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January 24, 2014

Electronic Submission

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554

Re: *Technology Transitions Policy Task Force*, Gen. Docket No. 13-5, *Numbering Policies for Modern Communications*, WC Docket No. 13-97, *Connect America Fund; A National Broadband Plan for Our Future*, WC Docket No. 10-90

Dear Ms. Dortch:

On January 23, Hank Hultquist, Bob Barber, Christopher Heimann, Philip Bowie, Penn Pfautz and I of AT&T Services, Inc. met with Julie Veach, Lisa Gelb, Deena Shetler, Patrick Halley, Kalpak Gude and Bill Dever of the Wireline Competition Bureau, Henning Schulzrinne, Jonathan Chambers of the Office of Strategic Planning and Policy Analysis and Stephanie Weiner of the Office of General Counsel.

In the meeting, we discussed IP interconnection for voice and other real-time communication services (IP Interconnection). In particular we focused on the role that IP interconnection will play in the IP transition, the development of industry standards to facilitate efficient and scalable IP interconnection, and AT&T's internal development of IP interconnection capabilities. The attached presentation formed the basis of our discussion.

It is AT&T's view that IP interconnection will take place on a nationwide basis, and at a relatively small number of places. Unlike TDM interconnection, IP interconnection should not distinguish between "local" and "long distance" calling. This difference between the legacy interconnection structure and the structure that is emerging for IP interconnection has profound implications. In particular, it means that all carriers will be responsible for getting traffic to and from aggregation points where it can be exchanged with other carriers. In this sense, IP interconnection should look much more like peering and transit arrangements for the exchange of Internet traffic than the TDM interconnection arrangements for the legacy phone network, which require calling party networks to deliver traffic to thousands of different locations.

AT&T also expects that IP interconnection will more closely resemble the structure of the Internet with respect to the extent to which service providers will rely on indirect interconnection. One of the great advantages of the Internet is that its robust system of indirect interconnection prevents the emergence of the kind of terminating monopoly that was enabled by

the regulatory structure governing interconnection of the legacy telephone network. AT&T similarly expects IP interconnection for voice and other real-time communications services to enable competitive choices that will protect against anticompetitive practices.

AT&T supports adoption by the Commission of a date certain on which the default interconnection obligation should flip from TDM to IP. Establishment of such a date certain would encourage industry efforts at developing national standards for IP interconnection and put all providers on notice, thus helping to ensure that all are ready to begin exchanging traffic in IP format. It would also make clear that prior to that date, IP interconnection is voluntary. Premature and location-specific mandates for IP interconnection, such as that currently faced by AT&T in Michigan, will divert resources away from development of efficient systems and processes for IP interconnection and to potentially inefficient and inconsistent arrangements that no entity could rationally support.

If you have any questions or need additional information, please do not hesitate to contact me. Pursuant to section 1.1206 of the Commission's rules, this letter is being filed electronically with the Commission.

Sincerely,

/s/ Brian J. Benison

cc: Julie Veach
Lisa Gelb
Deena Shetler
Patrick Halley
Kalpak Gude
Bill Dever
Henning Schulzrinne
Jonathan Chambers
Stephanie Weiner

IP Interconnection

Overview

- IP Interconnection critical to IP transition
- Industry is developing standards and best practices for IP interconnection
  - ATIS
  - SIP Forum
  - Coordinating with i3 Forum and GSMA, 3GPP
- Initial deployment of IP interconnection as an overlay
- Nationwide topology
- AT&T is developing capabilities to support IP interconnection

ATIS/SIP Forum NNI (Network to Network Interface) Task Force

- Collaborative effort includes wireline, wireless, MSOs, vendors
- Broadly open through SIP Forum
- The task force will have two distinct types of documents:
  - IP-NNI specification(s), which might also include an annex listing key concerns and a checklist for establishing IP interconnect points; and
  - Corresponding test plan(s).
- Task Force objective is a detailed, implementable specification that will include everything needed to implement an interoperable NNI.
- Two sub-teams formed to address
  - SIP protocol “on the wire”
  - Routing mechanisms
    - Examining NPAC as ENUM registry proposal

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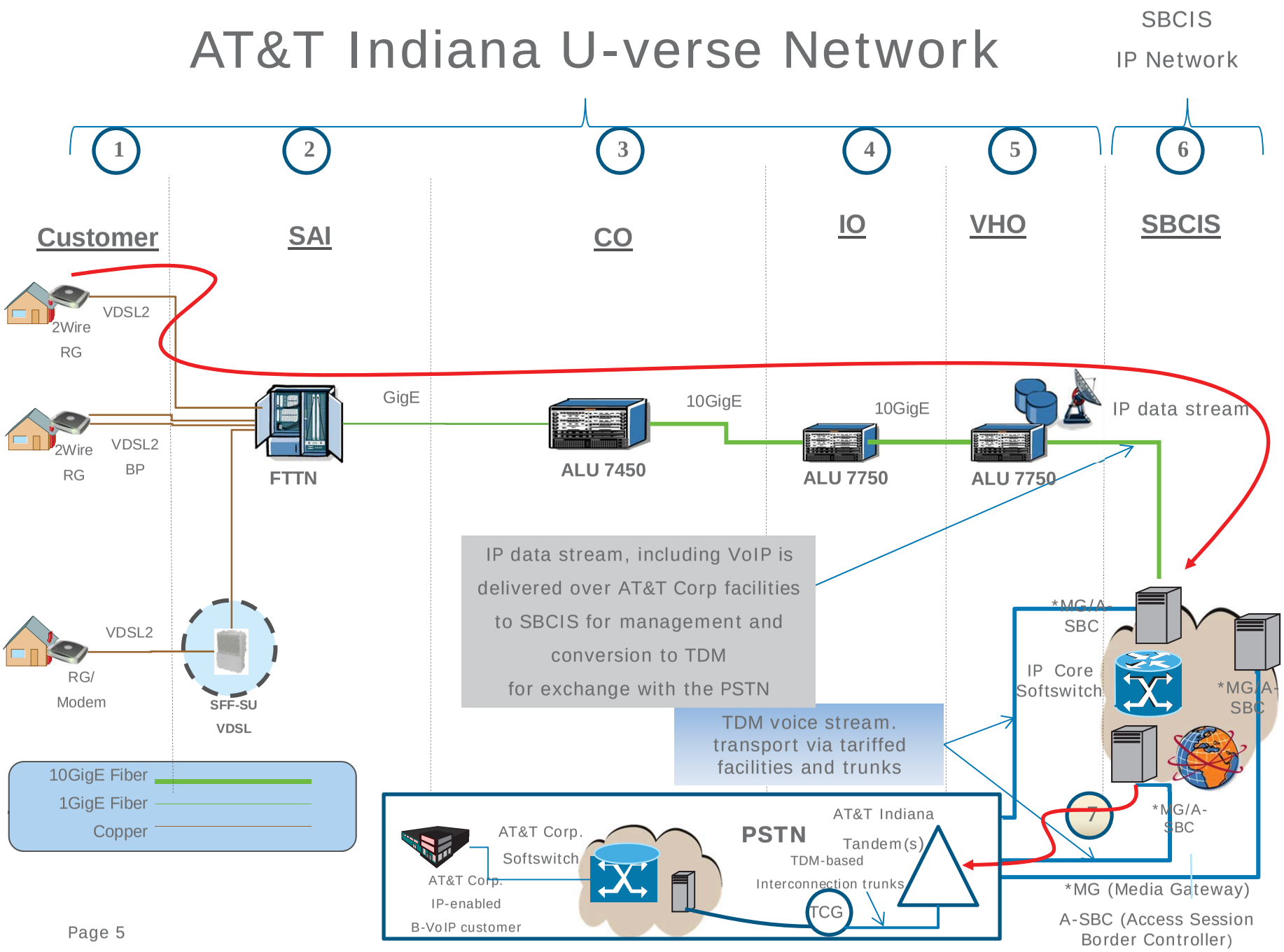
NNI vs. UNI

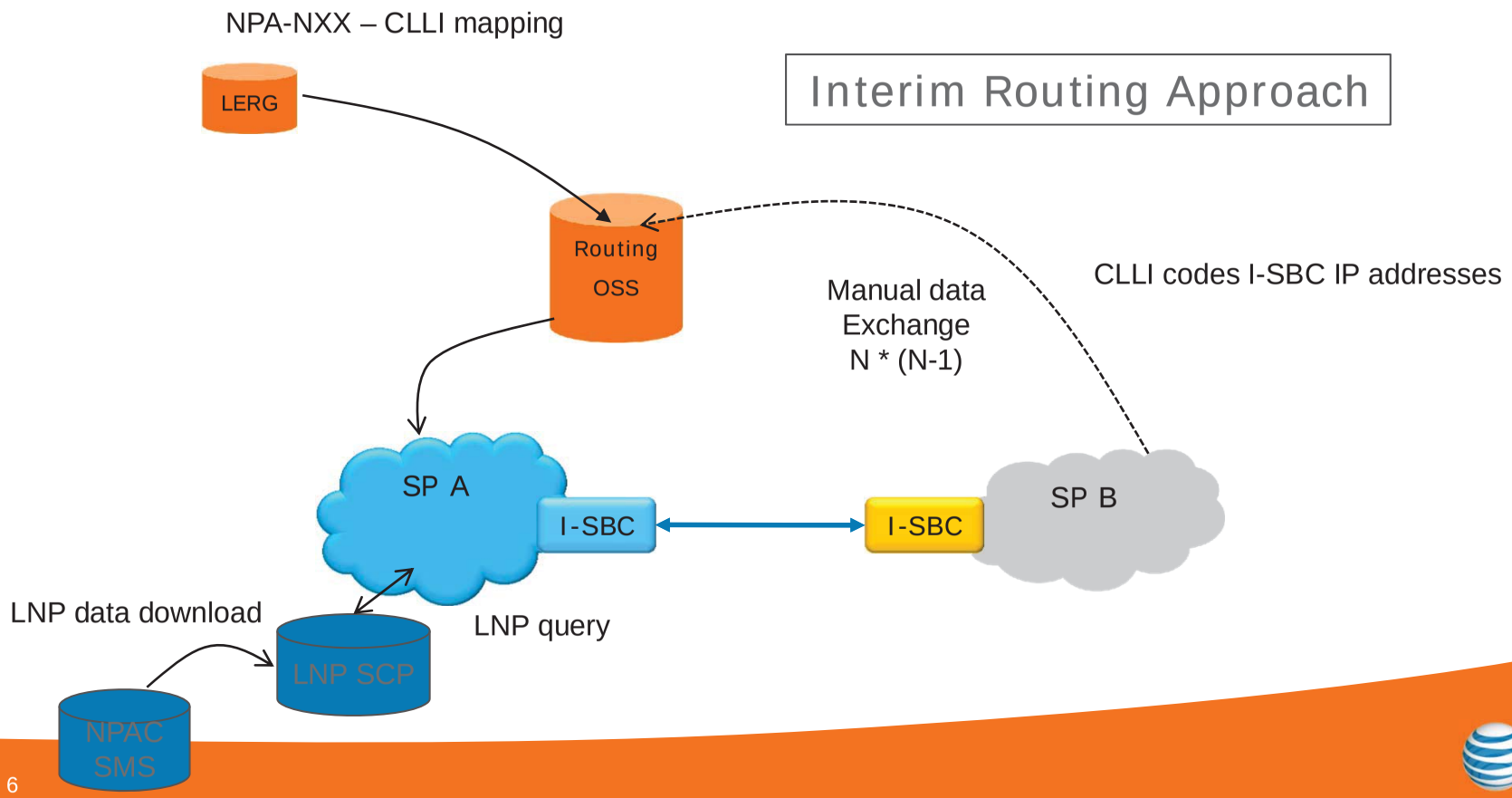
- IP interconnection requires a *network-to-network* interface (NNI)
- Providers may have an IP *User-to-Network* (UNI) Interface to their end users without having an IP network-to-network interface
  - e.g., U-Verse voice provides an IP UNI to residential users through an *Access* Session Border Controller but as yet has only a TDM NNI to other networks
- Existence of an IP UNI does not imply existence of a technically feasible point for IP interconnection
  - IP NNI requires an Interconnection SBC and additional call control capabilities and operations system support

AT&T Indiana U-verse Network

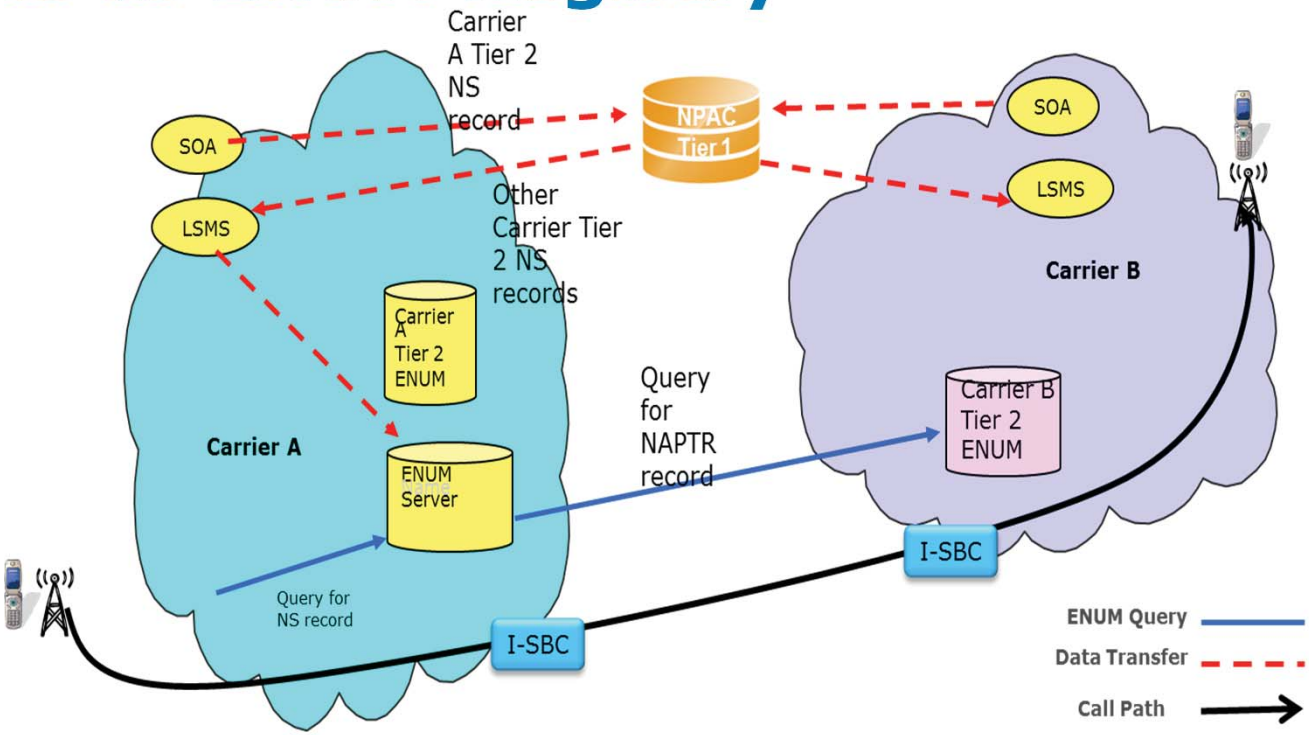


Why an ENUM Registry?

- Routing mechanisms must evolve beyond reliance on central office codes – a number conservation bottleneck
- Current bi-lateral data exchange won't scale, ill-suited to globalization
- ENUM technology is already deployed within many networks and in some interconnection arrangements



NPAC as ENUM Registry



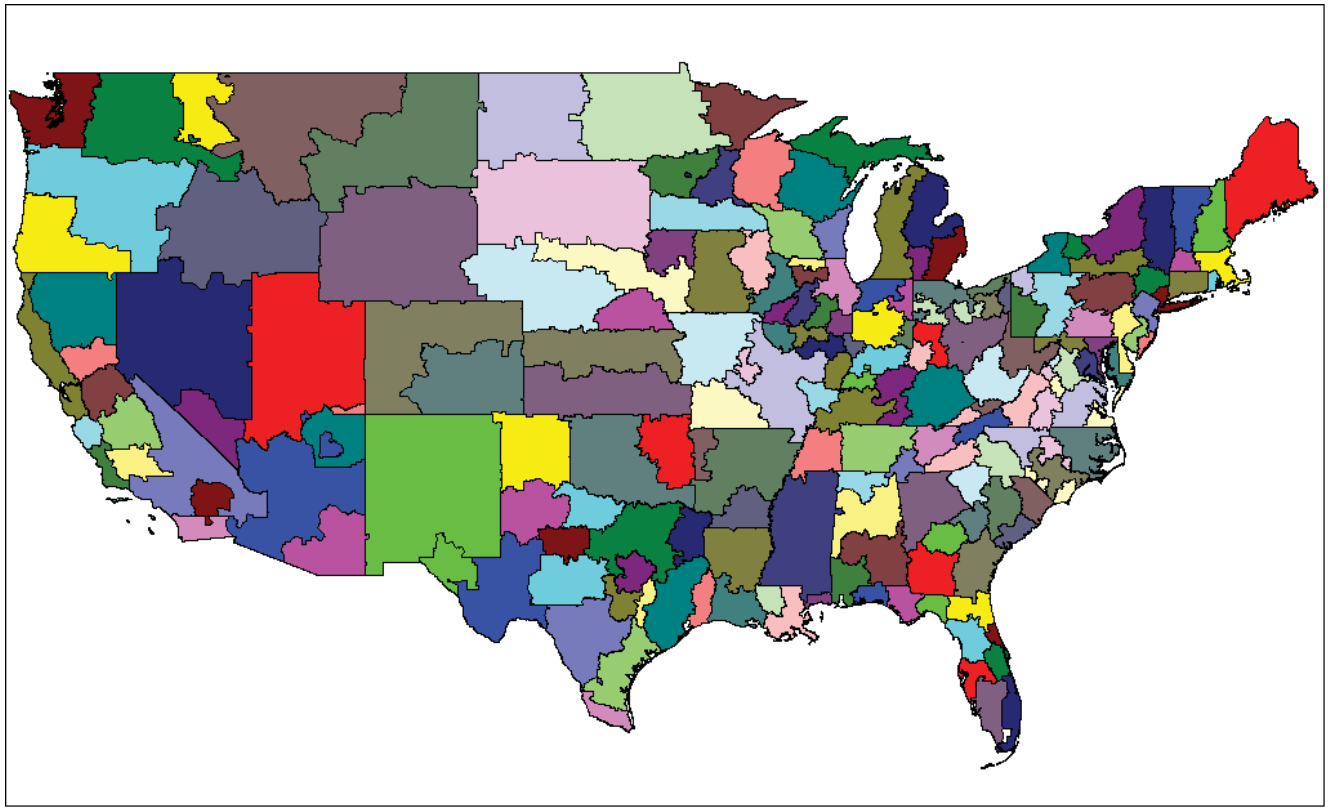
- NPAC capabilities can be used to instantiate a combined Tier 0/1 ENUM registry for the US
- Re-purpose Existing VOICEURI field is to contain NS record(s) which point to the Tier 2 ENUM server of the service provider of record for number
- Records are populated in NPAC by the serving provider SOA and distributed to each provider LSMS
- Providers then populate the NS records in their internal ENUM servers
- Originating provider queries its ENUM server and obtains the NS record resulting in a query to the Tier 2 ENUM server of the destination carrier.
- The response to the Tier 2 query provides NAPTR records that identify the ingress SBC to be used to deliver the call to terminating provider.

Evolution to IP Interconnection

- Will be deployed as an overlay alongside traditional interconnection
  - For AT&T, VoLTE will be biggest driver
- Adds greatest value where traffic is end-to-end IP which enables new services (e.g. video chat, instant messaging, file sharing) and better quality
  - Secondarily where traffic is already converted to IP for other reasons

Circuit Switched Interconnection Architecture

LATAs



- Must interconnect in each of almost 200 LATAs
- AT&T IXC has ~10K trunk groups to EO/ATs;
- AT&T Mobility has ~8K trunk groups to EO/AT/MSC
- AT&T ILEC has ~2500 trunk groups

IP Interconnection Will Be Different

- Not designed based on a system of implicit subsidies
- Driven by network efficiencies not regulatory mandates
- LATA structure outmoded
  - Relic of legacy technology and 30-yr old MFJ distinctions
    - Locally based switching and low capacity facilities
    - Local monopoly and competitive IXCs; service provider separation
- With VoIP in the cloud, notion of "local exchange" obsolete
- Internet interconnection, which involves orders of magnitude greater amounts of data is done in a handful of locations
- Industry discussions and current implementations reflect this topology (commenters in the record also support this)
- Should avoid inefficiencies that will cost consumers or divert investment dollars away from broadband deployment
- When interconnection is essentially national, state level regulation is impractical and unlawful

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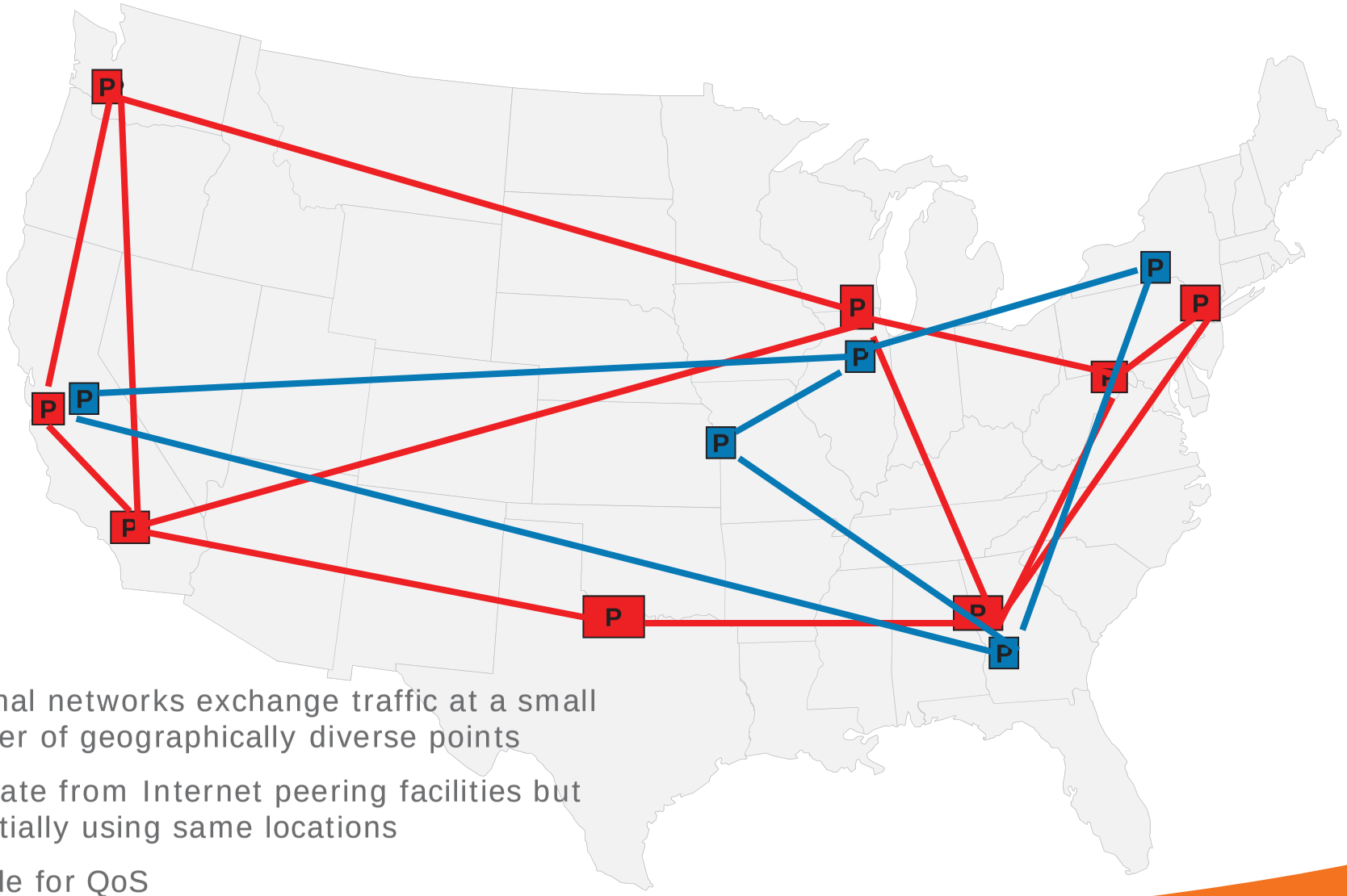
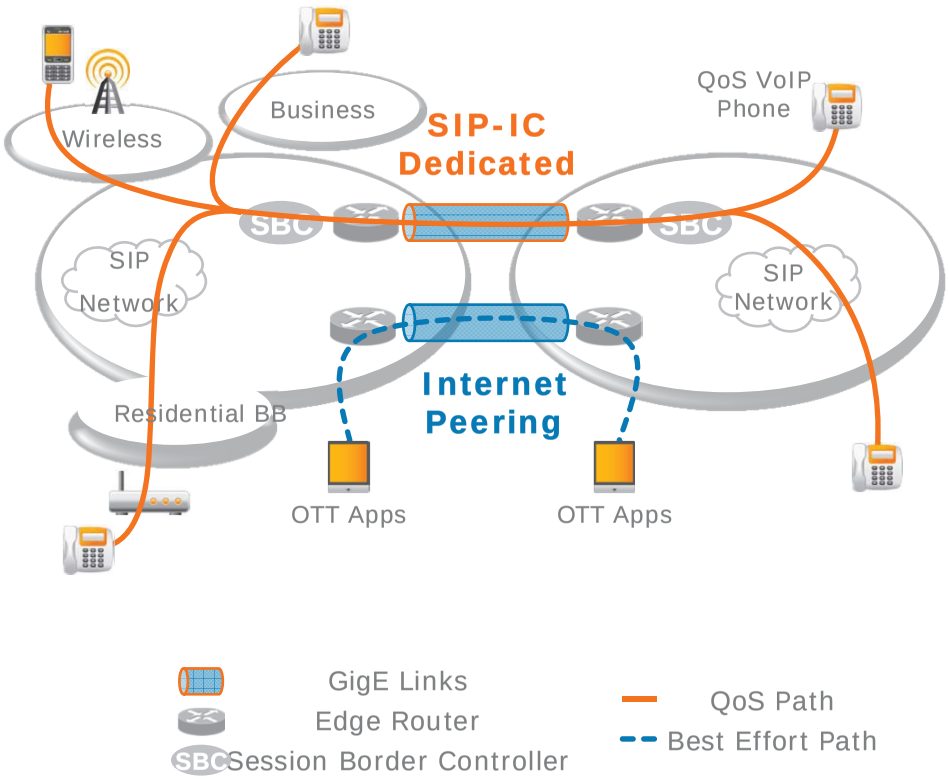
National Interconnection



- National networks exchange traffic at a small number of geographically diverse points
- Separate from Internet peering facilities but potentially using same locations
- Provide for QoS

Interconnection Structure



- Voice IP Interconnection is dedicated for SIP services with QoS support, separate from Internet peering
- Interconnect in 4-5 regions with two interconnects per region (target)
- Traffic exchanged will include transit traffic – not limited to traffic between each party's end users

Implications

- Efficient interconnection is national, not local
- Agreements will need to balance transport burden
- Internet does this by Peering/Transit combination
  - Peers similar in size and geographic scope
  - Smaller, localized entities purchase transit
  - Transit prices disciplined by competition
  - No terminating monopoly where indirect interconnection is available
- Should ignore local and LD traffic distinction - just as the Internet does
  - Jurisdictions largely irrelevant to retail services

AT&T IP Interconnection Development

- Implementing VoLTE interoperability (starting 2014)
  - Focus on bring new functionality to customers based on end-to-end IP
  - In discussions with other prospective VoLTE providers
  - Building the basis for a unified corporate IP interconnection capability
- AT&T is engaged in discussions with other providers about long-term and interim arrangements