

**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 a Unified Intercarrier Compensation Regime)	CC Docket No. 01-92
)	
Federal-State Joint Board on Universal Service)	CC Docket No. 96-45
)	
Lifeline and Link-Up)	WC Docket No. 03-109
)	
Universal Service Reform – Mobility Fund)	WT Docket No. 10-208

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COMMENTS OF COMCAST CORPORATION

Comcast Corporation (“Comcast”) and its affiliates hereby submit these comments in response to the Report and Order and Further Notice of Proposed Rulemaking released by the Federal Communications Commission (“FCC” or “Commission”) in the above-captioned proceeding.¹

¹ *Connect America Fund; A National Broadband Plan for Our Future; Establishing Just and Reasonable Rate for Local Exchange Carriers; High-Cost Universal Service Support; Developing a Unified Intercarrier Compensation Regime; Federal-State Joint Board on Universal Service; Lifeline and Link-Up; Universal Service Reform – Mobility Fund, WC Docket Nos. 03-109, 05-337, 07-135, & 10-90, GN Docket No. 09-51, CC Docket Nos. 96-45 & 01-92, and WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, FCC 11-161, 54 Comm. Reg. (P & F) 637 (rel. Nov. 18, 2011) (“Order” or “Further Notice” or “Order and FNPRM”).*

I. INTRODUCTION AND SUMMARY

The Commission's broad initial reforms to the intercarrier compensation ("ICC") regime were designed to modernize an outdated system that led to inefficiencies, wasteful arbitrage, and competitive distortions.² In adopting additional reform measures, Comcast urges the Commission to continue to focus on promoting efficiency, encouraging a competitive marketplace, and avoiding the imposition of new distortions.

With respect to originating access traffic, the Commission should not burden consumers by permitting incumbent local exchange carriers ("LECs") to recover revenues from the Connect America Fund ("CAF") or the Access Recovery Charge ("ARC") based on originating access minutes destined for an affiliated entity. The Commission also should avoid putting additional pressure on the CAF by beginning the transition for 8YY traffic after the transition plan adopted in the Order has been completed. Further, the Commission should ensure that incumbent LECs are required to provide at just and reasonable rates vitally important tandem transit services that Comcast and other voice competitors need to exchange traffic with rural carriers as well as each other. Finally, the Commission should adopt an ICC transition for transport rates that deters mileage-pumping arbitrage schemes.

With respect to its other ICC reform efforts, the Commission should permit carriers to rely on both tariffs and interconnection agreements during and after the transition. Requiring every originating voice provider to execute an interconnection agreement with every other voice provider that may terminate the originating provider's traffic would be impractical. The Commission also should eliminate CAF support for reduced ICC revenues over time. Permitting

² See, e.g., *id.* ¶ 9.

carriers to continue receiving replacement support indefinitely, even after such funding is no longer necessary, would distort the competitive playing field.

Turning to the Further Notice's questions about whether the Commission should regulate IP-to-IP voice interconnection or the interconnection arrangements through which broadband networks exchange traffic on the Internet "backbone," Comcast submits that the agency should take neither step. Regulation of IP-to-IP voice interconnection is premature and is likely to be counterproductive with far-reaching consequences. Moreover, as the questions in the Further Notice itself illustrate, regulation of IP-to-IP voice traffic, unhelpful in itself, could easily slip into broader regulation of the Internet backbone.

Regulation of the Internet backbone, whether deliberate or unwitting, would be an unwarranted and dramatic departure from the Commission's consistent policy of promoting growth and innovation by maintaining an Internet unfettered by federal or state regulation. Importing even portions of the legacy PSTN interconnection framework into the peering and transit arrangements that parties have developed in the Internet backbone marketplace would risk serious distortions of that vibrant ecosystem. The consequences would likely be fundamentally at odds with the Commission's and the Administration's goals for broadband deployment and adoption throughout the United States and inconsistent with the principles of Internet non-regulation that the United States has advocated around the world.

II. INTERCARRIER COMPENSATION REFORMS FOR ADDITIONAL RATE ELEMENTS SHOULD MINIMIZE THE BURDEN ON CONSUMERS AND PROMOTE COMPETITION

The Commission should design its ICC reforms for additional rate elements, such as originating access charges, in a manner that is intended to bring "substantial benefits to

consumers” and prevent marketplace distortions.³ Consistent with these overall goals, the Commission should adopt a transition plan that over time will move the existing compensation scheme to a more efficient regime.

A. Traditional Originating Access Traffic

The Commission should adopt its proposal to establish a multi-year transition schedule for gradually converting non-8YY originating access charges for both TDM and VoIP-PSTN traffic to a bill-and-keep regime.⁴ Such a transition will advance the Commission’s goal of “minimiz[ing] disruption to consumers and service providers by giving parties time, certainty, and stability as they adjust to . . . a new compensation regime.”⁵ While Comcast takes no view regarding the precise duration of this transition for non-8YY traffic, the Commission’s transition plan, at a minimum, should have two specific attributes.

First, the Commission should adopt a national, uniform transition plan for both interstate and intrastate originating access charges.⁶ The Commission’s Order highlighted the importance of national uniformity in reforming terminating access rates, correctly concluding that “[p]roviding a uniform national transition and recovery framework, to be implemented in partnership with the states, will achieve the benefits of a uniform system and realize the goals of reducing arbitrage and promoting investment in IP networks as quickly as possible.”⁷ These findings are no less true with respect to originating access.

³ *Id.* ¶¶ 9, 648.

⁴ *Id.* ¶ 1299.

⁵ *Id.* ¶ 798; *see also id.* ¶ 801.

⁶ *See id.* ¶ 1302 (questioning whether the Commission “should initially defer the transition to bill-and-keep for originating access to the states to implement”).

⁷ *Id.* ¶ 792; *see also id.* ¶¶ 790, 793.

Second, as suggested in the Further Notice,⁸ the Commission should not permit incumbent LECs to recover revenues from the CAF and ARC based on originating access minutes of use destined for an affiliated entity. In those instances, originating access charges are more of “an imputation” than “a real payment.”⁹ In any event, the incumbent LEC’s affiliate will clearly realize a reduction in its access charge “payments.”¹⁰ Prohibiting incumbent LECs from receiving CAF and ARC revenues based on originating access minutes destined for affiliated IXCs would avoid a needless additional burden on consumers.¹¹

B. 8YY Traffic

With respect to 8YY originating access traffic, Comcast recommends that the Commission adopt a plan that is consistent with the measured transition that it implemented for traffic covered by the Order. Specifically, Comcast proposes that the Commission commence the transition for TDM-originated and terminated (“TDM-originated”) 8YY traffic in two phases. First, no later than six months after the effective date of the order adopting this transition, the Commission should reduce originating intrastate access charges assessed on TDM-originated 8YY traffic by fifty percent of the difference between the intrastate rate and the interstate rate. One year later, the Commission should reduce originating access charges assessed on this traffic to interstate levels. At that point, both TDM and VoIP-originated intrastate 8YY rates will be set at interstate levels. Once this parity is achieved, it must be maintained for the duration of any

⁸ *Id.* ¶¶ 1300-1301.

⁹ Comments of the Coalition for Rational Universal Service and Intercarrier Reform, WC Docket No. 10-90, at 11 (Aug. 23, 2011).

¹⁰ *See, e.g.*, Comments of the Missouri Public Service Commission, WC Docket No. 10-90, at 13 (Aug. 24, 2011) (“Such instances highlight how the financial impact to the parent company is minimized by the off-setting impacts.”).

¹¹ Order and FNPRM ¶ 1301 (seeking comment on how to minimize the consumer burden related to the originating access transition).

further transition of 8YY rates. As the Commission has noted, a system that promotes varying rates can create “incentives for arbitrage and pervasive competitive distortions within the industry.”¹²

The Commission, however, should defer a decision on a final transition plan for such traffic until after the transition for terminating traffic for all carriers has been completed – July 1, 2020. This approach will enable the Commission to take into account the impact of its initial ICC reforms on consumers and carriers in assessing whether additional changes for TDM and VoIP-originated 8YY traffic are needed. It bears mention that if the Commission ultimately decides to move to a bill-and-keep system for such traffic, that change likely will raise novel legal and policy questions for the Commission and the industry. For example, in contrast to terminating access traffic, the end user of the originating voice provider is not the “customer” of the 8YY service. Rather, the customer is the subscriber to the IXC to which the originating traffic is routed. Moreover, whereas voice traffic exchanged between carriers on a bill-and-keep basis frequently is roughly balanced, originating 8YY traffic only flows in one direction.

As Comcast asserted above with respect to non-8YY originating access traffic, incumbent LECs similarly should not be permitted to receive replacement revenue from the CAF or the ARC for 8YY access traffic destined for an affiliated entity. With this recovery revenue limitation in place, consumers will benefit from Comcast’s prudent approach to the treatment of 8YY traffic, because the extended transition for 8YY originating access charges will prevent consumers from immediately being asked to assume a significant financial burden. Moreover,

¹² *Id.* ¶ 791.

because 8YY traffic is not susceptible to uneconomic arbitrage schemes, there is little risk that the transition proposed by Comcast would lead to new forms of “traffic pumping.”¹³

C. Tandem Transit Services

The Commission has acknowledged that it would be highly inefficient and cost-prohibitive for competitive facilities-based carriers to establish direct connections with each and every rural, competitive, and wireless carrier operating throughout the nation without regard to the volume of traffic exchanged with those providers.¹⁴ Comcast, like other voice providers, establishes indirect connections with smaller service providers, largely through tandem switches operated by incumbent LECs.¹⁵ Comcast also subscribes to the tandem switching services offered by competitive providers, but those services to date are not able to provide ubiquitous termination to end users served by every voice provider in the country. Consequently, Comcast and other service providers must rely on incumbent LECs to furnish these essential indirect interconnection arrangements.

Tandem switched transit service is a voice service that is very different from transit services that are used to provide connectivity and redundancy among Internet service providers (“ISPs”). Because of the hierarchical architecture of the legacy PSTN, tandem switched transit service is necessary to enable voice providers like Comcast to interconnect indirectly with incumbent LECs and others for the delivery of non-toll traffic destined for consumers on their

¹³ See, e.g., Joint Comments of AT&T, CenturyLink, FairPoint, Frontier, Verizon, and Windstream, WC Docket No. 10-90, at 22 (Aug. 24, 2011) (“[T]he majority of past and current arbitrage schemes involve terminating traffic, and the ABC Plan’s reforms of terminating charges – along with Commission action to address phantom traffic and traffic/mileage pumping – will eliminate most of those schemes.”).

¹⁴ See *Developing a Unified Intercarrier Compensation Regime*, Further Notice of Proposed Rulemaking, 20 FCC Rcd 4685, ¶ 126 (2005) (“2005 ICC FNPRM”).

¹⁵ Comcast typically obtains access to tandem transit service from incumbent LECs through interconnection agreements negotiated and arbitrated under 47 U.S.C. §§ 251 and 252.

local networks. Moreover, as noted, tandem switched transit service needed to reach a particular carrier frequently is only available from a single incumbent LEC. Transit arrangements among ISPs, in contrast, enable providers to obtain access to any point on the World Wide Web and are offered by scores of competing firms.

The record contains substantial evidence of concern about the risk of unreasonable pricing of tandem transit services by incumbent LECs, including the possibility that incumbent LECs would increase transit charges in an effort to recover revenue reductions caused by terminating access reform.¹⁶ The Commission, therefore, should confirm that incumbent LECs have an obligation to provide transit services and should establish a clear default rate methodology and transition for these services. In doing so, the Commission will ensure that a critical input is made available to voice providers at just and reasonable prices, consistent with the overall goals of the Commission's ICC reform plan.

When the terminating service provider owns the tandem switch, the Commission should establish bill-and-keep as the default end-point methodology for transit services, as it did for tandem switching and transport services. The Commission has concluded that "transit is the [non-access] functional equivalent of tandem switching and transport."¹⁷ In the Order, the Commission adopted a bill-and-keep methodology as the end point for all tandem switched

¹⁶ See, e.g., Comments of Cbeyond, Inc., Integra Telecom, Inc., and tw telecom inc., WC Docket No. 10-90, at 20 (Apr. 18, 2011) (AT&T offers competitive LECs tandem transit service at two-and-a-half times the legacy BellSouth's average TELRIC rate for tandem transit service and legacy Qwest offers competitive LECs tandem transit service at more than three times Qwest's average TELRIC rate for tandem transit service); see also Comments of Cox Communications, Inc., WC Docket No. 10-90, at 14 (Aug. 24, 2011) (incumbent LECs' tandem transit pricing where TELRIC rates are not required is indicative of incumbent LECs exploiting market power); Letter from Charles W. McKee, Sprint Nextel Corp., to Marlene H. Dortch, FCC Secretary, WC Docket No. 10-90, at 2 (Oct. 3, 2011) (if transit and other transport rate elements are left unregulated, "there would be no limitation on the ILECs' ability to increase charges for these other rate elements, while 'reducing' rates for termination").

¹⁷ Order and FNPRM ¶ 1311.

transport¹⁸ and established a transition to bill-and-keep for transport and termination within the tandem serving area where the terminating price cap carrier owns the tandem switch.¹⁹

Accordingly, the Commission should adopt the same bill-and-keep methodology and phase-in period for transit services which carry local traffic.²⁰

When the incumbent LEC owner of the tandem switch is not the terminating service provider, the Commission also should adopt a methodology that ensures the availability of reasonably priced tandem transit services. The Commission clearly has authority over this form of transit pursuant to section 251(c)(2) of the Communications Act of 1934, as amended (the “Act”).²¹ Indeed, numerous state public utility commissions and courts have found that section 251(c)(2) imposes transiting obligations on incumbent LECs.²² Accordingly, the Commission

¹⁸ *Id.* ¶ 819; *see also id.* ¶ 1307 (“We agree that [tandem switching and transport services] must be transitioned to bill-and-keep at the end state, as required by the Order, and seek comment on the final transition to bill-and-keep for these charges.”).

¹⁹ *Id.* ¶¶ 801, 819; 47 C.F.R. §§ 51.907(a), (g), and (h).

²⁰ *See* 47 C.F.R. §§ 51.907(a), (g), and (h).

²¹ 47 U.S.C. § 251(c)(2). Although the Commission’s rules define interconnection to exclude the transport and termination of traffic, 47 C.F.R. § 51.5, the Supreme Court confirmed that this exclusion refers only to the ultimate connection to the end user and that carrier-to-carrier transport is not excluded from the definition. *See Talk America v. Michigan Bell Tel. Co.*, 131 S.Ct. 2254, 2263 (2011) (“The [FCC’s definition of interconnection] cannot possibly mean that no transport can occur across an interconnection facility, as that would directly conflict with the statutory language. . . . The very reason for interconnection is the ‘mutual exchange of traffic.’”).

²² *See, e.g., Southern New England Tel. Co. v. Perlermino*, No. 3:09-cv-1787 (WWE), 53 Comm. Reg. (P & F) 189, 2011 U.S. Dist. LEXIS 48773, *12 (D. Conn. 2011) (“Reviewing the applicable FCC regulations and decisions as well as the relevant case law, the Court must conclude that interconnection under section 251(c) includes the duties to provide indirect interconnection and to provide transit service.”); *Qwest Corp. v. Cox Neb. Telecom, LLC*, No. 4:08CV3035, 2008 U.S. Dist. LEXIS 102032, *7 (D. Neb. 2008) (“The parties dispute whether an ILEC’s interconnection obligations under Section 251(c)(2) include a duty to provide transit service when an interconnecting CLEC seeks to indirectly interconnect with a third carrier. The plain meaning of the statute’s text establishes Congress’s clear intent to impose such a duty on ILECs.”); *Brandenburg Tel. Co. et al. v. Windstream Ky. E., Inc.*, Case No. 2007-00004, Order, 2010 Ky. PUC LEXIS 1015, *31 (Ky. PSC Aug. 16, 2010); *Application by Pac. Bell Tel. Co. d/b/a SBC Cal. (U 1001 C) for Arbitration of an Interconnection Agreement with MCImetro*

should implement, as a default methodology, a forward-looking long run incremental cost (“LRIC”) methodology, pursuant to the section 252(d)(1) “just and reasonable” pricing standard applicable to section 251(c)(2) arrangements.²³ A forward-looking LRIC pricing methodology is consistent with the pro-competitive goals of the Act, because it approximates pricing in a competitive market (generating appropriate signals for use of the telecommunications infrastructure)²⁴ and deters anticompetitive incumbent LEC behavior.²⁵ In addition, a forward-looking LRIC-based methodology already has been approved and used for section 251(c)(2) arrangements.²⁶

In adopting these default methodologies, the Commission should not disrupt existing transit agreements. Instead, the Commission should specify that the transit provisions of negotiated or arbitrated agreements will remain in force and that disagreements about such existing agreements will continue to be subject to the jurisdiction of state regulatory commissions pursuant to section 252. This approach is consistent with the Commission’s

Access Transmission Services LLC (U 5253 C) Pursuant to Section 252(b) of the Telecommunications Act of 1996, Decision 06-08-029, Application 05-05-027, 2006 Cal. PUC LEXIS 371, *13 (Cal. PUC Aug. 24, 2006).

²³ 47 U.S.C. § 252(d)(1).

²⁴ *See Implementation of the Local Competition Provisions in the Telecommunications Act of 1996; Interconnection Between Local Exchange Carriers and Commercial Mobile Radio Service Providers*, First Report and Order, 11 FCC Rcd 15499, ¶¶ 630, 679 (1996) (“Adopting a pricing methodology based on forward-looking, economic costs best replicates, to the extent possible, the conditions of a competitive market.”); *id.* ¶ 675 (“In competitive markets, the price of a good or service will tend towards its long-run incremental cost.”).

²⁵ *Id.* ¶ 679 (“[A] forward-looking cost methodology reduces the ability of an incumbent LEC to engage in anti-competitive behavior.”).

²⁶ *See id.* ¶ 672 (“[W]e conclude here that prices for interconnection and unbundled elements pursuant to sections 251(c)(2), 251(c)(3), and 252(d)(1) should be set at forward-looking long-run economic cost.”).

treatment of existing agreements in establishing a default rate methodology for terminating telecommunications traffic.²⁷

D. Transport Services

While Comcast takes no position at this time regarding the appropriate transition for tandem switching and transport charges not addressed in the Order, the Commission's plan should deter carriers from engaging in "mileage" or "local transport" pumping during the transition period. The record in this proceeding clearly indicates that "perpetuating high transport rates could undermine the Commission's reform effort and lead to anticompetitive behavior or regulatory arbitrage such as access stimulation."²⁸ Accordingly, until all transport charges are subject to a bill-and-keep regime, the Commission should adopt measures designed to prevent mileage-pumping schemes. Specifically, the Commission should require a competitive LEC engaged in such schemes to use the price cap LEC's average local transport miles or its own actual transport miles in assessing transport charges, whichever is lower. Absent such a limit on local transport mileage charges, mileage-pumping carriers will continue to thwart the intent of the access stimulation rules by designating distant points of interconnection and thereby inflating the mileage used to compute transport charges.

III. THE COMMISSION SHOULD PERMIT CARRIERS TO RELY ON BOTH TARIFFS AND INTERCONNECTION AGREEMENTS GOING FORWARD

The Commission has established a regime that relies on both tariffs and interconnection agreements during the transition, noting that "continuing to rely on tariffs while also allowing

²⁷ There, the Commission explained that its default rules did "not abrogate existing commercial contracts or interconnection agreements or otherwise require an automatic 'fresh look' at these agreements." Order and FNPRM ¶ 815. Rather, the Order left it to change-of-law provisions within existing contractual arrangements and negotiations between the parties to determine whether to revisit the terms of existing contracts in light of the Commission's reforms. *Id.*

²⁸ *Id.* ¶ 820.

carriers to negotiate alternatives during the transition is in the public interest because it provides the certainty of a tariffing option . . . while still allowing carriers to better tailor their arrangements to their particular circumstances.”²⁹ Going forward, however, the Commission asserts that carriers will and should rely primarily on interconnection agreements to govern the terms and conditions of terminating traffic.³⁰

Negotiated interconnection agreements clearly will play a growing role in setting the terms on which traffic is exchanged as the bill-and-keep methodology is implemented. The Commission, however, should not adopt proposals designed to eliminate or otherwise circumscribe carriers’ ability to employ tariffs to govern originating and terminating toll traffic. Comcast and other voice providers terminate traffic to hundreds, perhaps thousands, of other voice providers. Accordingly, requiring every originating voice provider to execute an interconnection agreement with every other voice provider that may terminate the originating provider’s traffic would be, in a word, impractical. Indeed, such a requirement would be analogous to a mandate that each carrier establish a physical interconnection with every other carrier, a standard that, as noted, the Commission previously recognized would be costly and inefficient.³¹ In implementing reforms to date, the Commission has taken into account “costs and benefits to industry,” finding that its ICC reforms have been designed to “impos[e] only minor incremental costs.”³² Eliminating the use of tariffs on a going-forward basis would be flatly inconsistent with this objective. Moreover, the tremendous costs and burdens of moving

²⁹ *Id.* ¶ 1322.

³⁰ *Id.* ¶ 1323.

³¹ 2005 ICC FNPRM ¶ 126.

³² Order and FNPRM ¶ 861.

exclusively to negotiated agreements would be “unduly disruptive” to the industry.³³ Thus, absent a practical alternative, the Commission should continue to permit carriers to maintain state and federal tariffs, or their functional equivalents.

IV. THE COMMISSION SHOULD ELIMINATE CAF SUPPORT FOR REDUCED INTERCARRIER COMPENSATION REVENUES OVER TIME

The Commission seeks comment regarding whether, and, if so, how, ICC-replacement CAF support should be phased out over time given “carriers’ transition to broadband networks” and the fact that carriers’ “associated business plans [will be] relying more heavily on revenues from broadband services.”³⁴ Comcast agrees that such support should be eliminated over time. Specifically, the Commission should eliminate ICC-replacement CAF support for price cap carriers at the end of the five-year support period for carriers that receive statewide CAF Phase II funding. These carriers should not receive CAF support for both lost ICC revenues and the cost of building out a broadband network that is likely to generate revenues that may more than offset ICC revenue reductions. The Commission already has adopted initial measures designed to guard against “duplicative recovery” from ARCs or the CAF.³⁵ The Commission likewise should recognize the wastefulness of permitting carriers to receive unnecessary funding given the firm budget that is in place for the CAF.

The Commission also should adopt a defined period for phasing out the ICC-replacement CAF support for rate-of-return carriers. In Comcast’s view, since the Commission adopted a three-year ICC-replacement CAF phase-out for price cap carriers beginning in 2017 (the year that price cap carriers finalize the transition to bill-and-keep for terminating switched end office

³³ *Id.* ¶ 964 (“flash cutting the whole industry to a new regime [of solely negotiated arrangements for intercarrier compensation] would be unduly disruptive”).

³⁴ *Id.* ¶ 1328.

³⁵ *See, e.g., id.* ¶ 862 n.1664.

access charges), rate-of-return carriers should be subject to a parallel three-year phase-out beginning in 2020 (the year that rate-of-return carriers finalize the transition to bill-and-keep for terminating switched end office access charges).³⁶ Establishing a parallel phased reduction that will occur on a specified timetable appropriately “balances the benefits of certainty and a gradual transition with [the Commission’s] goal of keeping the federal universal service fund on a budget and minimizing the overall burden on end users.”³⁷

V. TO AVOID AREAS OF AMBIGUITY AND POTENTIAL DISPUTES, THE COMMISSION SHOULD CLARIFY CERTAIN ASPECTS OF THE ORDER

Throughout the Order, the Commission addresses existing ambiguities in its rules and provides clarity in areas of uncertainty.³⁸ Similarly, in the Further Notice, the Commission asks whether the new rules may “result in any conflicts or inconsistencies.”³⁹ To avoid such conflicts and the creation of additional ambiguities, Comcast urges the Commission to clarify three matters. First, the Commission should specify the portion of the Tandem-Switched Transport Access Service rate a competitive LEC may charge when it provides the transport component of this service *in whole or in part*, but does not provide the switching component. Second, the Commission should clarify that competitive LECs that tariff a *benchmarked* rate are not required to adopt the transition path applicable to the majority of lines capable of being served in its service area when both price cap and rate-of-return regulated incumbent LECs operate therein. Finally, the Commission should confirm that LECs, including competitive LECs, are not permitted unilaterally to tariff rates for non-access traffic.

³⁶ See *id.* ¶¶ 801, 920.

³⁷ *Id.* ¶ 847.

³⁸ See, e.g., *id.* ¶ 22 (“we clarify certain aspects of CMRS-LEC compensation to reduce disputes and eliminate ambiguities in our rules”).

³⁹ *Id.* ¶ 1403.

A. Appropriate Charges for Tandem Switching Provided by a Competitive LEC

Beginning July 1, 2017, price cap incumbent LECs' Tandem-Switched Transport Access Service rates⁴⁰ are capped at \$0.0007 for interstate and intrastate terminating traffic traversing a tandem switch that the terminating carrier (or its affiliate) owns.⁴¹ If a competitive LEC benchmarks its interstate access rates against those of a price cap incumbent LEC that owns the tandem switch, the rates for the competitive LEC's terminating Tandem-Switched Transport Access Services may not exceed those of the competing incumbent LEC.⁴² The Commission's rules do not specify, however, whether a competitive LEC should charge the full \$0.0007 rate or some fraction thereof when it provides the transport component, but not the tandem switching component, of Tandem-Switched Transport Access Service.

Accordingly, the Commission should provide further guidance on what portion of the \$0.0007 rate would apply to a competitive LEC's tandem transport service. Specifically, the Commission should indicate: (1) whether per-mile charges for tandem transport will be permitted; (2) if so, how a \$0.0007 per minute cap on Tandem-Switched Transport Access service will translate into per mile charges for the use of tandem switched transport facilities; and (3) what charges competitive LECs should benchmark against for their tandem transport-only

⁴⁰ "Tandem-Switched Transport Access Service" is "(1) [t]andem switching and common transport between the tandem switch and end office or (2) [a]ny functional equivalent of the incumbent local exchange carrier access service provided by a non-incumbent local exchange carrier via other facilities." 47 C.F.R. § 51.903(i). Tandem-Switched Transport includes those rate elements specified in section 69.111 of the Commission's rules (other than dedicated transport rate elements), intrastate rate elements for functionally equivalent service, and any functionally equivalent access service provided by a non-incumbent LEC. 47 C.F.R. § 51.903(i)(2).

⁴¹ 47 C.F.R. § 51.907(g)(2).

⁴² Order and FNPRM ¶ 807 ("competitive LECs are permitted to tariff interstate access charges at a level no higher than the tariffed rate for such services offered by the incumbent LEC serving the same geographic area").

services in the event that the incumbent LEC does not separate its charges for tandem transport and tandem switching.⁴³

B. Rate Transition Applicable to Competitive LECs that Use Blended Rates

The Order provides some guidance regarding the access reform transition path competitive LECs that use a blended rate should follow.⁴⁴ Specifically, where more than one incumbent LEC operates within a competitive LEC’s service area and those incumbent LECs are subject to both price cap and rate-of-return regulation, the Commission requires the competitive LEC to adopt the transition path applicable to the majority of lines capable of being served in its territory.⁴⁵ The Order explains further that “if price cap carriers serve 70 percent of a competitive LEC’s service territory and rate of return carriers serve 30 percent of the service territory, then the competitive LEC using a blended rate should follow the price cap transition.”⁴⁶

The Commission indicates that this single transition path requirement will be extended to all competitive LECs that “tariff[] a benchmarked *or* average rate.”⁴⁷ Extending this requirement to carriers that use a benchmarked rate, irrespective of whether the competitive LEC has

⁴³ When considering this matter, the Commission should be mindful of the tension between section 61.26(f) and section 51.913(b) of its rules. Section 61.26(f) suggests that when terminating a call to its own customer (or any end user for which the competitive LEC provides the dialed number), a competitive LEC that provides tandem transport, but not tandem switching, may charge the IXC the rate that would be charged by the incumbent LEC “for *all* exchange access services required to deliver interstate traffic to the called number.” 47 C.F.R. § 61.26(f) (emphasis supplied). This rate would include the tandem switching charge, since that charge would be included in the rate that the incumbent LEC would charge for all exchange access services required to deliver the traffic. Such a reading of section 61.26(f), however, seems to conflict with section 51.913(b)’s prohibition against a competitive LEC “charg[ing] for functions not performed by the local exchange carrier itself or the affiliated or unaffiliated provider of interconnected VoIP service.” 47 C.F.R. § 51.913(b).

⁴⁴ Order and FNPRM ¶ 807 n.1512.

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ *Id.* (emphasis supplied).

typically assessed non-blended access rates, however, would mark a significant departure from the current CLEC benchmarking rules. Such a departure would contravene the Commission’s conclusions that “a uniform approach for all LECs is preferable” and that there is no “compelling evidence to depart from the important policy objectives underlying the CLEC benchmarking rule.”⁴⁸ Moreover, such a requirement would result in the imposition of asymmetrical rates, another end result which the Commission wishes to avoid.⁴⁹ For example, from 2017 until 2020, a competitive LEC that benchmarked its rates to those of a price cap carrier for almost half of its traffic, but followed the transition plan for rate-of-return carriers, could assess terminating access charges on the benchmarked traffic. In contrast, the price cap carrier would be bound by a bill-and-keep framework during that period. To avoid this asymmetrical result, the Commission should revise the reference to competitive LECs that tariff a “benchmarked or averaged rate” to refer instead to competitive LECs that tariff a “blended or averaged rate.”

C. Competitive LECs’ Right Unilaterally to Tariff Rates for Non-Access Traffic

As discussed above, carriers generally should have the flexibility to maintain state and federal tariffs that govern the terms and conditions of terminating intrastate and interstate traffic.⁵⁰ This tariffing regime, however, should apply only to access traffic where tariffing is permissible in the first instance. Thus, to avoid the perpetuation of inventive arbitrage schemes as the Commission’s ICC reforms are implemented, the Commission should confirm that competitive LECs are not permitted to tariff local termination rates for non-access traffic.

⁴⁸ *Id.* ¶ 808.

⁴⁹ *See, e.g., id.* ¶ 948 (the Commission’s “prospective regime for VoIP-PSTN intercarrier compensation is symmetrical, and thus avoids the marketplace distortions that could arise from an asymmetrical approach to compensation”).

⁵⁰ *See* Section III *supra*.

Today, the vast majority of carriers, including Comcast, exchange non-access traffic with competitive LECs on a default bill-and-keep basis in the absence of a traffic exchange or interconnection agreement. This is the case for two reasons. First and most importantly, since 1996, local termination rates for non-access traffic have been subject to the reciprocal compensation obligations of section 251(b)(5).⁵¹ Absent a negotiated agreement, the only “reciprocal” arrangement that can exist under federal law and policy is bill-and-keep. Second, as noted above, it is unreasonable to expect that all competitive LECs can negotiate individual agreements with one another.⁵² Unfortunately, some competitive LECs have departed from this industry practice and have instead included above-cost, non-reciprocal local termination rates in their intrastate tariffs. By unilaterally filing such rates in tariffs, these competitive LECs are able to impose excessive charges that cause significant economic harm to Comcast and other carriers in the absence of a negotiated agreement that is acceptable to both parties.

While some states have correctly ruled that competitive LECs may not unilaterally tariff such charges under any circumstances,⁵³ other states have urged the Commission to “provide[] greater clarity on the scope and intent of federal law.”⁵⁴ To deter the continued imposition of these excessive charges, the Commission thus should make it clear that competitive LECs are not permitted unilaterally to tariff local termination rates for non-access traffic until the transition to a bill-and-keep methodology for terminating traffic has been completed. In other words,

⁵¹ 47 U.S.C. § 251(b)(5) (all LECs have “[t]he duty to establish reciprocal compensation arrangements for the transport and termination of telecommunications”).

⁵² See Section III *supra*.

⁵³ See, e.g., *Establishment of Carrier-to-Carrier Rules*, Case No. 06-1344-TP-ORD, Opinion and Order, 2007 Ohio PUC LEXIS 572, *42-43 (Ohio PUC Aug. 22, 2007).

⁵⁴ *Pennsylvania Public Utility Commission v. MCImetro Access Transmission Services, LLC d/b/a Verizon Access Transmission Service Introducing Local Tariff Termination Service for Non-access Minutes of Use*, Docket No. R-00050799, Order, at 17 (Pa. PUC June 22, 2006), available at: <<http://www.puc.state.pa.us/PcDocs/614037.doc>>.

competitive LECs should not be permitted to tariff a local termination rate for non-access traffic until either July 2017 (for competitive LECs that benchmark to price cap carriers) or July 2020 (for competitive LECs that benchmark to rate-of-return carriers).

VI. COMMERCIAL AGREEMENTS SHOULD GOVERN IP-TO-IP INTERCONNECTION AND THE COMMISSION SHOULD REFRAIN FROM APPLYING LEGACY REGULATIONS

The Further Notice solicits comment on two distinct regulatory proposals related to IP-to-IP interconnection: First, the Further Notice seeks comment on whether the Commission should regulate IP-to-IP voice interconnection. Second, the Further Notice seeks comment on whether the Commission should regulate the peering and transit relationships through which broadband networks exchange data traffic on the Internet “backbone.”

The Commission should take neither step. Regulation of IP-to-IP voice interconnection is at minimum premature, and it could prove counterproductive. Further, as the range of questions in the Further Notice itself illustrates, regulation of IP-to-IP traffic has the potential to bleed into regulation of the Internet backbone itself, which would be an unwarranted and dramatic departure from the Commission’s consistent policy of promoting growth and innovation by maintaining an Internet unfettered by federal or state regulation. Importing even portions of the legacy PSTN interconnection framework into the Internet backbone marketplace would risk serious distortions of that vibrant ecosystem, with consequences that are fundamentally at odds with the Commission’s and the Administration’s goals for broadband deployment and adoption throughout the United States.

To be clear, Comcast lauds the Commission’s goal of supporting the transition to IP-to-IP interconnection for voice services. Comcast and other MSOs have invested heavily in the IP architecture that will deliver the future of communications. The challenges presented by having to work with and around the legacy incumbent TDM-based networks have been a source of

frustration and cost. That said, and as discussed in Section VI.A, below, there has been some progress in this area, and the Commission should allow market forces to continue to determine the pace and evolution of IP voice interconnection solutions before rushing to impose regulations in this area.

VoIP providers have begun to enter into commercial IP-to-IP interconnection arrangements for the exchange and transport of voice traffic. Development of these private commercial agreements is occurring without regulatory intervention. More importantly, clear answers have yet to emerge about the optimal structure, scope, and terms of these voice IP-exchange agreements; they are evolving in response to changes in technology, service offerings, and the specific needs of the parties seeking such arrangements. The Commission should encourage and facilitate the negotiation of such commercial solutions, but more intrusive regulatory intervention now could interfere with this dynamism, and could risk creating unforeseen arbitrage opportunities and costly inefficiencies that are not yet understood or predictable. This could very well prove counterproductive for the interests of VoIP providers and consumers, and ultimately for the Commission's interest in ensuring that the Internet backbone will continue to be a powerful engine of economic growth.

Section VI.B addresses the Further Notice's suggestion of a dramatic departure from precedent to intervene in the Internet backbone marketplace through regulation of peering and transit arrangements. This proposal is cause for profound concern. Congress and the Commission have maintained a consistent policy of promoting growth and innovation by maintaining an Internet unfettered by federal or state regulation. The proposals on which the Further Notice solicits comment would represent a precipitous and ill-advised reversal of this remarkably successful policy. The Internet is a diverse and competitive environment in which

marketplace participants play multiple and constantly evolving roles. The Internet's defining capability has been its ability to adapt to rapid changes in technology and consumer preferences. Trying to regulate IP interconnection – and it is doubtful that a coherent regulatory framework would even be achievable – would interfere with beneficial incentives and commercial arrangements and allow a handful of actors to gum-up the dynamism at the root of the Internet's success.

A. The Commission Should Refrain from Premature Imposition of Regulations on IP-to-IP Interconnection Arrangements for Voice Services

The Commission should support voluntary efforts by carriers and non-carrier VoIP service providers to enter into IP-to-IP interconnection arrangements on a commercial basis; indeed, it makes sense for the Commission to encourage and even facilitate such private, market-based solutions. For several reasons, regulatory intervention at this stage would be at least premature and possibly counterproductive. The marketplace for VoIP services is clearly flourishing, even in the face of challenges posed by PSTN interconnection. VoIP service providers are in the opening stages of developing commercial voice IP interconnection, and there is no market failure or impending crisis that requires immediate regulatory intervention. Neither the Commission nor even marketplace participants yet have enough real-world evidence or experience to understand how such a regulatory regime should operate. As a result, the Commission should tread carefully here. Moreover, the evidence to date plainly indicates that the marketplace likely will move toward commercially negotiated IP interconnection arrangements for voice on its own, in efficient ways, *without* regulatory intervention; if anything, the Commission should encourage or facilitate these developments, rather than seek to dictate them. This will give the market time to develop and allow providers to get a better sense of the unique technical and architectural aspects of IP-to-IP voice interconnection. In the absence of

credible evidence and meaningful real-world experience that suggests the market is not working, the imposition of regulatory requirements for IP-to-IP voice interconnection could be detrimental to network innovation and efficiency, both for IP voice services and the development of the IP marketplace more broadly.

1. There Is No Evidence of Market Failure Warranting Regulatory Intervention

In the absence of any regulatory mandate, many voice service providers are transitioning to IP infrastructure and beginning to exchange VoIP traffic.⁵⁵ This transition will likely accelerate now that the Commission has “take[n] initial steps to eliminate barriers to IP-to-IP interconnection” through comprehensive reform of its intercarrier compensation policies.⁵⁶

To be sure, some providers are moving faster than others in conversion to IP facilities, and this has been a source of frustration for Comcast as well as many others. It would be premature, however, to conclude that the uneven pace of change is necessarily the result of intransigence, anticompetitive intent, or some harmful strategy. Rather, the uneven evolution of these interconnection arrangements reflects, at least in part, the significant challenges and questions that providers encounter as they face the need to craft entirely new interconnection agreements and solutions. There are particularly difficult architectural and cost efficiency questions about how to exchange “local” voice traffic in IP. The answers to these questions may vary depending on the size of the providers involved, whether they are wireless or wireline providers, and numerous other factors. Experimentation is beginning to produce a variety of

⁵⁵ See, e.g., Comments of AT&T, WC Docket No. 10-90, at 8 (Apr. 18, 2011) (explaining that “a revolutionary transition from the circuit-switched networks of the past to the all-IP architecture of the future . . . is well underway”); Comments of Verizon and Verizon Wireless, WC Docket No. 10-90, at 16 (Apr. 18, 2011) (noting that the “transition to IP interconnection . . . is already happening in some cases”).

⁵⁶ Order and FNPRM ¶ 1340.

answers to these questions, but the questions themselves illustrate why this process is not happening overnight or as quickly as some marketplace participants might wish; as discussed below, it is beginning to progress, even among the providers who have been slower to move in this direction.

2. There Are Real Challenges to Voice IP Interconnection that the Marketplace Is Seeking to Solve

Notwithstanding progress, Comcast agrees that there have been impediments and inefficient costs imposed in the transition to IP voice interconnection. But at this stage, regulation based on legacy interconnection rules may hurt more than or as much as it helps. As the discussion above suggests, IP-to-IP voice interconnection does not neatly fit into any existing regulatory construct or into the physical interconnection TDM-based architecture that has developed under that construct.

For example, a key network efficiency gained by IP-to-IP voice interconnection is the ability to exchange traffic at a limited number of regional or national points of interconnection (“POIs”). This traffic exchange architecture renders irrelevant the traditional concept of a Local Access and Transport Area (“LATA”) – which demonstrates, at a minimum, the inapplicability of legacy local interconnection rules that require one POI per LATA. Regulatory requirements for interconnection that depend on geographical boundaries would not make sense for VoIP services; on the other hand, an interconnection regime that involves very few POIs raises thorny jurisdictional questions that do not fit neatly into the existing regime. This is consistent, of course, with the Commission’s recognition that legacy jurisdictional classifications generally are no longer sensible for VoIP intercarrier compensation.⁵⁷ In other words, simply imposing an interconnection obligation that applies to legacy incumbent LECs under existing law with respect

⁵⁷ *Id.* ¶ 949.

to IP voice services could have bizarre consequences and would raise novel legal and practical questions.

In addition, there are a host of unresolved issues regarding how to allocate the financial obligations for transporting traffic to whatever and wherever the applicable POIs end up being housed, as well as questions about the obligations for direct versus indirect interconnection in an IP ecosystem. It is unclear how transport costs and obligations will be assigned in an environment with marketplace participants of varying size and geographic reach and with (presumably) far fewer, geographically dispersed POIs. Moreover, as traffic shifts from wireline to wireless services, it is not evident whether traditional concepts regarding providers that should bear the obligations of direct interconnection should apply. With time, market participants should be able to work out rational and efficient solutions to these challenges, or possibly several different potential solutions, and in the process, providers will learn what the risks and loopholes of these solutions might be. In the interim, however, given the serious complexities, it would be counterproductive for the Commission to impose rules grounded in a legacy regulatory regime that is designed for an entirely different marketplace structure.

Further, IP interconnection involves novel issues not raised by legacy interconnection. For example, some IP-network owners are agreeing to exchange traffic at specified levels of prioritization, and industry groups are beginning to standardize the ways in which such traffic exchanges occur.⁵⁸ Additional technological efforts are underway by standard-setting bodies to adapt protocols from third-party data transit services to create third-party transit for VoIP services.⁵⁹ This has no parallel in the legacy regulatory framework, and it is important that the

⁵⁸ Reply Comments of tw telecom inc., GN Docket. No. 09-191, at 17-18 (Apr. 26, 2010).

⁵⁹ *Id.* at 15-17.

Commission not interfere with these efforts with regulations that will distort the developing marketplace.

In addition, IP interconnection raises some challenges today because of the ongoing realities of the legacy network. One significant challenge concerns the continuing need for, and obligations associated with, interconnection to 911 networks. While a transition to IP-to-IP voice traffic exchange is starting to take shape, the same is not true for the transport of 911 traffic. Interconnection with 911 networks and the transport of 911 traffic are still largely dependent on TDM networks and incumbent carrier selective routers. Even where a competitive IP-based service provider is the service provider for a public safety answering point, by virtue of their size and ubiquity, the incumbent LEC TDM networks remain largely in the middle of that traffic flow.

To date, the marketplace for VoIP services has been evolving successfully to meet its challenges while bringing innovative services to consumers. The VoIP marketplace and IP-to-IP voice interconnection practices will continue to evolve. The Commission should allow the market to experiment and learn from real-world experience before concluding that a prescriptive regulatory regime for IP-to-IP voice interconnection would serve the public interest; certainly, the Commission should allow such experience and learning to influence any regulatory solutions that it may ultimately feel compelled to adopt. In these early stages of VoIP IP-to-IP interconnection development, regulations based on incorrect assumptions about the optimal future trajectory of these arrangements could hinder the industry's growth, stunt the deployment of innovative technologies and commercial arrangements, and ultimately risk dangerous intervention into IP data interconnection.

3. Regulation of IP Voice Interconnection Has the Dangerous Potential to Bleed into Regulation of the Internet Backbone

As the Commission well knows, there is no one-size-fits-all description of VoIP service or IP-to-IP voice interconnection. VoIP services may be “facilities-based,” offered over dedicated telecommunications facilities, or “over-the-top,” offered by providers who neither own nor operate such facilities. For the reasons just described, “solving” any problems relating to IP interconnection for facilities-based voice providers raises serious challenges, but these pale in comparison to the challenges presented by IP interconnection for over-the-top (“OTT”) voice providers. Whatever else the Commission does, it must not take the legacy interconnection regime for the TDM-based PSTN and create IP interconnection rights and obligations for OTT VoIP, which has never participated in or relied on those rights in the legacy PSTN regime.

OTT VoIP is exchanged over the Internet backbone, through transit and peering agreements that are used to deliver any other Internet data packets. A vast range of providers – ranging from Google Voice to a game console provider that allows communication around gaming, for example – may offer OTT VoIP to customers, which opens up a wide range of potentially covered “providers” to whom the Commission would be granting unprecedented, broad rights. Moreover, there is no way necessarily even to *identify* a VOIP packet as being separate from any other data packet that may be exchanged between two network providers – especially since this traffic is frequently exchanged indirectly among providers with no commonly agreed-upon or trusted packet “marking” protocol, or any way to enforce such a protocol. In other words, who is an “OTT VoIP provider” and how providers should recognize and segregate OTT VoIP for special regulatory treatment are questions that present unique, serious issues with which the Commission would need to grapple before it could even begin to consider granting interconnection rights to this class of traffic.

Furthermore, regulating or providing interconnection rights that apply to the transmission of OTT VoIP would put the Commission on a very slippery regulatory slope. It is entirely unclear how the Commission could regulate OTT VoIP interconnection rights without affecting and reaching into the data peering and transit agreements on which these entities – or their underlying network providers – rely. And, as discussed below, that is a step the Commission should avoid at all costs.

Of course, this risk of unwitting regulatory intervention into the backbone’s core data traffic exchange agreements is not one that can easily be avoided by confining rules to VoIP or even just facilities-based VoIP services. Even if, for now, facilities-based and OTT VoIP services are typically governed by different types of interconnection arrangements, those distinctions may dissolve over time. The industry and technology may evolve in such a way that all VoIP traffic may ultimately be exchanged pursuant to the same peering and transit arrangements as other Internet traffic.⁶⁰ In other words, providers may develop means to exchange VoIP traffic over data connections, and provide the necessary quality of service to do so. It is important that Commission regulations not forestall that technological evolution in this proceeding. The Commission must be aware that technological changes that blur the distinction between the facilities-based and OTT VoIP could suddenly catapult the Commission into the regulation of the Internet backbone, even if it agrees, as it should, that this is a line it should and will not cross. Again, this suggests that facilitating commercial, market-based solutions today is the most advisable path forward.

⁶⁰ The Commission has suggested that it “may make little sense for providers to maintain different interconnection arrangements for the exchange of VoIP and other forms of Internet traffic.” *Connect America Fund*, Notice of Proposed Rulemaking and Further Notice of Proposed Rulemaking, 26 FCC Rcd 4554, ¶ 679 (2011). Commenters such as AT&T have agreed. *See* Comments of AT&T, WC Docket No. 10-90, at 24 (Apr. 18, 2011).

B. The Commission Must Not Reverse Years of Successful Nonregulation by Intervening in Commercial Internet Backbone Relationships

Regardless of how the Commission decides to approach VoIP interconnection, it should be careful, as noted, to avoid any regulation of IP-to-IP data interconnection or, in other words, the core peering and transit relationships that make up the Internet “backbone.” Any initiative to regulate the Internet would represent a dramatic and unwarranted departure from the Commission’s consistent and long-standing policy of “creat[ing] a deregulatory environment in which the Internet could flourish.”⁶¹

Through its decisions, notices, and statements the Commission has repeatedly and consistently rejected requests that it intervene to assert regulatory authority over Internet interconnection arrangements. In its order approving the WorldCom/MCI transaction, the Commission stated that it “seek[s] not to regulate the Internet, but rather to ensure that Internet services, which rely on telecommunications transmission capacity, remain competitive, accessible, and devoid of entry barriers.”⁶² The Commission reinforced this position in a 2009 Notice of Proposed Rulemaking, observing that “it has long been U.S. policy to promote an

⁶¹ Chairman William E. Kennard, FCC, “The Unregulation of the Internet: Laying a Competitive Course for the Future,” Remarks before the Federal Communications Bar, Northern California Chapter, 1999 FCC LEXIS 3413, *3 (July 20, 1999); *see also* Chairman Julius Genachowski, FCC, *The Third Way: A Narrowly Tailored Broadband Framework*, 2010 FCC LEXIS 2898 (May 6, 2010) (“[F]ully reclassifying broadband services as ‘telecommunications services’ and applying the full suite of Title II obligations, has serious drawbacks. . . . Title II, for example, includes measures that, if implemented for broadband, would fail to reflect the long-standing bipartisan consensus that the Internet should remain unregulated and that broadband networks should have only those rules necessary to promote essential goals, such as protecting consumers and fair competition.”).

⁶² *Application of WorldCom, Inc. and MCI Communications Corporation for Transfer of Control of MCI Communications Corporation to WorldCom, Inc.*, Memorandum Opinion and Order, 13 FCC Rcd 18025, ¶ 142 (1998).

Internet that is both open and unregulated,” an approach “reflected in more than two decades of FCC decisions.”⁶³

Chairman Kennard stated at the outset of the broadband era that “[w]e can have openness and competition by allowing this market to develop unfettered by regulation. We can have openness and competition by following the FCC’s tradition of ‘unregulation’ of the Internet.”⁶⁴

Chairman Genachowski affirmed the same policy principles ten years later: “Throughout its history, the agency has done best for the country when it has encouraged free and open markets, when its rules have empowered consumers to pick winners and losers, and when it has enabled innovators to innovate without permission.”⁶⁵

The Commission should not now deviate from its emphasis and reliance on the unregulated Internet marketplace. The Internet is entering a critical phase with skyrocketing demand for data and the constant introduction of new services and technology into the marketplace. The Commission should adhere to the principles that “when Internet-based services replace traditional legacy services, begin to deregulate the old instead of regulate the new.”⁶⁶ To be sure, the FCC should “maintain a watchful eye to ensure that anticompetitive behavior does not develop.”⁶⁷ But it should not regulate based on speculation that bottlenecks

⁶³ *Preserving the Open Internet; Broadband Industry Practices*, Notice of Proposed Rulemaking, 24 FCC Rcd 13064, ¶ 47 (2009).

⁶⁴ Kennard, *supra* note 61, at*11-12.

⁶⁵ Chairman Julius Genachowski, FCC, “Innovation in a Broadband World,” Prepared Remarks at the Innovation Economy Conference, 2009 FCC LEXIS 6271, *4-5 (Dec. 1, 2009).

⁶⁶ Jason Oxman, Counsel for Advanced Communications, *The FCC and the Unregulation of the Internet*, Office of Plans and Policy Working Paper No. 31, at 3 (July 1999), available at <http://transition.fcc.gov/Bureaus/OPP/working_papers/oppwp31.pdf>.

⁶⁷ *Id.*

might develop, and must “be careful that any regulatory responses are the minimum necessary and outweigh the costs of regulation.”⁶⁸

Substantial, enduring changes in the structure of the Internet marketplace would have to occur before regulation should even be considered. As one working paper released by the Commission’s Office of Plans and Policy concluded, “[a]ny regulation of the Internet backbone market would represent a significant shift in the unregulated status quo under which the Internet industry has grown at unprecedented rates, and therefore would require a corresponding shift in the competitiveness of the market.”⁶⁹ No such change in the market’s structure has occurred. As discussed below, conditions justifying regulatory intervention do not exist in the Internet backbone; the Internet’s dynamism and diversity would fatally complicate any attempt to devise a coherent regulatory scheme, and regulatory intervention would critically hinder the Internet’s hallmark ability adapt to rapid, ongoing change in both technologies and consumer preferences.

1. There Are No Conditions Justifying the Imposition of Interconnection Regulation on the Internet Backbone

As noted, the Commission’s hands-off approach to Internet policy has been based on its consistent finding that the marketplace for Internet backbone services has been and remains highly innovative and competitive.

In approving the Verizon/MCI merger in 2005, for example, the Commission stated that “[b]ecause we conclude that the Internet backbone market is sufficiently competitive and will remain so post-merger, it follows that the prices and terms of interconnection in the market will

⁶⁸ *Id.*

⁶⁹ Michael Kende, Director of Internet Policy Analysis, *The Digital Handshake: Connecting Internet Backbones*, Office of Plans and Policy Working Paper No. 32, at 26 (Sept. 2000); available at: <http://transition.fcc.gov/Bureaus/OPP/working_papers/oppwp32.pdf>. Regulation of the Internet backbone today would have no less impact than it would have had at the time that this working paper was published.

also be competitive.”⁷⁰ The Commission similarly found in approving the SBC/AT&T transaction that “interconnection between Internet backbone providers has never been subject to direct government regulation, and settlement-free peering and degradation-free transit arrangements have thrived.”⁷¹ The Commission’s predictions and conclusions were accurate, and there is no basis for the Commission to reach different conclusions today.

Indeed, just two months before releasing the Further Notice, the Commission, in approving the Global Crossing/Level 3 transaction, concluded that the Internet backbone was robustly competitive. In so doing, the Commission rejected arguments that the combined backbone businesses of Level 3 and Global Crossing would have an incentive to engage in anticompetitive transit and peering practices: “If it did so, the combined entity would lose customers to its remaining peers, because those entities would still enjoy ubiquitous Internet connectivity and, hence, would be more attractive to customers.”⁷² It is implausible that in the space of just a few months since September of last year there has been a dramatic change in the “ubiquitous Internet connectivity” necessitating sudden and potentially harmful regulatory intervention.

The evidence shows that there has in fact been no such change. Since the inception of the commercial Internet backbone in 1995, the unregulated Internet has sustained explosive growth in traffic volumes to the benefit of end users and providers of content and applications – a trend

⁷⁰ *Verizon Communications Inc. and MCI, Inc. Applications for Approval of Transfer of Control*, Memorandum Opinion and Order, 20 FCC Rcd 18433, ¶ 133 (2005).

⁷¹ *SBC Communications Inc. and AT&T Corp. Applications for Approval of Transfer of Control*, Memorandum Opinion and Order, 20 FCC Rcd 18290, ¶ 132 (2005).

⁷² *Global Crossing Ltd. and Level 3 Communications, Inc. Applications for Consent to Transfer Control*, Memorandum Opinion and Order and Declaratory Ruling, 26 FCC Rcd 14056, ¶ 27 (2011) (“Global Crossing/Level 3 Order”).

that continues unabated today and is in fact accelerating.⁷³ Furthermore, in the relatively short life to date of the commercial Internet, it has proven resilient and flexible in the face of proliferating uses, participants, and data flows.

The Internet is a vast network of interconnected domestic and international networks through which traffic flows unimpeded through a host of redundant routes supported by a web of privately negotiated commercial relationships. Indeed, despite the fact that the Internet is an entirely unregulated ecosystem, in which myriad providers and entities negotiate individualized interconnection agreements of various types, there have been relatively few major commercial disputes over the exchange of traffic among networks; even fewer disputes have ever resulted in actual interruptions in traffic flow, and even those have been very short-lived and were resolved quickly *without* government involvement.⁷⁴ Indeed, even the highly publicized dispute initiated

⁷³ In a June 2011 white paper, Cisco Systems reported that global IP traffic had increased eightfold over the past five years. *See* Cisco Sys., *Visual Networking Index: Entering the Zettabyte Era* 1 (June 1, 2011). The same white paper projected that global IP traffic would increase fourfold over the next five years, and that annual global IP traffic would cross the “zettabyte” threshold by the end of the 2015. *Id.* at 1, 11 (explaining that one “zettabyte” is equal to one sextillion (1,000,000,000,000,000,000,000) bytes). In a February 2012 update, Cisco Systems reported that global mobile IP data traffic has grown at an even more torrid pace – more than doubling in each of the past four years – and that last year’s mobile IP data traffic was eight times greater than total global Internet traffic in 2000. *See* Cisco Sys., *Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011-2016*, at 1 (Feb. 14, 2012).

⁷⁴ Daniel Golding, *The Real Story Behind the Comcast-Level 3 Battle*, GIGAOM (Dec. 1, 2010), *available at*: <<http://gigaom.com/2010/12/01/comcast-level-3-battle/>> (noting that commercial disputes “rare[ly]” lead to even a short-lived “partition,” because maintaining connectivity is “the first rule among network engineers and peering managers, and a great deal of effort goes into meeting this goal”); Scott Woolley, *The Day the Web Went Dead*, FORBES.COM (Dec. 2, 2008), *available at*: <http://www.forbes.com/2008/12/01/cogent-sprint-regulation-tech-enter-cz_sw_1202cogent.html?feed=rss_news> (noting that these disputes and their prompt resolutions underscore “how resilient and flexible the unregulated Internet is. . . . In the rare instances where part of the Net does break down, as in the recent fight between Cogent and Sprint, the market provides overwhelming incentives to repair the breach quickly.”).

by Level 3 against Comcast never came close to disrupting flows of traffic between the parties' customers.

The Internet has thrived in the absence of regulation because this dynamic marketplace supplies its own checks and balances. In particular, network externalities create powerful incentives for networks to interconnect with one another.⁷⁵ Networks on today's Internet must interconnect with networks operated by major application, search, or content providers, content delivery network providers ("CDNs"), cloud servers, and others – entities that have become core players in the Internet ecosystem. For example, Google alone accounts for at least six percent of global Internet traffic, and CDNs such as Limelight and Akamai account for nearly ten percent.⁷⁶

Furthermore, many network providers – even so-called “terminating” providers like residential ISPs – *originate* large amounts of traffic and thus need interconnection to obtain access to others' networks as much as they are asked to *provide* access to their own end users. For example, Comcast hosts websites and serves CDN customers or smaller network providers to whom it provides transit services; in order to serve these customers, Comcast must maintain connectivity to other networks to get their traffic to its destinations.⁷⁷ Indeed, as Comcast has

⁷⁵ Kende, *supra* note 69, at 26. Network externalities may be direct or indirect. *Id.* at 4. Users of email and social-networking applications derive direct network externalities: the more Internet users, the more valuable the Internet is for such communications. Users of the World Wide Web and online-video applications derive indirect network externalities: the more Internet users, the more Web and online-video content will be developed, which makes the Internet even more valuable for its users. *Id.*

⁷⁶ See C. Labovitz, et al., *ATLAS Internet Observatory 2009 Annual Report* 15, 18, available at: <http://www.nanog.org/meetings/nanog47/presentations/Monday/Labovitz_ObserveReport_N47_Mon.pdf>; see also John Markoff, *Scientists Strive to Map the Shape-Shifting Net*, N.Y. TIMES, Mar. 1, 2010 (noting that ““hyper giants’ like Limelight, Facebook, Google, Microsoft and YouTube . . . now generate and consume a disproportionate 30 percent of all Internet traffic” (internal quotation marks omitted)).

⁷⁷ Letter from Lynn R. Charytan, Comcast Corporation, to Marlene H. Dortch, FCC Secretary, GN Docket No. 09-191, at 1 (Dec. 7, 2010).

elsewhere explained to the Commission, despite being commonly thought of as an “eyeball network,” Comcast’s *outgoing* traffic with its peers is roughly balanced with the incoming traffic destined for its customer “eyeballs.” As a result, even so-called “eyeball” or wrongly labeled “terminating” networks are in no position, and have no incentive, to try to impose commercially unreasonable terms for interconnection with other networks because they themselves depend on connectivity to those other networks. This mutual dependence produces a marketplace dynamic that has ensured universal connectivity to the benefit of content providers and consumers. (And, as discussed further below, the ubiquitous availability of transit routes gives a terminating network very little power to in fact foreclose access to its network.)

In short, the Internet is a network in which interconnection needs are shared by a huge number of providers whose interests are ultimately in basic equipoise. There is no plausible argument that would justify Commission intervention in this context.

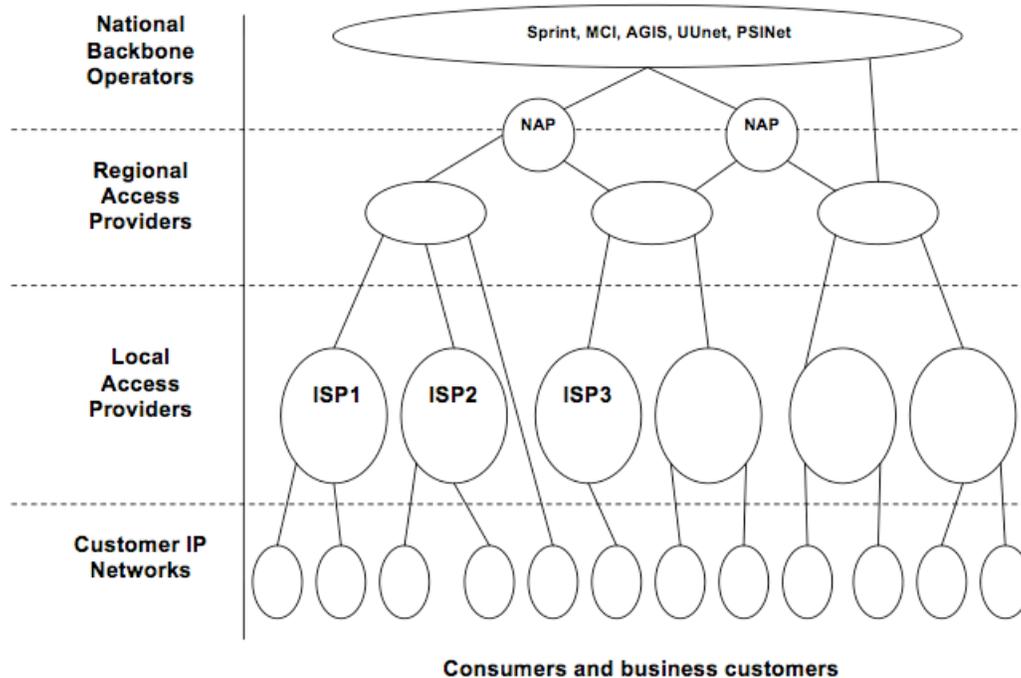
2. The Unregulated Internet Has Moved Consistently Toward More and Diverse Forms of Interconnectedness Without Regulatory Intervention

Furthermore, the Internet marketplace has shown and continues to show an uninterrupted trend toward more interconnectedness and more forms and flavors of interconnection – all without government intervention. Therefore, regulatory intervention here, in contrast to the market-enhancing intervention in the pre-1996 PSTN marketplace, is likely to have the effect of undermining market solutions rather than resolving market failures.

In the commercial Internet’s first decade, the relationships among its constituent networks were largely “hierarchical.” Business and residential users typically connected to the Internet via an ISP, each ISP typically purchased transit from one or more national backbone providers to reach other ISPs, and these national “Tier 1” backbones entered into settlement-free

peering arrangements with one another.⁷⁸ The hierarchical structure of the commercial Internet in its first decade is shown in Diagram 1, below:

Diagram 1. Structure of the Commercial Internet in Its First Decade



Source: Labovitz, et al., *ATLAS Internet Observatory 2009 Annual Report*.

Since that time, the architecture of the Internet has continued to evolve toward more diverse types of interconnection. The most important predicate to this growth in connectivity has been the tremendous investment made in underlying infrastructure. As fiber prices have fallen, some, at least initially smaller (*i.e.*, non-Tier 1) ISPs began to build out their own backbone facilities – as Comcast did. With these new regional network facilities, providers were able to begin to interconnect *directly* with each other rather than *indirectly* through one or more larger

⁷⁸ See, e.g., Christopher S. Yoo, *Network Neutrality or Internet Innovation?*, REGULATION, at 22-24 (Spring 2010); Stanley M. Besen, et al., *Evaluating the Competitive Effects of Mergers of Internet Backbone Providers*, 2 ACM TRANSACTIONS ON INTERNET TECHNOLOGY 187, 189-90 (2002).

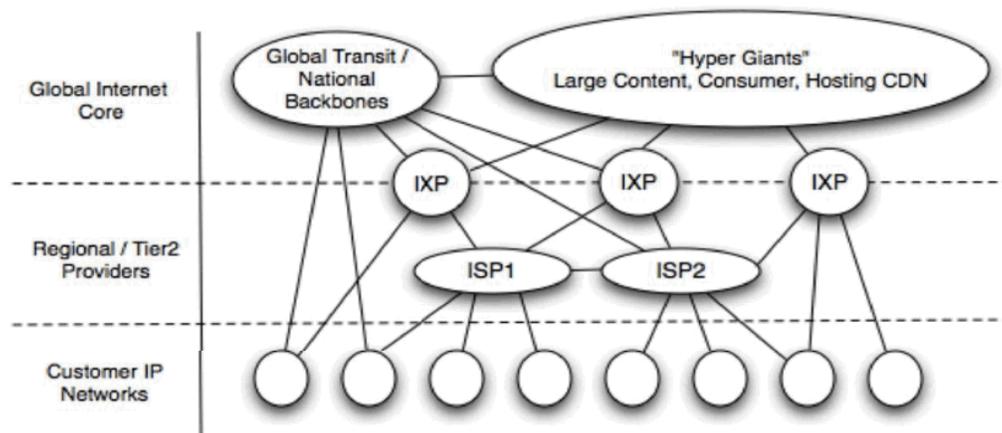
backbone providers. By interconnecting *directly*, non-Tier-1 ISPs were able to diminish their need to purchase transit from backbone providers. This development also gave rise to the development of “partial” transit, in which a provider could offer transit to its interconnected peers and/or purchase transit only to the subset of networks to which it had no direct interconnections. This new generation of agreements has enriched the interconnectedness and redundancy of the Internet backbone by opening a variety of new paths.

More recently, the Internet has seen the evolution of CDNs, which transmit content for the many video and other content providers proliferating on the Internet. And some large content providers, such as Google, have built their own networks to facilitate delivery of their content to ISPs’ networks. Cloud serving entities are now arising as a new major source of traffic that likewise will need ubiquitous connectivity. Some CDNs and major network-owning content providers might rely on transit, but many have also begun to arrange various types of direct interconnection with ISPs instead of, or in addition to, transit arrangements.

As providers outside of the Tier 1 community began to work out this new generation of direct interconnection, new forms of peering arrangements have developed. Traditional peering arrangements are settlement-free and typically exist only between networks whose traffic flows are roughly balanced in some way. As new networks of very different sizes, with very different traffic flows and network reach, began to interconnect directly, providers developed “paid peering” arrangements, which provide for settlement between networks to account for unbalanced traffic flows or any other disparity in “mutual value” of the interconnection. In addition, as noted above, the rise of this expanded direct interconnection among networks gave rise to “partial transit” – transit only to those destinations that a provider could not access via direct peering – and the provision of at least partial transit by a broader range of providers.

Some providers increasingly use a combination of direct peering and transit to reach the same network. As noted, this may be particularly prevalent with CDNs or other providers whose business relies on the ability to send high quality traffic through the best route at the lowest cost at all times. These providers often even have the ability to switch dynamically among their available routes. Beyond this, many large commercial customers also tend to have redundant Internet services, to ensure connectivity in the event that one is interrupted or even congested. As the Commission has noted, such “multi-homing” has become a very prevalent practice among major backbone customers.⁷⁹ This use of redundancy – together with the many routes throughout the Internet that provide a web of interconnectivity (as illustrated in Diagram 2 below) – ensures that there are fewer and fewer opportunities for significant disruption of the Internet based on a dispute between two networks.

Diagram 2. Structure of the Modern Commercial Internet



Source: Labovitz, et al., ATLAS Internet Observatory 2009 Annual Report.

In sum, the Internet has witnessed a sharp trend toward increased interconnectivity. The parties to direct peering arrangements need no longer be Tier 1 backbones, but may include

⁷⁹ Global Crossing/Level 3 Order ¶ 27 (noting “uncontested evidence in the record that 86% to 88% of Level 3 and GCL transit or direct Internet access (DIA) customers are ‘multi-homed’ with providers other than Level 3 and GCL”).

regional backbones, ISPs, CDNs, and traditional content providers, among others. This web of commercial interconnection arrangements has in turn produced an expectation of uninterrupted, universal interconnectivity so strong that a host of business models and applications have arisen – ranging from CDNs to cloud computing to online video to over-the-top VoIP – whose existence depends on such connectivity. And, most important for present purposes, this interconnectivity has not been the product of regulatory fiat, but has arisen from privately negotiated, commercial arrangements that have formed and evolved without regulatory oversight.⁸⁰

3. Transit Provides a Real and Attractive Alternative to Direct Peering, Creating Both Ubiquitous and Competitive Interconnection

As a consequence of the ubiquitous, redundant, and growing connectivity on the Internet, the price of interconnectivity is constrained by market forces – a circumstance that should give regulators comfort rather than giving rise to a need for intervention. One important factor on top of the proliferation of direct peering agreements that has developed in the marketplace is the availability of “transit” as an alternative to peering. The availability of transit in the marketplace ensures that networks interconnect with each other on commercially reasonable terms, and that networks that either do not qualify for direct interconnection or have no interest in seeking direct interconnection with myriad other networks nevertheless have a reasonable marketplace option.

As the Commission recently recognized, transit is readily available and competitive: “[T]here may be as many as 38 providers that sell transit or offer peering on a nationwide basis.”⁸¹ The availability of such transit serves as a significant competitive check on the pricing (where applicable) for direct peering. Suppose, for example, that a network with more traffic to

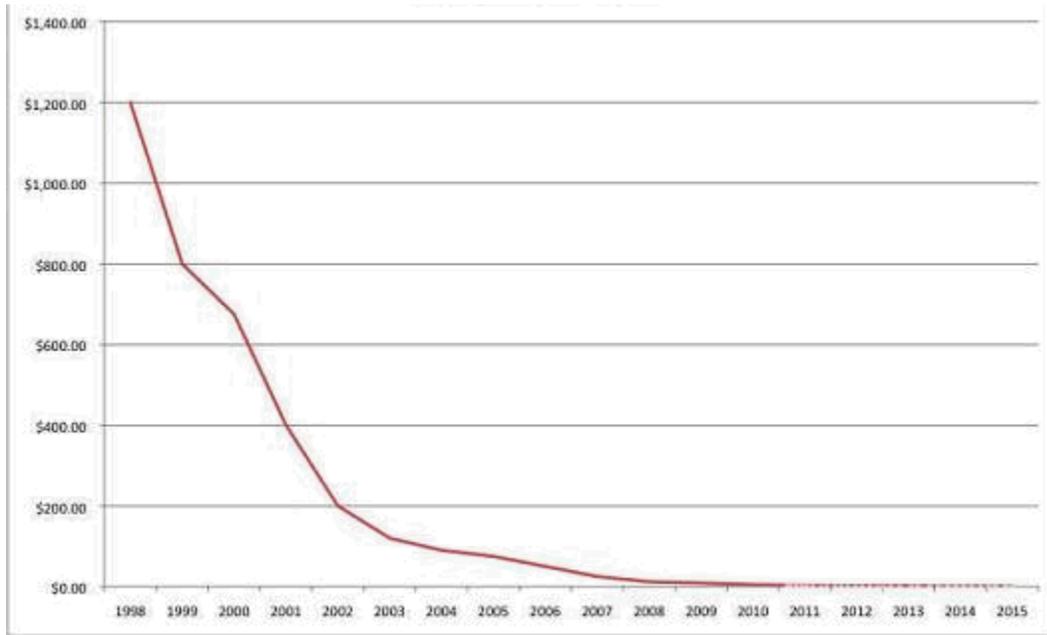
⁸⁰ *Id.* ¶ 18 (“Privately negotiated commercial agreements govern the relationships among entities carrying Internet traffic.”).

⁸¹ *Id.* ¶ 29.

send than it receives (a relatively small network that may serve a significant commercial enterprise or, for example, a CDN), wants to reach network A. That “sending” network (network B) can use transit to reach network A. Network A may, for a variety of reasons, prefer to connect directly with network B. For one thing, in some cases, network A may pay for transit, and thus may *pay* for the privilege of receiving network B’s traffic. But even where this is not the case, network A may prefer to have a direct relationship with B so that it can, for example, plan its facilities deployment rationally based on shared growth predictions; accept traffic onto its network at more rational locations (*i.e.*, closer to the final customer destinations than the transit link); manage traffic flows with its partner to avoid congestion; facilitate its ability to send traffic to network B efficiently where that is relevant; or reduce latency and thereby enhance the value of the connection to both providers.⁸² But to convince network B to connect directly rather than through a transit provider, network A must offer network B more attractive pricing than network B could get from the transit provider (or at least, a combination of better quality with at least competitive pricing). In other words, transit competes with direct interconnection to provide an inroad into any network. And since the price of transit is dropping and has done so consistently over the past decade, as the chart below illustrates, this exerts continued downward pressure on the pricing of settlements for direct paid peering.

⁸² Because accessing a single web page can require the exchange of dozens of messages, even a modest reduction in round-trip times can improve end-user experience. This improvement benefits both end users and content providers, because lower latencies enhance the attractiveness of their content to end users.

Diagram 3. Internet Transit Price
(USD per Mbps)



Source: DrPeering.net

Transit also means that no provider need accept the terms of direct interconnection at all since transit offers ubiquitous connectivity to any provider who wants it. And, as just discussed, some networks use *redundant* routes, connecting to the same network through *both* direct peering and transit arrangements, or through multiple transit routes. A network unhappy with the quality of its direct peering link can often shift traffic quickly to a transit route, which, as noted above, may impose costs on the destination network, which in turn puts pressure on the destination network to ensure that the terms and quality of the direct link are attractive. As the Commission recently recognized, an entity’s ability to send traffic onto a network through redundant routing arrangements has important competitive implications: if any one provider “were to engage in connection degradation or price increases, a large percentage of its customer base would be able to transition easily to another provider.”⁸³

⁸³ Global Crossing/Level 3 Order ¶ 27.

4. **Regulating Interconnection Would Cause Serious Distortions in the Backbone Marketplace**

Any regulatory intervention should be subject to a “rule, familiar to every doctor of medicine: ‘First, do no harm.’”⁸⁴ Here, there are no symptoms of market failure necessitating a regulatory cure. Competition, growth, and innovation on the Internet remain robust. In these circumstances, there is simply no basis for the Commission to abandon its longstanding commitment to an unregulated Internet. On the other hand, there is significant likelihood that imposing regulation here will cause harm given the dynamic nature of the marketplace and the complexity of commercial relationships discussed above.

In particular, there is a pronounced risk that regulatory intervention would create problems and inefficiencies where they do not now exist. Any price regulations would interfere with competitive networks’ “ability to price and diversify their services as the market dictates.”⁸⁵ Mandated access could deter investment by both the firm getting the benefit of the access rules and the network that is required to provide that access. And any regulatory framework patterned on regulation of the PSTN would be a particularly poor fit, given that assumptions made with respect to the PSTN simply have no place in the context of the Internet.

(a) Marketplace Participants’ Relative Bargaining Power Is Difficult to Assess

In the PSTN world, distinguishing the parties that should have interconnection obligations from those that should have interconnection rights was a relatively simple task. There was a legacy provider in every local geographic area that controlled the communications

⁸⁴ *Denver Area Educ. Telecommunications Consortium v. FCC*, 518 U.S. 727, 778 (1996) (Souter, J., concurring).

⁸⁵ *Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefor*, Further Notice of Proposed Rulemaking, 84 F.C.C.2d 445, ¶ 30 (1980).

marketplace and all access to customers. A newcomer could enter only if those legacy providers opened their networks. Thus, the participants capable of harmfully exercising market power were readily identified.

The Internet ecosystem is fundamentally different. From its inception in 1995, the Internet marketplace has been characterized by the absence of a dominant network. As discussed above, the number of networks and the relationships among them have only multiplied since then, creating a complex web of meshed interconnectivity and interdependence. There are no terminating networks on the Internet that, like the incumbent LECs in the PSTN, possess monopoly power that can reasonably be addressed by regulation.

Rather, as noted above, major eyeball networks today serve as much originating as terminating traffic. Comcast, for instance, a major “eyeball” network, has balanced traffic with its peers, and some entities thought of as “transit” networks may in fact serve smaller networks and large commercial businesses and in that sense directly serve many “terminating” eyeballs of their own. Beyond the fact that market participants play varied roles, and as also discussed above, CDNs and content providers enjoy as much bargaining leverage as any individual ISP. Because both content providers and end users demand universal connectivity, any eyeball network that is unable to deliver connectivity to Google, Netflix, Facebook, iTunes, and other content and applications will not be able to provide a viable service.

The varied roles that any one provider may play on the Internet can fundamentally change assumptions about who has market power. A transit provider tends to *charge* most smaller ISPs for the privilege of receiving traffic from and sending traffic to the rest of the Internet. (Transit providers tend to charge based on the biggest flow of traffic in *either* direction, into or out of the customer network.) In other words, in this relationship, the ISP with so-called

“terminating monopoly power” is in fact at the mercy of the *transit* provider and the terms that provider sets for interconnectivity to the Internet.

In the above scenario, a content provider or a CDN that might use transit to reach that terminating ISP may also have significant bargaining power in terms of achieving direct interconnection. That content provider imposes *costs* on the terminating network each time the provider sends its content to the network via the transit provider. When the content provider approaches the terminating ISP and seeks *free* interconnection, its ability to use paid transit that costs the ISP money provides it with a ceiling on any demand by the terminating ISP; the content provider can also offer to reduce the ISP’s costs by dropping traffic off at more efficient locations and the like – or might be able to threaten to increase costs by using an even less attractive transit route to the ISP. In short, again, traditional notions of which provider is in control of the terms of the relationship will not necessarily apply.

This same shifting and uncertain bargaining power exists among all providers. A CDN with multiple routes into a large ISP can impose costs even on that larger ISP by delivering traffic indirectly and inefficiently, at locations far from the end-user customer. A CDN with dynamic routing capabilities can disrupt the ISP’s traffic planning by shifting traffic quickly to any available open transit link into the ISP’s network, thereby causing repeated congestion incidents. And the CDN can, of course, send traffic through an expensive transit route that costs the ISP money. In this environment, attempting to divine the relative bargaining leverage of parties to an interconnection arrangement presents an intractable task. Negotiations over interconnection take place against a backdrop in which each network – regardless of the outcome – will have several routes over which to deliver traffic to the end users of the other. This means that the providers on both sides of any interconnection agreement may find it mutually beneficial

to reach a direct interconnection agreement to reduce transit or facilities-related costs and improve network reliability. Attempting to ascertain which party to the negotiation stands to obtain the greater benefit from direct interconnection and which party should be made to shoulder the costs of a transit arrangement are complicated tasks with dynamic answers, and are best addressed by market interactions.

Finally, because there are no “certification” requirements on the Internet, it is important for the Commission to understand that creating an interconnection right for a certain “type” of party could mean that literally thousands of businesses suddenly become players armed with new regulatory opportunities – and because there are no “local markets” on the Internet, this means that these thousands of entities could make requests at any one interconnection location. These may be tiny companies with one server, or massive international networks. And a tiny entity that is given an interconnection right today can, as discussed further below, open up its path to another network, becoming a major channel for traffic flows virtually overnight. Finally, identifying a certain class of providers that may have rights or obligations will not ensure that a business that fits that model will not add to or change its business model in subtle ways once it has interconnection, and may foreclose legitimate new flavors of providers that evolve in the constantly changing Internet marketplace. The players and the business models in this ecosystem are radically more dynamic than on the PSTN: the Internet marketplace is proving that it can respond quickly to these evolutions, but a static regulatory regime could do serious harm.

(b) Regulatory Intervention Could Lead to Arbitrage Opportunities and Hinder Efficient Cost-Sharing

Regulation of IP interconnection could promote opportunistic behavior and hinder efficient cost-sharing. Consider first a rule that either mandated bill-and-keep or set a default

price for IP interconnection. Such a rule would immediately distort efficient outcomes by providing the beneficiaries of regulation an artificial ceiling on the prices they would pay regardless of the costs they impose on other networks or consumers.

Absent regulation, a CDN that transports content from its content-provider customers and a retail-access ISP have mutual incentives to minimize their combined costs for transporting content from content providers to end users. Suppose that the CDN bears a cost of \$3 million for transporting the content to the ISP, which then bears a cost of \$8 million to transport this content to end users. If the ISP became aware of a method for delivering the traffic that would increase its own costs to \$9 million, but reduce the CDN's costs to \$1 million, it would be economically efficient for the ISP to adopt the new method, because doing so would reduce the parties' combined cost of transporting the content from \$11 million to \$10 million. In this example, if the CDN were to pay the ISP an amount between \$1 million and \$2 million to adopt the new method, both the CDN and the ISP (and ultimately their customers) would be better off.

If the terms on which networks carry each other's data traffic are regulated, however, the parties' incentives change: rather than seeking to reduce their combined costs, which would be efficient for the system as a whole, they will instead seek to obtain the best deal they can under the applicable regulatory framework. If interconnection were mandated on a settlement-free basis in the example above, the ISP would no longer have any incentive to make the \$1 million investment to reduce the CDN's costs by \$2 million, because the ISP would receive no economic returns from making that investment.

Maintenance of mutual incentives for efficient cost-sharing is particularly critical for IP interconnection because the coordination needed to minimize costs is multilateral. An originating network can cause inefficiencies and impose costs on a so-called "terminating"

network by, for example, dropping off traffic destined for New York at a Los Angeles port rather than delivering it at the New York port or at least a port located on the East Coast. This rerouting imposes costs on the terminating network and is inefficient, but it may reduce the originating network's costs. Importantly, this is not something that is within the control of the terminating network, except as a function of contract, and then only when the two networks are directly interconnected and are not exchanging traffic through a transit link. While it is difficult enough for parties to police commercial contracts that prevent such opportunistic behavior, regulation could eliminate the incentive to negotiate such contracts at all – or could provide parties with one-sided rights or obligations, allowing some parties to take advantage of “open” links and/or providing full bargaining power to a party on one side of the equation and removing that power from the other side.

Regulation could also create arbitrage opportunities that allow providers to impose significant costs on other networks – an issue that the marketplace struggles with today, but that is addressable where parties are free to renegotiate agreements, to suggest that an unsavory partner choose an indirect rather than a direct interconnection route, or to use other commercial measures to protect themselves and their customers. Assume, for example, that the Commission were to insist that a certain class of requesting providers have a “bill and keep” relationship with so-called terminating providers. Such a provider could then use its regulatory interconnection arrangement to attract thousands of others who might want to send traffic onto that terminating network, and even sell that “partial transit” link for a profit. This could happen literally overnight on the Internet.⁸⁶ It would be very difficult for the terminating provider to attract any

⁸⁶ In other words, if network A has a settlement-free (or low cost) peering arrangement with network B, network B can sell access to A via B's peering link to networks C, D, and E. This can happen in less direct ways as well. Network A may have a reasonable transit arrangement

other parties sending traffic over that free link into a direct interconnection arrangement with it, since it could hardly offer to beat the “free arrangement” – and even if it could do so with providers that cared about a quality interconnection, new traffic would quickly fill in the gaps. Or, as has happened in the past, the sending provider could suddenly change its business model and become a CDN, suddenly causing its traffic volume to multiply by ten, twenty, or even fifty times the initial estimates.

In a regulatory scenario, the “terminating” network would presumably have to continue to receive all this traffic, and provision capacity, until regulatory relief could be arranged – and relief could be slow in coming. Meanwhile, another provider’s transit or CDN business costs would be imposed on the terminating carrier. While these scenarios occur in the Internet today, providers have commercial tools that allow them to respond. Regulation could freeze relationships or open up these direct and indirect arbitrage loopholes throughout the complicated web of relationships on the Internet.

The notion of imposing a concept such as “bill and keep” on the Internet also fails to reflect the very significant differences among the networks that make up the Internet today. A terminating network has very different costs than a CDN network, for example. Even if a CDN must transmit one movie, for example, or web page, across a thousand network miles to reach a carrier-neutral facility where it has a server that interconnects with a terminating ISP, it typically will send that movie or web page to the server only once, or a handful of times. The terminating ISP, however, might send that same movie or webpage many thousands of times throughout the local network served by that server (or, if the content has been delivered at a distant network, the

with network F, which in turn provides transit from network G. If pricing is low enough on these links, network G may decide to “resell” the route through F to A, suddenly causing traffic on network F to balloon and congesting the route to A through that connection.

ISP might have to first haul the traffic to another local network area and *then* serve it to thousands of end users).

And the costs of deploying the Internet and supporting its growth have typically been borne collectively by all players through the very complex, two-sided relationships described above. *All* providers contribute to the Internet's growth and expansion, since all benefit equally from it. Allowing some providers to impose their costs on others – and specifically, on so-called terminating networks – will cause a massive shift of costs to those providers and to their end users. That result is in direct tension with this Administration's and this Commission's interest in promoting broadband *adoption*, as well as broadband *deployment*, which can take place only in an environment in which investment incentives are sound and costs are not imposed by regulatory fiat by one set of providers on another. Interconnection regulations also often include requirements imposed on one provider to ensure “adequate” or “quality” interconnection links – but here again, the implications for the Internet would be troubling. While that type of rule may seem innocuous enough, the fact is that in the context of the Internet, it could be extremely unfair and one-sided and lead to real marketplace distortions.

As discussed above, in many circumstances, an originating carrier can use dynamic routing to avoid congestion, so that the originating carrier will always send traffic through the least congested port. While that may seem reasonable, it also complicates network planning for the terminating network. As soon as the network provisions capacity on any transit link, traffic may migrate very quickly from other ports to the newly provisioned capacity – even if the purpose was to provision that capacity for new traffic in that geographic location. The provisioning network may find itself in a continuous game of “catch-up” as it tries to ensure sufficient connectivity on these transit routes. This is not a problem to the same degree with a

directly interconnected peer – which, as noted above, creates incentives for direct interconnection. But regulatory intervention creating fixed obligations could distort these incentives in significant ways. On the other hand, however, rules designed to prevent dynamic rerouting would interfere with the fundamental operation of the Internet.

(c) *Regulation of IP-to-IP Interconnection Would Stunt the Internet’s Development by Reducing Flexibility and Investment Incentives*

Regulation would also reduce investment incentives and constrain the ability and incentive of networks to experiment with alternative architectures and commercial arrangements. As one industry observer has noted, “[i]n the absence of some reason to believe that policymakers will be able to anticipate which architecture will ultimately emerge as optimal, mandating one architecture over another has the unfortunate effect of foreclosing exploration of the potential benefits of alternative approaches.”⁸⁷ The unregulated environment leaves dynamic business decisions with the actors that are closest to the technological and commercial needs and therefore best suited to drive change in the myriad systems comprised by the Internet.

Had regulation governed transit prices or compelled access to backbone networks during the Internet’s first decade, incentives to invest in network facilities and engage in efficient cost sharing would likely have been critically diminished and with them the prospect for the efficient arrangements that the marketplace has produced.⁸⁸ Instead, in an unregulated marketplace,

⁸⁷ Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 94 GEO. L.J. 1847, 1851 (2006).

⁸⁸ See Daniel F. Spulber & Christopher S. Yoo, NETWORKS IN TELECOMMUNICATIONS: ECONOMICS AND LAW 39 (2009) (“Regulations that constrain access prices below market rates or compel access reduce incentives to invest in network facilities, while at the same time stimulating demand for network services. Regulatory price constraints and compelled access requirements will not be responsive to increases in market demand, in contrast to market prices, thus further lowering incentives to invest.”).

various participants in the Internet ecosystem invested in new network infrastructure.⁸⁹ Absent market-generated transit pricing, these participants' incentives to make efficient investments in new infrastructure would have substantially diminished.⁹⁰ In addition, had the Commission regulated the Internet in its first decade, the regulatory framework it imposed might well have entrenched the hierarchical structure of the Internet that, at that time, was taken as given. Such a regulatory framework might have defined terms on which an ISP could obtain transit from a regional network, the terms on which a regional network could obtain transit from a backbone, the terms on which backbones could peer with each other, and so forth.

The importance of preserving network owners' latitude to experiment with alternative interconnection regimes is even more important today than it was in the Internet's first decade. Peering networks' experimentation regarding the number and geographic dispersion of ports through which they interconnect provides one illustration. Today, networks in a direct peering relationship meet at a carrier-neutral facility and can buy just that network's access or transit. Historically, this has been at a few ports throughout the network. A nascent industry trend, however, has involved interconnection at several regional ports, each serving only a part of the

⁸⁹ See *supra* at 35-36 (explaining that, in order to minimize transit costs, traditional content providers and providers of residential Internet access have built out backbone networks).

⁹⁰ The cost of transit continues to spur innovation and investment in the Internet. For instance, Vudu, Inc., a content delivery media technology company acquired by Walmart in March 2010, distributes full-length movies over the Internet to end users' televisions via a dedicated set-top box that is external to or integrated into a television or Blu-ray player. Each device is fitted with a large hard drive; the first few seconds of every movie in Vudu's catalog are loaded onto the hard drive, ensuring instant playback when the end user selects a movie. The rest of the movie is pieced together via an Internet connection to the device, using peer-to-peer networking from other Vudu devices that have stored that content. As a result, a user is able to watch high-definition movies with no delay with as little as a 4 megabit-per-second broadband connection. In this way, Vudu uses its customers' own broadband connections to deliver content to other users in lieu of paying transit to a CDN or backbone service.

terminating network. And some networks have begun experimenting with an even greater number of metro ports, each serving an smaller portion of the terminating network.

If a regulatory framework were to grant networks an interconnection “right” at a few ports throughout the network, the framework could “short-circuit the process of network reconfiguration by effectively locking the existing interfaces into place.”⁹¹ “At best, the natural evolution of network configuration will be delayed.”⁹² At worst, conferring an interconnection “right” at a few ports throughout the networks would “preempt the process altogether and prevent innovation.”⁹³

(d) *The Commission’s Approach to the Internet Should Be Consistent with the Policies that the U.S. Government Has Urged Other Countries to Adopt*

It would be particularly wrong for the Commission to depart from these principles at the very same time the U.S. government is advocating them to the international community. Proposals to regulate the Internet by regulatory bodies in other countries have been met with strong criticism by U.S. officials. Assistant Secretary Strickling last year forcefully articulated the Administration’s unequivocal opposition to government regulation of the Internet:

The United States is most assuredly opposed to establishing a governance structure for the Internet that would be managed and controlled by nation-states. Such a structure could lead to the imposition of heavy-handed and economically misguided regulation and the loss of flexibility the current system allows today, all of which would jeopardize the growth and innovation we have enjoyed these past years.⁹⁴

⁹¹ Spulber & Yoo, *supra* note 88, at 170.

⁹² *Id.*

⁹³ *Id.*

⁹⁴ Assistant Secretary Lawrence E. Strickling, National Telecommunications and Information Administration, U.S. Dept. of Commerce, Remarks at the Danish Internet Governance Forum, Copenhagen, Denmark (Aug. 23, 2011), *available at*:

Ambassador Verveer similarly has emphasized in remarks before a foreign audience that IP interconnection was accomplished organically in the United States without the need for government prescription or guidance.⁹⁵ He explained that Internet backbone transmission companies of all sizes have reached interconnection agreements solely in response to rational economic incentives.⁹⁶ In contrast, regulation, whether by individual foreign governments or intergovernmental bodies, “inevitably would diminish the dynamism of the Internet.”⁹⁷ That principle applies equally to unnecessary regulation by the Commission of properly functioning commercial relationships. Put simply, any Commission initiative to impose regulatory controls on the Internet would be flatly inconsistent with the policies that the Administration has urged foreign governments to adopt and would undermine the Administration’s efforts to avoid ITU regulation.

VII. CONCLUSION

For the foregoing reasons, the Commission should adopt the transition plan for 8YY traffic proposed herein, ensure that transit remains available at reasonable rates, permit voice service providers to continue to rely on tariffs and interconnection agreements governing

<<http://www.ntia.doc.gov/speechtestimony/2011/remarks-assistant-secretary-strickling-danish-internet-governance-forum>>.

⁹⁵ See Ambassador Philip L. Verveer, Coordinator for International Communications and Information Policy, U.S. Dept. of State, “The Future of Internet Governance,” Remarks at the Russian State University of People’s Friendship, Moscow, Russia (May 12, 2010), *available at*: <<http://www.state.gov/e/eb/rls/rm/2010/168623.htm>> (“The very important point here is that commercial lawyers and their clients worked out a very elaborate economic regime that aligned the economic incentives in a way that has induced a remarkable and remarkably productive level of cooperation.”).

⁹⁶ *Id.*

⁹⁷ Ambassador Philip L. Verveer, Coordinator for International Communications and Information Policy, U.S. Dept. of State, Remarks at the Broadband Policy Summit VI, Washington, DC (June 11, 2010), *available at*: <<http://www.state.gov/e/eb/rls/rm/2010/168622.htm>>.

intercarrier compensation, and eliminate CAF support for incumbent LECs. In addition, the Commission should refrain from taking any steps to impose regulatory controls on the Internet. Instead, the Commission should allow market forces to continue to drive Internet growth and innovation.

Respectfully submitted,

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