC or CLEC wasn't able to port my number.

Also, you seem to indicate that porting a number from a VoIP provider (i.e. Vonage) to a LEC/CLEC isn't possible. However, my boss, Rich Tehrani ported his Vonage number to AT&T (CallVantage).

Now of course, CallVantage is AT&T's VoIP offering, so maybe they get around the regulations that way. But nevertheless, AT&T was able to find a "workaround" to get Rich's business. Thus, SBC/AT&T should have been able to port my number as well. Perhaps they could have made me a "temporary" AT&T/SBC CallVantage customer and then once they owned the number in their network, they could have easily switched it over to SBC's traditional landline offering.

The pure play VoIP players seem to have an advantage in porting capability over the LECs/CLECs and apparently the cable MSOs. But that doesn't mean it isn't possible

There is way too much confusion and inconsistency as to who is able to port and who can't. Rich Tehrani basically bitched for 4 months to get his number ported. I just didn't think it was worth my time and effort to save my old number.

1. RE: Number Portability problems

Lane Patterson :

September 6, 2006 11:33 AM

Interesting blog on LNP. I spent several years of my career in the LNP space, and my wife still works as an analyst for Neustar, who administers the LNP database, and this sort of thing still amazes us.

If fact was I believe happens is that once Vonage, Sunrocket, a wireless carrier, or any other non-geographic player gets a hold of your number, it is considered “contaminated” if it ever goes back into the landline pool. Under the rules for contaminated numbers, it must be aged for something like 90 days. What you didn’t consider is that wireline to wireless, or VoIP to wireless is probably also easy. I think you could keep it, if you’re willing to wait while it ages. My guess is that either the back office systems don’t support aging, or customers won’t wait, so it isn’t done.

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

1. RE: Number Portability problems

Andy :

September 6, 2006 04:26 PM

Tom:

I agree it wasn't worth your time and effort. You ran into the old "this is the way we've always done things" scenario. I have heard from the big carriers (ILECS) the word "can't" so often when what they really mean is "won't". The rep is probably actually correct in a sense in saying "can't" because he/she typically doesn't have the ability to put your telephone number into their system if it doesn't match the rate center the system is expecting. Envision this: the rep has a green screen terminal, types in your address, and the system fills in the NPA and offers certain choices of NXX's. When you wanted to port in a number that didn't have a matching NXX, oops, there is no match with the choices the system gives, there is no override button and thus, you have the proverbial square peg in round hole scenario. Now, the ILEC could change their systems and offer a porting in option, but they have to put controls in so that the number gets ported in correctly, the CO routing tables get built correctly, the rating tables are built correctly, etc. So, the easy and cheaper way out is for the ILEC to say: "No, we can't port your number from that bad old VoIP provider, but wouldn't you like a nice new number [that fits in with our system]?" (sarcasm probably obvious). Also, in addition to winning a customer, the ILEC can make the VoIP provider look bad, so they get 2 for 1!

I didn't mean to imply that porting the number from a VoIP provider to a CLEC was difficult. Porting is often done, it just takes more work and since the CLEC typically wants your business, they will usually go the extra mile. SBC wants your business according to their rules. Not that that is bad, it is just required in order to maintain the efficiencies of a huge organization. Porting your number in can be done, it just matters to SBC whether or not it fits in with the rate centers that are defined in the central offices. So, if you hadn't moved, I wonder if porting would have worked?

Why Charter wouldn't do it is beyond me. As I mentioned, I think they missed the boat and should have ported your number over. Some possiblities are: 1) maybe they don't have much experience in porting? 2) maybe their system is only set up to port numbers from ILECs and they don't want to hassle with porting numbers from CLECs or VoIP providers? 3) maybe they

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

won't port numbers into their system at all and only give you numbers from their own NPA-NXX? I don't know much about how Charter operates their system. Do they allow porting in another number that isn't/wasn't a Charter number? Perhaps they can only work with their own NPA-NXX's? Just throwing out possibilities, maybe someone else can shed some light on Charter...

1. RE: Number Portability problems

Mark :

September 6, 2006 10:00 PM

To Andy's points, which are all accurate and concise, there is one other possibility why Charter didn't port.

Charter doesn't do the porting, they are relying on a CLEC to provide them with that service. The CLEC switch Charter relies on may not have trunking for the original Vonage/SNET rate center, which would have prevented the port in from working.

203-854 is a SNET Norwalk rate center. The new number 203-740 is Danbury, 203-775 is Brookfield. Both are SNET, but these rate centers are not in the local calling area for Norwalk.

The other consideration for LNP number ports that cross geographic and/or civil boundaries is that these 'foreign' numbers bust the hell out of E-911 systems.

Every system has limits. I'm surprised that no one suggested changed number intercept along somewhere the way. Most states require providers to offer this service at no charge.

1. RE: Number Portability problems

Tom Keating :

September 7, 2006 09:37 AM

>>203-854 is a SNET Norwalk rate center.

Yes, but SBC owns SNET, which also owns AT&T. Therefore SBC owns my original number, so you'd think it would be easy for them to port. Of course, they are bound by tighter regulations than the VoIP service providers. They can't simply give me a traditional landline with a 203-854 (Norwalk rate center #) that is physically located in Brookfield. That would certainly screw up what is considered local calling vs. long-distance. Of course, I do have the unlimited local and long-distance, so it doesn't really matter in terms of their billing or profit - they earn the same amount no matter what my number is.

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

That's the beauty of these unlimited plans. There is no such thing as national long-distance - only international long-distance.

Perhaps if I went with AT&T CallVantage (a VoIP server) I would have been able to port the number. But I would lose my double-play voice/data special package, plus guaranteed voice quality at a flate monthly rate.

1. RE: Number Portability problems

anonymous :

September 7, 2006 12:47 PM

I just read your number portability article “Number Portability Problems”. I’ve lived these problems every day for the past few years, first running the LNP group for a known VoIP hosted services company.

Your account presents a great view of the customer frustration resulting from the archaic rules surrounding number portability. We often run into the problem of why Vonage can seemingly port numbers anywhere and other companies cannot. By the way, our company, a pure VoIP solution, would have provided you the same answer Charter and SBC did. The number is out of rate center and can’t be ported. The fact is that most consumers don’t know the how’s and whys of the North American Number plan so they don’t understand why numbers just can’t move around like cellular.

Many VoIP companies follow the same regulations as traditional phone companies and cable companies, others do not. So your characterization of when porting works and when it doesn’t is not entirely accurate.

The bottom line is that there are a host of sub-issues tied to the geographical link between a number and a subscriber’s address. The biggest are billing for toll vs. local calls, translations and routing, and E911 call management. You could write an entire multi-part article about each of these areas. Let’s just say that the nature of the POTS network (and VoIP providers must do business on the POTS network) is such that geographical independence is not yet possible. The far newer cellular network and the nature of mobile phones created a session registration schema that adapts to number portability. But the POTs and cellular networks are fundamentally different so what works for one, won’t necessarily work for the other.

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

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So how can Vonage and other carriers do it? Your theory is close to correct in some cases. Some carriers do not provide accurate address data, and then they hope that no one has a heart attack at that location. Other companies employ a very inefficient process of assigning "ghost numbers" from the correct rate center to the subscriber's location, making the arrangement appear as though it is geographically aligned. Monetary settlements over IP based traffic are already a source of contention in the industry and will likely escalate into a full fledged brewha. Traditional phone companies are creating wholesale products for VoIP carriers to try and manage the sharing of revenue. All of this creates the illusion that numbers are being held hostage. In fact, these industry practices are necessary to facilitate the multi-owner/operator network that has evolved with competition. Do I like it? No. I'd rather be able to port numbers anywhere, anytime. I am working on just that for my company, but it's a little trickier when you try to accomplish that while still complying with the "rules".

Anyway, I guess my only point is that phone numbers in the landline network are still very much tied to geographical locations. As much as we wish they weren't, the complexities of moving beyond geography as a limiting factor are significant and not easily overcome.

Thanks for the article; it illustrates what our customers feel every day.

Re: Number Portability problems

- **About Me** (Tom Keating) (Full Bio)

CTO, VP, Founder of TMC Labs; B.S. Computer Engineering, 12 years telecom experience, 26 years programming, tinkering with and breaking computers. Gadgets and VoIP are my favorite topics on this blog

Contributor

Gadget and Consumer electronics lover Randy Savicky (President and CEO of Strategy + Communications, Inc. has written about consumer electronics and gadgets for nearly three decades.

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

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Appendix Item 4: Additional Examples of 1-336-555-2625 Configurations

*Additional examples of possible configurations of 1-336-555-2665:
1-336-555-COOKIE
1-336-555-BOOKIE
1-336-JKL-BOOKS (see http://www.lathamlaw.org/publications.html), JKL Communications
1-336-JJJ-BOOKING (http://www.ranchweb.com/triplejranch/) JJJ Wilderness Ranch

Submitted by Jay Carpenter of The 1-800 American Free Trade Association (1-800 AFTA)

Appendix Item 5: E.164 Telephone Number Definition from SearchNetworking.com

http://searchnetworking.techtarget.com/sDefinition/0,,sid7_gci1094695,00.html

E.164

DEFINITION- E.164 is an international numbering plan for public telephone systems in which each assigned number contains a country code (CC), a national destination code (NDC), and a subscriber number (SN). There can be up to 15 digits in an E.164 number. The E.164 plan was originally developed by the International Telecommunication Union (ITU).
With E.164, each address is unique worldwide. With up to 15 digits possible in a number, there are 100 trillion possible E.164 phone numbers, more than 10,000 for every human being on earth. This makes it possible, in theory, to direct-dial from any conventional phone set to any other conventional phone set in the world by inputting no more than 15 single digits.

The ITU and the Internet Engineering Task Force (IETF) are currently working on a new plan called ENUM that will expand E.164 to encompass both traditional analog phones and digital devices, including computers and other devices on the Internet. All types of communications devices -- including analog phone sets and fax machines, digital phone sets and fax machines, wireless (cellular) phone sets, pagers, digital modems, digital video terminals, and VoIP devices -- will have unique E.164 addresses with direct dialing possible from any device to any other.

LAST UPDATED: 03 Jun 2005

The End-user Identity Paradox

“An Assigned Telephone Number Has An End-user But The End-user Has No Face”

By
Jay Carpenter
1-800-American Free Trade Association (1-800-AFTA)

ENUM Forum Conference Call
September 16, 2008

Identity ?

1-555-555-5555

All assigned telephone numbers have an End-user. However, not all End-users at the overall system level have a face or **universally** agreed upon identity.

Impact of the End-user Identity Paradox

- Determining End-user Identity is a dilemma in:
  - End-user ENUM (Authentication, Authorization and Validation)
  - Next Generation Network Identity Management
  - Next Generation Network Security
  - Toll Free Number Management
  - VoIP Porting (Possibly)

Key Contemporary End-user Identity Issues

- **End-user ENUM-(red highlighting added for emphasis)**

  – "While the objectives of the trial were met, it should be noted that there are aspects of End-user ENUM that are not yet fully developed. One primary example is the **authentication and authorization** process necessary to ensure that only current assignees of telephone numbers would be allowed to register those numbers."

  Source: CC1 ENUM LLC End-user ENUM Trial Report cover letter to Mr. John M.R. Kneuer, October 26, 2007.
  (http://ustrial.enumllc.com/)

  – "UKETG did an enormous amount of work on **authentication and validation**. This is a very hard problem. There are a large number of awkward corner cases (for example, DDI blocks, pay-as-you-go mobile phones, premium rate and non-geographic numbers, and so on) that present difficult challenges. Other obvious challenging cases include ex-directory numbers and households when many people share the one phone number. UKETG has demonstrated how to perform authentication with or without the participation of the relevant telephone company. This is a very valuable result from the trial. Even so, more work still needs to be done in this area."

  Source: UK ENUM Trial Group (UKETG) Report, May 2004, EXECUTIVE SUMMARY, page 5, (

  http://www.ukec.co.uk/docs/UKETGReportFinal.pdf)

Key Contemporary End-user Identity Issues (continued)

•**End-user ENUM-(continued)**

"Authentication Agency
• Proposed solution for the authentication problem
> How can we be sure someone "owns" the telephone number they are registering?
> Complicated by UK Telephone Numbering Scheme
• Privacy & commercial confidentiality issues
• **No centrally-maintained database"**

Source: An Introduction to ENUM, UK Network Operator's Forum London, Jan 10th, 2006, Jim Reid, RTFM Ltd, page 27, (http://www.uknof.org.uk/uknof3/Reid-ENUM.pdf)

Key Contemporary End-user Identity Issues (continued)

- **End-user ENUM-(continued)**

- **“How is the user of a number authenticated?**
- Users could be corporations, individuals, government agencies, military organizations and hosts of other non-individual users. Service providers typically assign large blocks of numbers to these entities; the telecom manager within these entities then assigns numbers to users, so even the service providers cannot identify the users for a large portion of the allocated numbers. **This is an unresolved issue**, but one that must be resolved prior to deploying a robust and secure ENUM service. It is likely that the service provider that allocated the number(s) to the user will be involved in the process of authentication.”

- Source: Neustar, ENUM website,
- (http://www.enum.org/faq.html#31)

Key Contemporary End-user Identity Issues (continued)

- **Next Generation Network Identity Management** –

- "The *personal profile* is the cornerstone of an End-user-centric world. Today, End-users are confronted with fragmented service, requiring them to enter and maintain equivalent information several times – for example: address books, buddy lists, billing and payment preferences, phone numbers, presence, and ring-tones."
- Source: ATIS NGN Framework Part III: Standards Gap Analysis, page 9, May 2006 (http://www.atis.org/obf/_com/docs/sag/060518001att.pdf)

- **Next Generation Network Security –**

- "**3.4 User Account Management -** Authentication Credentials Management spans the creation, archiving, distribution, and revocation of digital credentials supporting authentication and authorization for a heterogeneous mix of managed elements, across the following areas
- Individual user account creation.
- Specification of user identifiers.
- Resetting of user passwords.
- Specification and maintenance of user access rights and privileges."…
- **"3.5.1 Assessment - …** 'To date, there has been no successful effort to pull these sources of data together and provide detailed standards for the telecommunications industry related to these topics. There are no detailed standards or guidance that would provide telecommunications companies a roadmap to design and implement these functions. ' "
- Source: ATIS TECHNICAL & OPERATIONS (TOPS) COUNCIL Security Issues Focus Group Security Issues, page 41, April 20, 2004
- (http://www.atis.org/obf/_com/docs/sag/ATIS-WP-Security%20Issues-FINAL.pdf)

Key Contemporary End-user Identity Issues (continued)

- **<u>Toll Free Number Management</u> –**
- ATIS, Ordering and Billing Forum, SNAC Issue 2617
- "While any Resp Org, either on its own initiative or at the request of a customer, can implement procedures to reduce the likelihood of a slam of a toll free number in a request that is submitted directly to the current Resp Org, there is currently no means by which a Toll Free Service End-user Subscriber can prevent an unauthorized slam if a request is submitted directly to the Help Desk. The unauthorized porting of Toll Free numbers is no less serious than slamming of outbound services, and is likely to be more difficult to detect and to causes greater monetary damages to the End User Subscriber."

Circular Logic

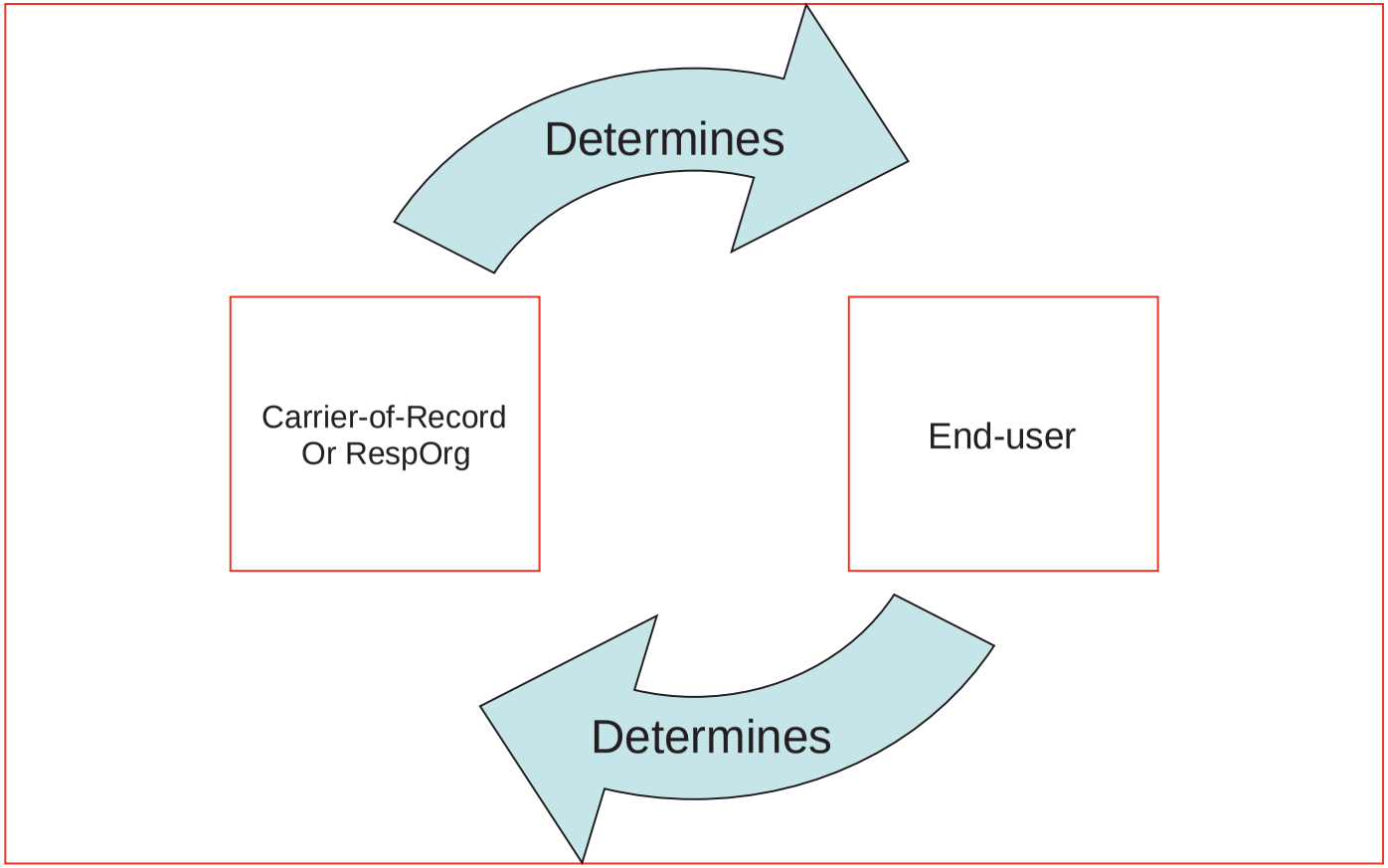
- The Catch-22 or Liar Paradox
  - If each assigned telephone number has an End-user then it would seem that the End-user should be identifiable.
  - But, at the **overall system level**, there is an unanswerable question regarding the true or false nature of a given End-user identity.
  - Since the Carrier-of-Record (Geographic) or the Responsible Organization (RespOrg in Toll Free) determines the End-user but the “valid” End-user determines the Carrier-of-Record or RespOrg for the telephone number there is a self-referential structure that results in a paradox regarding the true or false nature of the statement “I am the ‘valid’ End-user”.

Is This Statement True or False?

- "I am lying" This statement is neither true nor false because it is self-referential. (Liar Paradox or Epimenides Paradox)

- "I am the valid End-user because the Carrier-of-Record/RespOrg that I select identified me as such". This statement is also circular and/or self-referential.

Self-Referential Structure



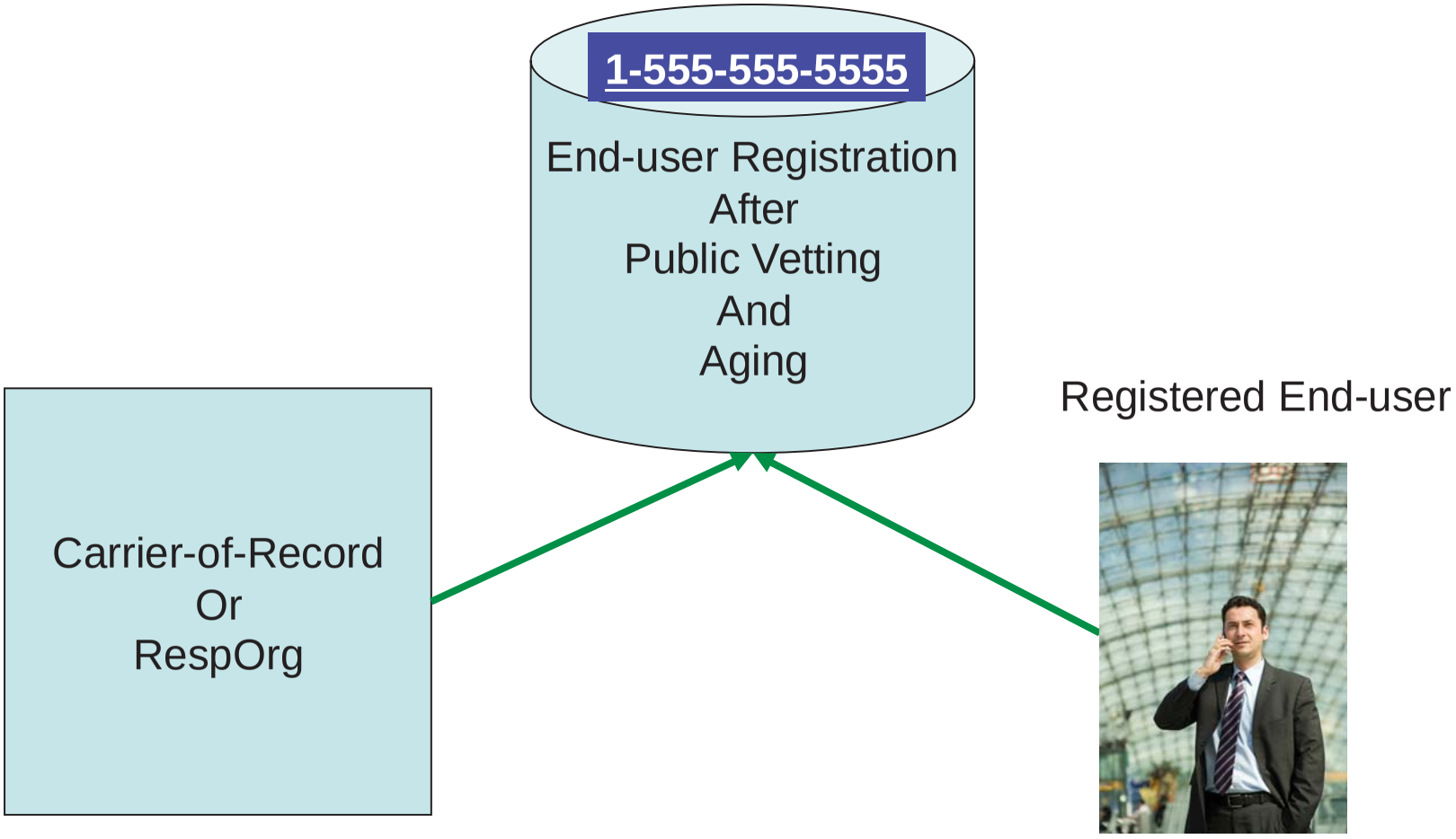
Putting a Face to the End-user

1-555-555-5555

Vetted Registration

1-555-555-5555

Central Database To Break The End-user Identity Paradox



Summary

- **Identity -** Determination of End-user Identity for a given telephone number is a current dilemma at the overall telecommunications and media delivery system level without an objective database that contains the definitive identity of the End-user.

- **Self-Referential** - The existing circular structure of the End-user designating the Carrier-of-Record/RespOrg while the Carrier-of-Record/RespOrg designates the End-user Identity creates a key Next Generation Network telecommunications and media delivery paradox.

- **External Database** - Creation of an objective database such as End-user ENUM for registration and incorporating public vetting and aging to establish definitive End-user identity for a given telephone number could break the current circular dilemma surrounding determining End-user Identity.

- **Registration, Public Vetting and Aging** – This **process** could contain key components for establishing and validating overall system level End-user Identity for successful implementation of Next Generation Network services. Moving forward with End-user ENUM implementation and an enhanced End-user ENUM registration process could be the key to ending this vexing paradox.

ENUM FORUM CONTRIBUTION:

Contribution #: GEN0145R0

SOURCE: ENUM Forum Roundtable

CONTRIBUTOR: James Baskin, Roundtable Scribe

DATE SUBMITTED: 10/15/2008

TITLE: Minutes of September 16, 2008 ENUM Forum Roundtable

ENUM Forum Conference Call Minutes
September 16, 2008, 2 PM Eastern time

End-User ENUM Roundtable:

Agenda:
1) End-User ENUM Trial Readout – Robert Schafer- ENUM Trial Director
2) Trial Participant Readout – Any of the Public ENUM trial participants that wanted to provide a summary of the trial from their perspective
3) National End-User ENUM presentation - perspective on future of End-User ENUM in US – Chip Sharp, Jay Carpenter
4) ENUM LLC Presentation – Steve Lind
5) Open Discussion – Should the industry proceed with End-User ENUM? If so, next steps?

Participants: (on Conference Bridge and/or LiveMeeting)

Gary Richenaker, NeuStar –ENUM Forum Chair, Moderator
Steven Lind, AT&T – ENUM Forum Vice Chair
Robert Schafer, Verizon – LiveMeeting Moderator
Jim Baskin, Verizon – Scribe
Tom Creighton, Comcast
Debbie Guyton, Telcordia
Chip Sharp, Cisco
Penn Pfautz, AT&T
Doug Birdwise, Bell Canada
Jay Carpenter, 1-800-AFTA
Andy Gallant, AG Design
Sewan Grewal, Qwest
Blaine Elzey, Alcatel-Lucent
Jim Castagna, Verizon
David Greenhaus, 800 Response
Shan Lu, Comcast
Warren Bent, In-Charge Systems
Hala Mawafy, representing the National LIDB Forum
Tom Moresco, Telcordia
Suzanne Howard, Cox Communications
Charles Ganzhorn, Cisco
Armstrong Soo, AT&T
Beth O'Donnell
Asaad Alnajjar
Chris Brown

Agenda Item 1

End-User ENUM Trial Readout – Robert Schafer- ENUM Trial Director
Mr. Schafer provided a summary of the ENUM LLC's End-user ENUM trial activities and results, and answered questions for clarification.

Agenda Item 2
Trial Participant Readout

Trial participants present on the conference bridge had no additional information to share regarding the end-user trial.

Agenda Item 3
National End-User ENUM presentation

The End-User Identity Paradox – Jay Carpenter
Mr. Carpenter made a presentation on the problem of identifying the end-user associated with a given E.164 telephone number. He suggested that end-user ENUM could be used as an objective database to solve the problems described. There was extensive discussion of his assumptions and conclusions.

ENUM for Inter-Enterprise Rich Media Services – Chip Sharp
Mr. Sharp presented a case for using ENUM technology to enable enterprises to accomplish inter-enterprise rich media communications. His presentation described academic and other private efforts to develop naming schemes that fall short of universal consistency needed for large-scale adoption. The presentation recognized that the E.164 numbering plan provides the universality, but has not been widely used through ENUM because of its inter-governmental management aspects. As with the preceding presentation, there was extensive discussion of the assumptions and conclusions presented.

Agenda Item 4
ENUM LLC Presentation – Steve Lind

Mr. Lind presented the history of the CC1 ENUM LLC's work on end-user ENUM, including the drafting of RFPs for both Tier 1A and Tier 1B systems. He also described the steps that would need to be taken by industry and the LLC to move forward with end-user ENUM should there be sufficient support to do so, and answered questions for clarification.

Agenda Item 5
Should the industry proceed with End-User ENUM? – Gary Richenaker

Mr. Richenaker coordinated a discussion of North American interest in end-user ENUM, including how it compares with ENUM activities and implementations in other parts of the world, the interest expressed or not expressed by session participants, and reasons for the lack of participation by certain interests.

There was a debate about how to justify building end-user ENUM in the US without significant resource commitments from interested parties, as well as the

uncertainty of issuing and funding an RFP for Tier 1A and 1B providers before government agreement on the delegation of Country Code 1.

The participants ultimately agreed that in order to demonstrate sufficient interest in further development of North American end-user ENUM motivated parties should write contributions for circulation to the ENUM Forum and CC1 ENUM LLC mailing lists. If sufficiently detailed and relevant contributions are received, a further meeting will be scheduled to review them and discuss next steps.

It was agreed that contributions should be distributed to the mailing lists directly by the authors. The list addresses are: enumf-gen@enumf.org and enumllc-gen@enumllc.com. Only list members may post to these lists. Anyone who is not on these lists may be added by sending a request to chair@enumllc.com.

All four of the presentations made during today's call can be found at: http://enumf.org/documents/eurt/

Telecommunications Relay Services, Video Relay Services and Toll Free Telephone Number Allocation

Federal Communications Commission

Notice of Proposed Rule Making – Comments due December 2, 2010

WC Docket No. 10-191

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Summary:

Toll free telephone number subscribership is dependent upon context. At the level of a call recipient, once a toll free telephone number is given out to family, friends and business contacts, a call recipient generally considers him or herself to be the subscriber or the subscriber equivalent of the toll free telephone number. A service provider might also rightfully claim subscribership for the same toll free telephone number. Conflicts can and do arise in these situations. The issues that have surfaced in the iTRS/VRS realm are symptomatic of a general need within the toll free telephone number industry.

The North American Numbering Council (NANC) Future of Numbering Working Group (Fun WG) has produced a White Paper that is relevant to the questions posed by the Notice of Proposed Rulemaking (NPRM) and Request for Comments related to toll free telephone number assignment for Internet-based Telecommunications Relay Service (iTRS), Video Relay Service (VRS) and IP Relay. This proceeding is classified under WC Docket No. 10-191. The comments contained in this response address the issues raised in the NPRM. Comments are due by December 2, 2010.

Because the issues raised within the iTRS/VRS NPRM parallel the issues posed to the toll free telephone number industry at large and contained within the pending FoN WG FTN-005 White Paper, the 1-800-American Free Trade Association (1-800-AFTA) recommends that the Commission postpone a ruling on the proposed allocation methods until the industry at large has vetted the content of the pending FTN-005 White Paper. The target date for industry comments to be concluded is tentatively suggested to be January 21, 2011.

We therefore respectfully request a delay of six months for a ruling in the matter of toll free telephone number allocation methods for iTRS/VRS providers and users.

Description of Considerations:

Existence of Definitive Subscribership
The context of subscribership

Context: While subscribership might exist within the realm of a provider's database, it might not clearly exist at the next level above the level of the internal provider's database. For example, within the NPRM, the following language is used:

"When a hearing user dialed the iTRS user's toll free number, the voice call was routed by the PSTN to the provider that had subscribed to the number and assigned it to the user." (NPRM Section II. Background, 5. Internet-based TRS Order)

Within this description it is unclear and conflicting as to whom would be the definitive toll free telephone number subscriber. Different observers would have different views of who holds subscribership to the toll free telephone number dialed. In addition, it conceivable that the same toll free telephone number could serve more than one call recipient. Within the toll free telephone number industry at large, multiple call recipients can be served using one toll free number in a variety of ways. One such arrangement is called shared-usage.

As the context of subscribership moves from the specific to the general, the definitive identification of the subscriber for a given toll free telephone number becomes clouded. The FTN-005 White Paper addresses in detail the issues related to clouded subscribership at various system-wide levels (see section 3 Description of Issues, 3.1 Subscriber Identity and Control).

Dispute Resolution

At this time, no industry standards exist for settling disputes that might arise from multiple parties claiming subscribership to a specific toll free telephone number. Disputes must be settled either informally between Responsible Organizations (RespOrgs), by filing a claim with the FCC or by seeking remedy in the courts. (See section 2.6 Toll Free Portability, final paragraph)

iTRS/VRS is Emblematic

iTRS/VRS toll free is an example of the vexing problem of subscribership. Reversal of prior order to return toll free numbers is an illustration of the inherent numbering problems that extend beyond the iTRS/VRS realm. The problems that have surfaced in this inquiry have surfaced internationally as well.

Transfer of Subscribership:

First Come, First Serve

First Come, First Serve (FCFS) is the method of allocation and return to the spare pool that governs toll free telephone numbers. This allocation method directs potential subscribers of toll free telephone numbers to look to the spare pool for their choice of specific numbers. In addition, once a subscriber is finished with toll free telephone number usage for a specific number, the FCFS rules require the subscriber to return the number to the spare pool so others can have a FCFS chance at gaining subscribership to the specific toll free telephone number. Directed transfers to another subscriber without giving all potential subscribers a chance at obtaining subscribership to a specific toll free telephone number is prohibited under current rules. The NPRM proposal to have providers transfer subscribership to iTRS/VRS users could be counter to the FCFS rules. In addition, if more than one potential iTRS/VRS user might be interested in

subscribing to a particular number, a directed transfer might be considered unfair to the potential user that does not win subscribership. Also, there could conceivably be potential subscribers outside the iTRS/VRS community that could be interested in having a chance at future subscribership for a toll free number that had been used for this purpose in the past. Circumventing the FCFS rules by directed transfer from providers to users might be counter to First Come, First Serve allocation rules. Item 84 in the NPRM might be in error relative to “Federal Rules That May Duplicate, Overlap, or Conflict With the Proposed Rules”.

Incentive to Return Toll Free Telephone Numbers to the Spare Pool

As highlighted in the FTN-005 White Paper, there is little incentive for incumbent subscribers to return toll free telephone numbers to the spare pool (see section 3.3 Replenishing Toll Free Service Numbers). At this time, the 1-800 toll free code is completely assigned. This scarcity of the 1-800 code makes it all the more unlikely that the iTRS/VRS users or providers would have incentive to return these toll free numbers to the spare pool versus finding alternative uses for renewed deployment.

Database Synchronization:

iTRS and SMS/800 Synchronization and Resource Mapping

The NPRM calls for toll free telephone numbers to be terminate to the geographic telephone number associated with the iTRS/VRS user. This could pose a problem of synchronization between two separate databases. In addition, the considerations listed above regarding definitive identification of the iTRS/VRS user/subscriber could also be problematic if there is any dispute or uncertainty.

Internet Protocol (IP) address synchronization of toll free telephone numbers is also called for in the NPRM. This could be problematic for all the reasons listed above and because there are no IP addresses currently associated with toll free telephone numbers. Telephone Number Mapping (ENUM) databases can accommodate a variety of IP addresses via ENUM Naming Authority Pointers (NAPTRs). This further complicates the provisioning problems when the definitive identity of the subscriber is clouded.

Public Vetting

The FTN-005 White Paper proposes the toll free industry discuss and consider ways in which the registration of toll free telephone number like addresses could be signaled or displayed to the public at large. This “public view” could be valuable from several respects for insuring the toll free address is being used by the undisputed subscriber (see section 3.4 Warehousing Toll Free Service Numbers).

Future Applications of Toll Free Numbering

Assuming toll free numbering based upon existing toll free telephone numbers evolve into the IP network from the Public Switched Telephone Network (PSTN), there could be Next Generation Network services that are unique and valuable to current subscribers of toll free PSTN numbers. Encouraging the return of toll free telephone numbers by incumbent subscribers could be lamented once new services such as multimedia services are associated with existing numbers.

Conclusion:

Because many of the issues posed by the NPRM parallel the issues about to be discussed by the toll free industry at large and by the NANC Future of Numbering Working Group, I respectfully request the Commission consider the following path forward:

a. Delay a decision until the FTN-005 is vetted
b. Delay action until the industry acts upon the FTN-005 White Paper
c. Evaluate potential solutions identified by the FTN-005 White Paper and consider the potential for these solutions to resolve the needs identified within the NPRM

A delay for approximately six months or until July 1, 2011 should allow sufficient time for the toll free industry and interested stakeholders to discuss the pending issues detailed in the FTN-005 White Paper. This time period should also be adequate to include specific discussion of the iTRS/VRS provider and user community toll free telephone numbering issues identified in the Notice of Proposed Rule Making WC Docket No. 10-191.

Addendum

Professional Profile of Jay Carpenter

- SNAC Member
- FoN WG Member and Issue Champion for FTN-005
- ENUM Forum Member and Contributor
- CC1 ENUM LLC Participant and Technical Advisory Committee Contributor
- 1-800-AFTA President
- RespOrg
- Toll Free Shared-Usage Provider
- University of Southern California, MBA (honors)
- Arizona State University, B.S. in Business Administration (honors)

NANC Future of Numbering Working Group FTN-005 White Paper is available at:

http://www.nanc-chair.org/docs/documents

May 21, 2010 NANC Meeting

May10 FoN Report

May14 White Paper on Toll Free Resources