Before the

Federal Communications Commission

Washington, D.C. 20554

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Establishing Just and Reasonable Rates for Local Exchange Carriers	)	WC Docket No. 07-135
	)	
High-Cost Universal Service Support	)	WC Docket No. 05-337
	)	
Developing an Unified Intercarrier Compensation Regime	)	CC Docket No. 01-92
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	
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	)	
Universal Service Reform – Mobility Fund	)	WT Docket No. 10-208

SECOND FNPRM COMMENTS OF THE

COALITION FOR RATIONAL UNIVERSAL SERVICE AND INTERCARRIER REFORM

These comments represent the views of the Coalition for Rational Universal Service and Intercarrier Reform (CRUSIR), a group of competitive service providers that has filed comments previously in these proceedings. We recognize the complexity of the issues at hand and then need for the Commission to complete its reform of intercarrier compensation, especially concerning VoIP.

Interconnection policies should in general be technology-neutral, evolving to adopt new technology. Today that often involves voice over IP. But that rarely travels over the Internet; we explain how the technology of PSTN VoIP usually isolates the traffic from the public Internet. The Internet itself not be regulated as if it were the Public Switched Telephone Network. The two are very different, and even the

presence of some telephone calls on the Internet does not make it part of the PSTN. We also repeat our previously held position that originating access should be phased out, and we point out that transport charges are as important as termination charges in computing net compensation.

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Originating Access

In our earlier Comments, we noted a number of problems with Originating Access and suggested that it be the *first* part of switched access to be removed. While the Commission has obviously not adopted this position, we nonetheless hold to the position that Originating Access be removed as expeditiously as possible, though we concede that certain exceptions may be acceptable for revenue-retention purposes.

One key problem with Originating Access is that it is billed inconsistently with Reciprocal Compensation. While the latter has a *sent-paid* termination fee, the former has as *collect* fee, in which the originating carrier charges the next recipient of the call. Because of this inconsistency, the distinction between a call subject to access charges and a call *not* subject to access charges is artificially important. This in turn places stress on the origination point of calls, and makes issues such as "phantom calls" more important. It is even more important in the VoIP context, where the signaling protocols and industry practices do not support the specific local/toll geographic distinctions that underlie Originating Access.

The Commission's Order did not even mention, let alone address, one very contentious issue, so-called "virtual NXX" (VNXX) traffic, nor did it address Foreign Exchange (FX) traffic. In the latter case, Commission policies adopted in the 1980s subjected *interstate* FX to Feature Group A access charges, though it recognized that "leaky PBX" trunks could also deliver such calls, and thus implemented a $25/DS0 "S25" surcharge on Special Access circuits that could be accused of leaking interstate calls into local exchange (not FGA) trunks. These are all obsolete vestiges of a system by which monopoly LECs were subsidized by contributory levels of switched access charges. Calls that "bypassed" switched access were thus subjected to alternative charges from the same monopolist. If the Commission wishes to move towards a bill-and-keep regime, then these charges should all be immediately discontinued.

VNXX in particular is an area where the controversy is over Originating Access. The purpose of VNXX is, in general, to make information services available on a local-rate dial-up basis to subscribers not physically located in the local calling area of the information service provider's point of presence. This is

especially important for rural subscribers, who not coincidentally are those most likely to be unable to have access to broadband services.

Some ILEC Interconnection Agreements, including the standard (boilerplate) offerings of the Bell carriers, explicitly treat VNXX as switched access, and impose *originating access* charges on *local* calls (as identified by NPA-NXX) made *to* VNXX numbers. This of course makes VNXX economically nonviable. Essentially no CLEC ever agrees to this charge, the rough equivalent of paying a taxi company their equivalent fare for all miles driven in one's own vehicle. Some very large CLECs (such as Level 3) have negotiated ICAs that waive this charge, sometimes in exchange for additional POIs. For several years, it was common for smaller CLECs to opt in to these ICAs. However, these ICAs are now past their expiration date. They remain in effect, in "evergreen" status, but most states do not require ILECs to accept opt-ins to them anymore. Thus new CLECs are at a material disadvantage compared to older ones. The restriction on VNXX thus raises no money; it is primarily a barrier to entry.

The other major use of Originating Access tariffs for VNXX is to simply put CLECs out of business by retroactively billing them for Originating Access on VNXX calls. A number of cases have arisen where the ILEC won judgments against a CLEC who used VNXX without explicit permission in its ICA. Again, there was rarely actual revenue raised from this; the CLEC simply shut down its operations. Prices for mass-market information services simply cannot cover *any* originating access charges.

Originating Access should thus be immediately discontinued for all calls *except* for Equal Access trunks. In this case, the IXC is ordering an Access service and its customers are aware that they are making toll calls, whether they are paying by the minute or by the month. Such charges may be phased out at the same rate as terminating access. These no doubt represent the bulk of actual originating access minutes; however, they represent only a small fraction of the *legal costs* of disputes over them. The loss of revenues to PCCs will be small enough that their overall profits will barely be impacted; they currently

make returns well over the 11.25% rate. In the case of small RoR carriers, the loss of originating access revenues should be treated the same as terminating access revenues are treated.

8YY Service

Current policy is that the closed end of reversed-charge (8YY) service is treated as originating access, even though it is actually terminating the call, while the open end is treated as terminating access. The logic of this is straightforward: The closed end, the recipient of the call, has the choice of carrier, and thus is more subjected to competitive forces. The so-called "terminating monopoly" of sent-paid calls is an originating monopoly to 8YY calls.

There is thus no need to change this policy. All but incidental-volume 8YY traffic already bypasses LEC switches, so the closed end is not subject to any switched access charges. The open end can still be subject to terminating access, phased out with other terminating access charges. While local and toll intercarrier compensation charges should be unified, rather than distinguishing between local, toll, CMRS, VoIP, etc., the applicable rate, unified or not, should be charged in reverse for these calls, reflecting the responsibility for payment.

Transport and Points of Interconnection

Intercarrier compensation includes both transport and termination charges. While the Commission's most recent *Order* in this proceeding specified new termination charges, these reforms can be rendered moot if transport issues are not carefully settled.

A simple fact is that an ILEC has a very low incremental cost of transport within its own service areas, typically within a LATA or Study Area and often far beyond that. Competitive carriers usually face a higher cost of transport. Because termination charges are capped for all carriers, supracompensatory transport charges have the effect of harming competitors and benefitting incumbents.

But it is not just the price of transport but the location of the Points of Interconnection that are critical. An "edge" that is far from a CLEC's operations can be very costly for the CLEC to reach. Many of today's agreements comport with current rules and allow the POI to be at any point in the incumbent's network. But if the CLEC is instead required to meet at, say, a tandem switch, not in its own area, then the cost of providing even local service will become prohibitive, especially if the CLEC has to pay a high transport charge such as Special Access in order to meet the edge. Thus it is necessary to preserve the CLEC's right to choose "any point" in the ILEC's network for interconnection. The single POI per LATA rule should be retained. While one large carrier (CenturyLink, cited at 1318) calls for the number of POIs to increase with the volume of traffic, this is unnecessary: A single POI can have multiple trunk groups groomed onto it, with its traffic divided between multiple switches, without requiring multiple physical POIs. Neither multiplexing (TDM or IP) nor transport (TDM or IP) is particularly costly to an ILEC.

Transport rates

The unification of switched access and reciprocal compensation charges also requires that access transport rates be brought into line with reciprocal compensation rates. At present, trunks that carry switched access calls between an access tandem switch and a CLEC POI are tariffed as switched access transport, even though local trunks are generally not charged. These "meet point" trunks should be treated as reciprocal compensation trunks in the future, as they will no longer produce the CABS (access) revenue that has supposedly covered their cost. This change could be made rapidly; it should at worst be phased in no more slowly than the reduction in end-office compensation rates.

To the extent that carriers deserve compensation for transport, this should be provided at cost-based rates. The current access tariff rates are essentially arbitrary and far above cost. Special Access in particular is far in excess of cost, albeit subject to separate proceedings at the Commission, and its scope should not be

increased by requiring additional POIs. Switched Access transport rates are likewise arbitrary, based on the recovery levels of the CALLS plan, not actual costs.

Rural ILEC POIs pose special problems. Many CLECs need to exchange traffic with them, but are not always physically located within their service areas. When CLECs do have a physical presence in the rural ILEC's serving area, they often connect directly at the wire center, as with any other carrier. Otherwise, the only available transport to establish direct interconnection is usually Special Access. Even if only small fraction of the meet-point circuit's mileage is in the rural LEC's turf, the entire circuit is Special Access; a price cap ILEC with the preponderance of the mileage thus makes a windfall profit from these circuits.

However, in many cases the rural ILEC subtends a large ILEC's tandem, and at least some level of transit connectivity via that tandem is usually permissible. Most current ILEC interconnection agreements allow local-traffic transit to any one carrier to be capped at the level of one DS1's worth of traffic (about 300,000 minutes/month), though this has not been strictly enforced in recent years. No such limit applies to CMRS traffic or access traffic. These transport rules should be unified.

A broader question concerns the problem of LATAs with multiple carriers in them. For the most part, ILECs operating in proximity to one another have traditionally operated as a unified network with multiple owners (a catenet). Meet-point billing of toll calls has fit this model. However, local interconnection rules were designed with the apparent assumption that a single metropolitan area or CLEC service area would have only a single ILEC. Thus intercarrier issues between a CLEC and multiple ILECs are far more complex than between a CLEC and a single ILEC. This is especially important with regard to interoffice transport. We see no reason why Special Access transport should suddenly come into play just because two or more ILECs operate in close proximity to one another. Unified transport should not be limited to a single ILEC's service area.

Voice over IP

Before answering specific questions in the *Further Notice*, we would like to clarify a number of issues concerning the Internet, Voice over IP technology, and how the two relate to one another. The FNPRM appears to be based on a number of assumptions that are simply not true, and in turn it raises issues that should not and need not be raised at all. In particular, it conflates the Internet with VoIP, and suggests literal regulation of the Internet backbone itself on grounds that it is part of the new IP-enabled PSTN. This is simply not true. The Internet thus should not be subject to new regulation based on the evolution of the PSTN.

"Voice over IP" is a label applied to a range of technologies and services. What they have in common is only one detail, the use of a particular packet-switched multiplexing header at one layer of their protocol stack. And even that is vague, inasmuch as IP has two incompatible versions (IPv4 and IPv6). Hence VoIP can apply to many things, some of which include:

1. VoIP trunking, in which a dedicated trunk circuit between two telephone switches is multiplexed asynchronously using IP headers, rather than synchronously. This is commonplace, and was described as "VoIP in the middle" in earlier Commission decisions. The availability of this option for use between carriers is the putative basis for much of the instant proceeding.
2. VoIP switching, in which an analog telephone line is converted to IP within the carrier's network, switched locally as IP, and turned back to non-IP form for delivery. This is done in some central office switches, and in some cases, carriers claim that their contractual (e.g., UNE-P replacement services) or regulatory obligations are waived as a result, even though the call is carried as IP only within a room, and never hits the Internet or any other network.
3. Dedicated customer access line multiplexing using IP over separate lower layer channels. In this case, a service provider offers both voice and data services (such as Internet) over a single physical facility, multiplexed at a layer below IP. The voice traffic is never carried over the

public Internet. This permits the voice traffic to be isolated from traffic-based losses (congestion), providing higher quality of service. PacketCable, the most common retail form of VoIP, is an example. Many CLECs provide dedicated service via DSL, high-capacity loops, and EELs this way too.

4. Intercarrier exchange of calls between providers using IP across the public Internet.
5. Customer access line multiplexing using IP across the Internet to access the PSTN via a CPE gateway. This is the “over the top” method popularized by Vonage. This was predicted by Commissioner Furtchgott-Roth in his dissent to the 1998 *Report to Congress* where he noted,

> The results of rules based on this framework are easy to predict. A new market for IP phones will spring up and replace today's phone-to-phone IP telephony service, which relies on remote "gateways" to make the voice-to-IP conversion. The proposed rules simply would force the conversion to IP packets further out in the network, from a limited number of gateways to all CPE.

What stands out from this list of five examples of VoIP is that only the latter two actually make use of the Internet itself. The fourth case, intercarrier VoIP across the Internet, is in fact very rare: The Internet does not reliably provide the quality of service needed for high-quality telephony, nor was it designed to, especially when packets are passed between ISPs at public peering points.

The preponderance of intercarrier VoIP (case 1 above) is carried over dedicated links, not the public Internet. The most common method of doing this makes use of MPLS or a similar shim layer to provide the necessary QoS and isolation, unless the link is dedicated to VoIP only. It also makes use of a Session Border Controller (SBC), an application-layer relay device which passes telephone calls *as* VoIP sessions *between* two IP networks *without* otherwise passing IP packets between the two and thus compromising their security.

Thus when carriers pass calls to each other in the future using VoIP instead of SS7-signaled TDM, their links will rarely if ever cross the Internet. The calls will typically pass over dedicated links (case 1), and thus will not look much different from today's TDM trunks except for the actual line protocol in use. If the carriers are not collocated and packet-switched facilities are needed between the carriers' respective locations, they will almost certainly be isolated from the Internet at a lower layer (case 3).

For this reason, all of the Commission's questions about Internet backbone peering should be dismissed as irrelevant, and the Commission should not attempt to claim any authority over the peering that constitutes the Internet backbone. The Internet's own unregulated, voluntary mechanisms have worked exceptionally well, free of the regulatory friction that necessarily characterizes the PSTN and regulated common carrier services. The Internet is not itself a common carrier service, and thus does not fall under Title II; rather, it is payload often carried by Title II carriers. The presence of a small amount of PSTN-bound traffic (cases 4 and 5) should not be used as a pretense to regulate the Internet as part of the PSTN. The Commission should limit the scope of this proceeding to PSTN calls themselves, not media which may merely incidentally carry some calls.

We also take issue with the notion (at 1338) that the Commission "has chosen" not to exercise authority over ISP to ISP peering. Since ISPs are not common carriers, their peering is outside of the purview of Title II, and a claim of authority over their behavior would be a stretch of the Commission's authority, as well as a needless attempt to regulate something that has worked well on an unregulated basis. Since ISPs are not common carriers, should any anticompetitive behavior occur among them that was not directly the result of common carrier issues, then the Federal Trade Commission would be the most likely federal body to deal with the issue.

This general rule answers many questions in the *Further Notice*. For example, the Commission asks [at 1347] if non-voice IP interconnection should be covered, citing a Google Comment. However, Google's cited Comment was referring to carriers "insofar as they are engaging in transport of

telecommunications". Transport is a lower-layer function, well within the Commission's regulatory purview; IP interconnection is a higher-layer function. Indeed the Commission's current policies limiting *access* to broadband telecommunications facilities are highly anticompetitive and should be revisited, but may be beyond the apparent scope of this proceeding. But then so is IP-IP peering.

Technology Neutrality

The Commission observes (at 1342) that Section 251 is technology neutral. This does pose problems for any policy that seeks to encourage IP to IP interconnection, or an evolution of the PSTN to "all IP", that does so by favoring IP technology over other competing technologies. Certainly there has been some market motion in the direction of wider use of IP. However, that does not imply that such trends will continue until IP carries 100% of PSTN traffic.

There are at least two alternative scenarios. One is that some legacy TDM will remain in place, noting that its costs too have fallen (when implemented using modern equipment, not 1980s vintage legacy gear), and it performs very well in many applications. A second is that some other technology will come along that is even better than IP. Given that IP was developed in the 1970s and was never intended to carry telephony, it is quite reasonable to assume that some future technology will be able to outperform it. Should regulatory policy favor IP simply because it is the *protocol du jour* during this proceeding, it will have the unfortunate and perhaps illegal effect of locking in old technology and preventing further progress.

There is also some question about defining just what constitutes "IP". The Internet Engineering Task Force is a voluntary organization that promulgates "Requests for Comment" and what sometimes are referred to as standards, but it is not a governmental organization and does not follow rules of the Administrative Procedures Act. Indeed it has been suspected at times of favoring certain vendors, if only because some vendors are able to send larger delegations to its meetings and devote more time to its efforts. Hence it cannot be used as an authoritative source of specifications that carry a regulatory

benefit. "IP" for regulatory purposes must be interpreted very loosely, essentially as *synecdoche* for any packet-switched network protocol capable of large-scale multi-operator high-volume network interconnection. Any protocol that is a functional superset of today's "IP" should thus be afforded the same benefits that apply to IP. This does not however mean that carriers should be obligated to support any specific protocol based on one party's request; intercarrier interconnection must necessarily make use of protocols that are commonly available to both parties at the time of the request.

Physical POI locations

The Commission suggests that IP requires fewer Points of Interconnection than TDM. This is not true. IP and TDM are merely multiplexing techniques. A circuit can be multiplexed using TDM, ATM, Frame Relay, Ethernet, IP, or something else, and it's still a circuit. This confusion may result from the fact that the Internet, a prototype network using IP, makes use of fewer POIs (peering points) than the PSTN. But this is caused by historical factors and regulatory decisions, not the technology itself.

In the case of the Internet, the original notion was that there would be many separate networks, each well-connected internally, which would exchange traffic with other networks at some limited number of points. This was in fact the rule for many years, especially before Internet access became an important public offering. So peering evolved to make use of a small number of private links and a small number of multi-provider traffic-exchange sites. This may or may not be economically ideal from a traffic perspective. However, the Internet's current *routing* protocols do not scale well.

All backbone routers essentially know about links between *autonomous systems* (routing domains, equivalent to an ISP or a customer of multiple ISPs) or IP address blocks around the world. If a business in say the (former Soviet) Republic of Georgia requires, for reliability, a connection to two ISPs, and has its own provider-independent IP address block, then every backbone ISP in the State of Georgia, like everywhere else, acquires routing table entries (via BGP). Backbone routers today are thus flooded with

roughly half a million routes. Additional connections would make this problem worse. IP version 6 exacerbates this, both by allowing more address blocks and by making each address four times as long.

The PSTN works differently. Its naming and addressing space (telephone numbers are used for both purposes, though the distinction is not always obvious) is hierarchical. International calls are routed by country. Within the United States, the network is divided into LATAs, which are to be sure an artifact of the early 1980s. PSTN handoff is generally on a per-LATA basis, with some interconnection agreements requiring even more granular handoff. When multiple ILECs serve a LATA, separate POIs are often required. The number of POIs may indeed be excessive; these can be anticompetitive. However, a key distinction is that the PSTN does not have an equivalent of BGP. Final routes are specified in the LERG and high-usage routes are privately negotiated. This is in practice a more stable, if inflexible, arrangement.

Changing protocols to IP makes no difference. LATA-scale interconnection, both final and high-usage, can use IP over dedicated circuits or TDM over dedicated circuits. These circuits can also be derived via multiplexing from larger facilities. In such cases, VoIP traffic will almost certainly be isolated from the global Internet. And the networks will be isolated by SBCs, which will relay calls as discrete entities. Other IP traffic will not cross over the same path. Thus Internet and PSTN will remain separate, even if IP is used for both. It is critical, though, that small rural carriers, including CLECs, not be required to haul their telephone traffic to a distant Internet peering point.

IP interconnection rates

The Commission asks about the appropriate basis for VoIP interconnection rates. Here the basic distinction between Internet and the PSTN must be noted. The Internet is a voluntary agreement among private network operators. The PSTN operates on a very different basis, with mandatory interconnection and a universal service obligation. Thus Internet peering rates are not an appropriate basis for IP-based PSTN interconnection rates, even though they superficially share the use of the same multiplexing header

(IP) at one layer of the protocol stack. That is a mere artifact; they are fundamentally different. This difference remains even if calls happen to traverse the public Internet at some point. By the same token, IP-based PSTN interconnection is still PSTN interconnection, not Internet.

In practice, most PSTN IP-based voice interconnection uses dedicated facilities, not the public Internet. These facilities might be derived via MPLS paths, ATM paths, TDM channels, or any other suitable multiplexing protocol. The point of technology neutrality is to make these decisions on the basis of good engineering practice, not regulatory favoritism.

Thus the starting point for IP-based voice interconnection *between PSTN carriers* should be the rate for TDM-based interconnection, adjusted to take into account the difference in cost between their respective interfaces. The difficulty today is that PSTN interconnection rates are extremely complex. Per-minute usage charges vary with the type of call. Per-mile transport charges vary based upon the type of call and the state/federal jurisdictional split Port charges vary depending upon the type of carrier. Thus it is incumbent upon the Commission to simplify intercarrier compensation for all types of calls.

It should be noted that capacity-based billing (the number of trunks) can apply equally to IP as to TDM. In the case of IP, interconnection is typically effected via a Session Border Controller, which relays each call as an application, and keeps track of every call. Thus carriers can simply sell a number of simultaneous calls of capacity across a lower-layer facility, using their SBCs to enforce the limit.

Full deregulation of IP-handled calls

Taking advantage of the confusion between IP the technology and the Internet as a business model, certain parties (notably AT&T Inc.) have requested complete deregulation of IP-based interconnection. This would go so far as to remove the mandatory-interconnection (universal service) policy that distinguishes the PSTN, overturning the century-old Kingsbury Commitment made by an AT&T predecessor company.

This is clearly a bad idea. Once again, multiplexing headers should not dictate policy. Some ILECs including AT&T want total deregulation in order to exercise the type of market power they retained by having inherited the pre-1996 monopoly plant, but which has been restrained by regulation. Absent regulation, ILECs would likely charge smaller local competitors to send *and* receive calls, or even deny them interconnection entirely. This must not be allowed. Mandatory PSTN interconnection at regulated default rates should remain in place even as the network makes its next evolutionary step.

PSTN rates were not deregulated when the network evolved from using manual switchboards and voice-frequency trunks to FDM trunks with decadic signaling, to FDM and TDM trunks with MF signaling, to CCIS and SS7 signaling over all-digital facilities. The evolution to IP signaling is just another example of new technology causing old equipment to be obsolete. It need not dictate the business model, or, especially, be used as an excuse for anticompetitive behavior.

Section 251 interconnection

The Commission asks (at 1381), " …whether the provisions of section 251 interconnection are also service neutral, or do they vary with the particular services (e.g., voice vs. data, telecommunications services vs. information services) being exchanged?"

This can be easily solved by taking a layered approach, as was the norm before 2005. Section 251 addresses physical facilities that are used for telecommunications. Information services are carried within the payload of telecommunications, at a higher layer. Thus the nature of the ultimate payload (telephony, Internet access, private data network, etc.) should not be relevant to the provision of network elements, as the key obligations of PSTN operators are to provide telecommunications services and the facilities that support them. But service-specific obligations of Section 251 are, in contrast, technology-agnostic. It follows that a service, such as PSTN telephony, provided over IP is still PSTN telephony, and Section 251 obligations still apply.

One-way voice services

The Commission asks if call signaling rules can be applied to one-way VoIP services. If so, how should calls be identified for charging purposes if the originating station does not have a PSTN number?

A simple answer is the most correct one here: Rates charged by a PSTN carrier for a call should not depend upon the origin of the call, but only upon the POI where the call is handed off, as that is where the cost is incurred. The Commission's reform of intercarrier compensation phases this concept in gradually, with intrastate and interstate access rates unified by 2013 followed by the *possible* unification of reciprocal compensation (transport *and* termination) with switched access. Hence the long-run answer is that origin should be irrelevant. Thus the Commission should not order a complex set of protocol and operational changes merely to capture this temporarily-relevant distinction. If there is no PSTN number, the call can simply be charged based upon the PSTN number assigned to the gateway.

Respectfully submitted for the Coalition for Rational Universal Service and Intercarrier Reform

By its consultant,

Fred Goldstein
Ionary Consulting
PO Box 610251
Newton MA 02461