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Ex Parte VIA ECFS

January 16, 2013

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th St SW
Washiington DC 20554
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RE: GN Docket No. 13-5 Technology Transitions Task Force
WC Docket No. 09-51 A National Broadband Plan for our Future

Dear Ms. Dortch:

On Tuesday, January 15, I met with Nicholas Degani and Courtney Reinhard both Legal Advisors to Commissioner Pai on technical subjects related to the Technology Transitions Policy Task Force and the retirement of TDM/SS7 networks as outlined in the National Broadband Plan. It is beyond obvious that a National Session Initiation Protocol based Interconnected/Interoperable Real-Time Communications network using North American Numbering Plan [NANP] numbers is a critical and essential national service. Removing legacy regulations is important but the PSTN Transition has countless technical issues associated with it.

First I wish to congratulate the Chairman, Commissioner Pai, and all the Commissioners for creating the Task Force to move this important discussion forward. I related several technical concerns and outlined several items the Commission and the Task Force may wish to consider.

1. The issues surrounding PSTN Transition and the ongoing Commission work on Next Generation 911 transition should be considered inseparable. The retirement of Legacy TDM and SS7 POTS gear is itself a public safety issue since much of it has

reached its technical End of Life [EOL] and has already complicated various Commission actions, such as Phantom Traffic determination.

2. It is my belief that a substantial percentage of issues in the Transition will center on technical issues involving the routing and termination of traffic dependent upon the NANP and other numbering issues themselves. I have previously filed an ex parte on this issue and others as part of the Vonage Petition on NANP access. [1]

3. I believe it is vital for the Industry and the Commission to reach consensus on how and possibly if the existing numbering databases [LERG] [NPAC] should play a role in the Transition. The existing SIP interconnection practice of exchanging Microsoft .xls files with Local Routing Number ranges and Operating Company Number will not scale.

4. There are other numbering databases where it is unclear how they will transition. In particular the Line Information Database [LIDB] which is vital for call blocking and the 800 SMS. [2]

5. It is not clear that the Industry as reached consensus on a technical outline or "profile" on how all a national system of SIP Interconnection would work "on the wire". The Commission and the Technology Transitions Task Force should encourage the Industry to convene *an open, multi-stakeholder [Cable, Wireless CLEC, ILEC, Rural] consensus driven process* on a National Technical Profile for Network to Network SIP Interconnection at the earliest possible date.

6. Interconnected SIP is NOT the Internet. I have noted several commenters' have understood this. I particularly note the comments by Charter Communications on December 17, 2012, that accurately describes how operators view the issues in interconnecting traffic,[3] as well as COMPTEL,[4] [5] and a white paper published by the National Regulatory Research Institute.[6] I do not believe that Intercarrier SIP Interconnection agreements should necessarily follow the existing voluntary transit peering agreements for best efforts Internet services, especially during the complicated USF/ICC Transformation.

7. The Commission has steadfastly refused to classify Interconnected VoIP/SIP as either a Title I or a Title II Telecommunications service. I understand the rationale for this decision. Either determination has consequences associated with it. Either too little or potentially to much Authority to Act in an environment where it seems clear less is often more. I suggest the Commission and especially the Technology Transitions Task Force may wish to investigate its Authority to Act under section 251

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1 http://apps.fcc.gov/ecfs/document/view?id=7022009344
2 http://apps.fcc.gov/ecfs/comment/view?id=6017113702
3 http://apps.fcc.gov/ecfs/document/view?id=7022085488
4 http://apps.fcc.gov/ecfs/document/view?id=7021905358
5 http://apps.fcc.gov/ecfs/document/view?id=7022005061
6 http://www.nrri.org/documents/317330/7821a20b-b136-44ee-bee0-8cd5331c7c0b

(e) [1] which governs the Commissions plenary authority over the NANP. This authority has been successfully tested in the Federal Courts of Appeal in the Pooling Decision of 2002. [7] The concept is simple. The carriers want phone numbers. If they want ongoing access to get phone numbers in the future they must comply with certain technical requirements necessary for SIP interconnection or..[fill in the blank]. Plan B.

8. The Transitions Task force may wish to test this theory out. In my previous ex parte I supported the concept of a full NPRM on Numbering issues which could now be expanded to develop a record on how the system should be transitioned to all SIP Interconnection. The Commission and the Task Force should reaffirm the decision in the USF/ICC Transformation Order that carriers can and should "negotiate in good faith" SIP interconnection now, even in the absence of regulatory reform.
9. The Task Force may wish to recommend a specific Notice of Inquiry on mandating National 10 Digit Dialing now. 10 Digit Dialing is in my judgment a precondition for the Transition to an all SIP network and has the advantage of increasing the size of the NANP by 20% [the D digit], and sets the stage for National Geographic Number Portability. One number, keep it for as long as you wish, anywhere in the United States.
10. The Commission may wish to appoint a National Director for the PSTN Transition to enhance both internal coordination of efforts and external outreach to the numerous affected communities. In addition the Commission may wish to establish a central repository for items related to the Technology Transitions Task Force work to keep the public informed about this important effort, similar to its new Health Care Initiatives.
11. The Task Force, once it has made a preliminary investigation, should organize and execute another series of Workshops on the Transition similar to the ones in December of 2011 with particular emphasis on the technical issues in PSTN Transition including Numbering.

    I also attach a recent presentation I made on these subjects to the Federal Communications Bar Association last December.

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[7] 267 F.3d 91

I'm available to answer any questions about these comments as needed.

Respectfully submitted,

Richard Shockey
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CC via email

Courtney Reinhard

Nicholas Degani

Commissioner Ajit Pai

Technical Aspects of SIP/VoIP Interconnection

Federal Communications Bar Association CLE
Washington DC Nov 19, 2012

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Who am I?

- Private Telecommunications Consultant based in Washington DC.
- Chairman of the Board SIP Forum (Session Initiation Protocol RFC 3261 industry promotion board)
  - apolitical
- Long time participant in the Internet Engineering Task Force (former ENUM RFC 6116 co chair)
- Member US Federal Communications Commission - Communications Security Reliability, and Interoperability Council
- Geek
  - http://apps.fcc.gov/ecfs/document/view?id=7022009344

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First....

- STOP calling this IP Interconnection.
- It's VoIP/SIP interconnection.
- We all know how IP Interconnection works for "best efforts" IP traffic.
- Voluntary IP Transit Peering agreements are well understood and unregulated.
- VoIP/SIP traffic is different and the agreements will have to be different as well.
  - NO Latency Jitter etc.

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How did we get here?

- The phone system (POTS) is approaching technical obsolescence
  - It cannot be upgraded.
  - It is a 35 year old infrastructure DMS 5ESS
  - It is decaying Parts – Personnel
  - It needs to be renewed
- When I say "phone system" I mean
  public switched telephone network (PSTN) running on time division multiplexing (TDM) and Signaling System 7 software protocols (SS7)

The FCC and the CRTC seem to be coming to similar conclusions about the Transition. NBP, ICC/USF Order and CRTC Policy 2012-24

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How did we get here?

- TDM/POTS is about 70% of the entire Voice communications industry in the core, including all the US legacy wire line, all the current Wireless networks running CDMA and HSPA (GSM protocols)
- Cable, FIOS and uVerse, CLEC Access technologies are different and use SIP but everyone (well some) still have to rely on the PSTN to interconnect more on that later.
- The existing TDM network is a parallel universe draining money out of the system that could be better used to provide, say broadband access or pay dividends.
- The existing regulatory environment is not helpful.
- VoLTE is bearing down on us.

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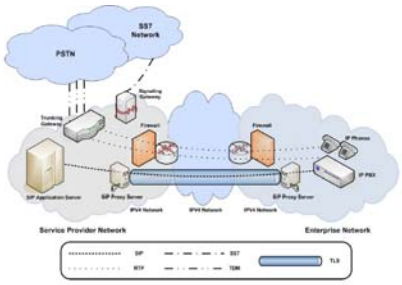
Enterprise VoIP/SIP is being degraded.

- **The PSTN is used as the inter-VOIP "default" network**
- Nearly every PBX in the enterprise now sold is SIP based.
- SIP Trunking (Enterprise to Service Provider) is nearly 15% of the total enterprise real time access market and growing.
- We can't do ubiquitous HD Voice – Point to Point Video or Rich Text using e164 addressing.



SIPconnect
SIP FORUM

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The social contract continues

- We assume there is still a PSTN "social contract" after a transition, though the terms of that are yet to be defined.

•We should be guided by…

Reliability
Affordability
Accessibility
Ubiquity

We are not taking away grandma's phone…yet. It is not clear Congress or the public understand what is going on.

AARP

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The existing environment is not helpful

- We have to solve the funding problem for Connect America. Take your pick. The 2% excise tax solution?
- We have to solve the problem of funding NG 911 PSAPs. The PSTN Transition and NG 911 are inseparable issues.
- The regulatory silos are complicating the problem.

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The Good News - Technology

- We have about 85% of the technical underpinnings in place for the transition from POTS.
- We have a lot of SIP in the field it works well.
- Bad News: The last 15% is unknown.
- We really want something that is better faster cheaper and generates new ARPU.
  - High Definition Voice VoLTE
  - Point to Point video
  - Rich text media
  - Something new !!

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I hate quoting Donald Rumsfeld

Former US Secretary of Defense

- "Now what is the message there? The message is that there are no "knowns." There are things we know that we know. There are known unknowns. That is to say there are things that we now know we don't know. But there are also unknown unknowns. *There are things we do not know we don't know."*

Some of the big ones are SMS service and LIDB

http://apps.fcc.gov/ecfs/comment/view?id=6017113702

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The general terms of VoIP/SIP Interconnection

- Interconnection is never "technically neutral"
- Presume a business case and a rational policy…then you have to deal with geeks like me.
- SIP Real-time Communications Traffic IS TOTALLY different. It has to be "managed".
- Managed SIP traffic generally segmented from best efforts IP traffic

"Annex A" SIP Technical Interconnection agreements must consider:

- Transport protocols/capabilities
- Signalling protocols
- Media codec schemes and Transcoding
- QoS parameters enforcement
- Technically feasible POI
- Addressing and Routing schemes
- Security issues IPv6?
- Accounting and Charging issues ?
- Testing process
- What MUST be in the signalling stream CNAM?

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OTT

- Who cares?
- The Pulver Order covers this.
- They can buy wholesale transit.
- This is about Interconnected E.164 named traffic. Policy is tied to who is a carrier. Section 214? NANP access?
- You will want to watch RTCWEB developments.
  - http://vimeo.com/cullenfluffyjennings/rtcwebexplained

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Telephone Numbering

- Phone Numbers have been essential to the deployment of a ubiquitous and universal real time communications service
- Most of the transition problems will involve numbering and the numbering databases. . Its all about the dips.
- We may need a 3rd numbering database or a rethink of the NPAC and LERG functions to accommodate VoIP translations, NANC 401-405
- ENUM RFC 6116 might not be the right answer. There is still The Thick vs Thin registry issue.

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More Numbering Issues

- The bill and keep model and the restructuring of LATAs in the USF/ICC Transformation offers some new opportunities to rethink numbering policy.
  - One number for life?
  - No geographic connection?
  - Ubiquitous full ten-digit dialing increases the size of NANP by 20% automatically. The D digit.
- Should phone numbers be more like domain names?
  - Do you own them?
  - Are they tradable?
  - What about 800 numbers?

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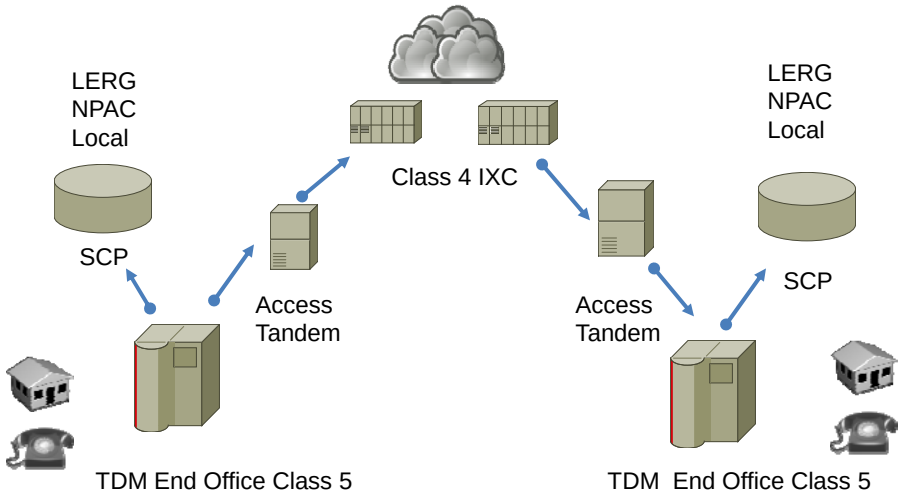
The POTS System Today



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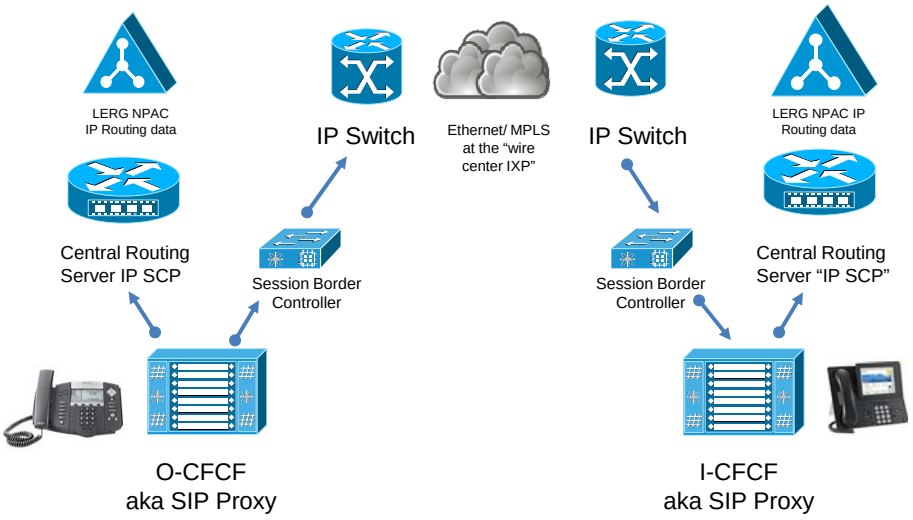
SIP Interconnection Future



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How does this work now?

SIP Peering has been going on for some time.

This is not new.

Locally Cached Central Routing Server(CRS) is provisioned by multiple registries LERG, NPAC, Trunk Group profiles, Local Routing policy

- End-user dials E.164 to initiate service
- (S) erving-CSCF [Call Session Control Function [aka the SIP Proxy] issues a service discovery query to ***on-site or hosted*** CRS. Is this my number Y/N.
- CRS takes dialed number, Portability Corrects to discover the underlying Local Routing Number [LRN] and then finds the Operating Company Number (OCN) that identifies the terminating Carrier of Record.
- CRS discovers the number is owned by a peering partner and retrieves stored routing and trunk data based on local policy.

How does this work now?

- CRS Passes URI of destination target SBC and Trunk Group data to S-CSCF
- S-CSCF resolves target host name within SIP URI using on-site or hosted private DNS infrastructure
- S-CSCF sends SIP INVITE to destination (I)nterrogating-CSCF through the designated Trunk Group into a peering switch located at an agreed to "meet and greet facility" [carrier hotel or wire center] then to the Session Border Controller of the terminating provider.
- SBC authenticates the SIP INVITE and performs SIP normalization as required.
- Standard SIP/SDP session negotiation follows
- Call completes.

Limitations

- The OCN "Terminating Carrier of Record" or SPID routing process presumes the transaction is essentially POTS.
- Its not clear this is the ultimate solution. A more granular routing engine may be needed. You want a future proof solution, since protocols and applications change over time.
- Think of the use of phone numbers for other transactions and protocols beyond SIP.
- There is the ultimate policy question of who owns the number.
- Provisioning the data is going to be an issue. Its one thing to have 5-6 carriers email a spreadsheet around of their LRN's, URI's and OCN's . Its another thing if its 1200 licensed carriers. Think scale!

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Doing nothing will create SILOs

- They don't interconnect.
- Where would we be if we had more than one DNS root?
- Instant Messaging vs SMS is the story of the failure of Yahoo vs Hotmail vs AOL
  - MMS Interconnection (ENUM)
  - SMS in Japan
- Intercarrier - Interconnected applications are MORE PROFITABLE!

We need a Plan! We need a profile !

1. **We need an Industry wide planning exercise focusing on the transition and the three critical elements. Our regulatory friends want consensus!**
2. **There has to be Federal / Industry leadership here. This cannot be undertaken on a state by state basis. A patchwork approach is not economically feasible.**

Policy
- *Reliability*
- *Affordability*
- *Accessibility*
- *Ubiquity*

Economic
- *Cost Recovery?*
- *Funding*

Technical !!!!
- *Congestion management*
- *NNI Annex A*
- *Security*
- *IPv6*

First Step.. undertake a full industry wide Technical Gap Analysis 18 months minimum IMHO. Reconcile the 4-5 existing SIP/IMS NNI profiles.

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In conclusion.

Get your Engineers involved in this discussion right now !

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