

In the Matter of

VCXC Petition For Notice of Inquiry On The
Migration To HD Voice

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) WC Docket No. 14 - _____
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Federal Communications Commission
Office of the Secretary

**VCXC PETITION FOR NOTICE OF INQUIRY ON THE
MIGRATION TO HD VOICE**

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A satisfactory outcome to the IP transition requires more than merely redeploying legacy PSTN services in an IP context. The transition to IP is occurring because – from the perspective of the communicating public – the benefits, ease of use, and universality associated with the PSTN have proved insufficient to sustain its viability. The Commission cannot ignore market forces reversing a century of steady growth in PSTN access lines. Attempting to preserve network values for the shrinking base of users of legacy voice services offers no benefit for the vast majority of the public.¹ Instead, the Commission should facilitate the migration to HD voice as part of the IP transition, which would provide an antidote to collapsing interest in standard definition voice services.

The FCC has identified three topics as the focus of IP transition planning – the TDM to IP, copper to fiber, and wireline to wireless transitions. But this focus frames the IP transition only from the perspective of a negative – what might go wrong as the consuming public migrates away from traditional voice services. These topics ignore important opportunities for the IP transition to benefit end users, specifically through the introduction of innovative services such as HD voice.

Furthermore, the current focus of IP transition planning positions the FCC as a defender of legacy services that the public is increasingly abandoning. The various forms of broadband serve as mere inputs to the communications experience, and the migration of the communicating public to non-regulated information services and less regulated wireless services reflects the relative value proposition of these services. However, the inherent fragmentation of over-the-top services leaves the public at risk of closed and proprietary services, thereby losing the communications benefits of a ubiquitous PSTN.

¹ FCC Technology Advisory Council, Critical Legacy Transition Working Group, Sun-setting the PSTN, at 1 (September 27, 2011) (“Our population is quickly migrating to voice services that are not part of the traditional PSTN, thus negating the assumption, that the current system of PSTN regulation and subsidy can continue to support our social and economic needs as a nation. Examples include: 3G and 4G cellular; VoIP; over the top services such as Skype; and many others.”), http://transition.fcc.gov/oet/tac/tacdocs/meeting92711/Sun-Setting_the_PSTN_Paper_V03.docx.

HD voice as a replacement to standard definition voice offers a means to retain the demand for voice services and provide a necessary revenue stream to fund broadband network deployments. All the precursors for the migration to HD voice are in place. The redeployment of voice services to an all-IP network represents a significant undertaking, but the HD voice migration would add no incremental cost or complexity to the IP transition.

Migration to a new common HD standard replacing the obsolete standard definition voice will not occur spontaneously. No network operator completes more than 10 percent of customer calls without the assistance of other networks. Unilateral voice quality improvements by even the largest operators would still leave the vast majority of calls unimproved. And, despite the expanding reliance on text modes of communication, voice remains by far the dominant mode of communication in daily life. Expanding the IP transition to include HD voice would avoid many of the interconnection disputes that plagued the PSTN and that threaten IP networks.

Facilitating the migration to HD voice by the entire industry will produce tangible public interest benefits, including: (i) enhancing the quality of voice communications for all consumers, particularly the disabled; (ii) improving the global competitiveness of communications infrastructure in the United States; (iii) eliminating delays and complications associated with the Section 214 service discontinuance process; (iv) providing a clear means for tracking progress as the IP transition unfolds; (v) offering a meaningful method of engagement with the public about the IP transition; and (vi) serving as a foundation to promote the benefits of the IP transition. The Commission's leadership is necessary if the benefits of HD voice are to be realized fully and promptly.

Accordingly, the Commission should grant the Petition and issue a Notice of Inquiry on the migration to HD voice.

II. DISCUSSION

A. The HDTV Transition Provides a Helpful Model for the Migration to HD Voice

The HD voice migration can proceed much like the migration to HDTV, which was industry led but Commission-facilitated. At this juncture, all that is required is for the FCC to include HD implementation as an objective of the IP transition.

The HDTV migration provides a prominent example of a successful technology transition. The migration from standard definition TV to HDTV traces to an entrepreneurial effort in Japan and a competitive response in America. The general public made no demands on television manufacturers or broadcasters to improve the quality associated the decades old NTSC standard. The FCC took on the challenge of supporting a common HDTV standard after a petition by the Association for Maximum Service Television.² The subsequent convening of the Advisory Committee for Advanced Television Service rallied industry around a common HDTV implementation. The risks of fragmentation in the case of television manufacturing motivated the FCC to support a common HDTV standard.

In the case of standard definition voice services, the 3.3Khz frequency arose as the standard through subjective testing conducted by Harvey Fletcher at AT&T Bell Laboratories in the 1930's. The standard persists 80 years later, even though it predates the invention of the transistor and computing by more than a decade. Its longevity should not be construed to mean that the communications public is disinterested in voice quality. Rather, the public have taken voice quality for granted as they have enjoyed advances in others communications functionality - telegraph, telephone, radio, television, Internet, and the various incremental improvements in each.

As the country stands on the cusp of the transition to IP networks, there exists again the risk of the fragmentation of voice services. To avoid this risk, the Commission should facilitate the migration to HD voice in a manner precisely analogous to the digital transition in television.

² See *Petition For Notice of Inquiry The Impact of Advanced Television Technologies on Local Television Broadcasting*, MM Docket No. 87-268 (filed February 13, 1987).

B. The Migration to HD Voice is Essential to Preserving Voice Communications

The IP transition imperative reflects the transformation of the communication services landscape by the arrival of the commercial Internet in 1995. The dramatic differences between available communication services in 1994 and 2014 should inform IP transition planning. The still proliferating products and services owe to the 1000 fold increase in routine connectivity from the 9.6Kbps dial-up modem to 10Mbps broadband service. The same 20-year period, however, generated no improvement in the value proposition of a telephone call, and thus the resulting decline in call volumes undermining support for the PSTN should come as no surprise.

Navigating the competitive realities of the communications free-for-all requires appreciation of the ability of end users to move seamlessly between different types of services. Email, a text, or a web search displaces telephone calling in many contexts, which makes voice services as a separate communications market a dubious proposition. Increasing end user interest in voice as compared to all manner of over-the-top text, video, and the elaborate communications functionality associated with social media necessitates an upgraded voice service, which common HD implementation can achieve.

The retirement of the PSTN ends the direct connection between network ownership and service revenue. The structural separation of connectivity and services in IP networks unleashes the same forces in telecommunications as those driving innovation in the information technology industry. The IP transition turns telecommunications into an information technology industry. The Moore's Law and software driven market for over-the-top services generates new communication options on a daily basis. The migration to HD voice reflects a recognition that no service can remain unimproved yet hope to compete for end user time and attention in the intensely competitive communications market.

C. Network Operator-Provisioned Services Remain Essential For Network Investment

The notion that over-the-top services can meet all the communications needs of end users is a popular but unstated assumption held by a cross section of industry, government, and the public interest community. The failure to include an upgrade of voice services through a common HD implementation as part of the IP transition would turn the assumption into policy. Indeed, the shrinking revenue prospects for standard definition voice risks making an over-the-top only world a reality, in the absence of an HD voice migration. Such a world poses significant risks to network investment.

No one would seriously dispute that network operators require revenue streams that justify the significant investments required to construct, maintain, and operate their networks. However, broadband revenues – standing alone – are unlikely to provide the necessary financial incentives for network operators. The existing competition between IP and TDM networks for customers and by extension the competition between over-the-top services and the network operator-provisioned services will transform as the IP transition proceeds. The IP transition converts over-the-top and network operator-provisioned services into complementary sources of revenue obtaining a return on investment for a single network. Although demand for broadband associated with over-the-top services benefit network operators, the migration to HD voice represents a source of revenues from network operator-provisioned voice that will compete against over-the-top services. The prospect for investment in networks and the value of networks improve as the portfolio of both network and over-the-top services expand through a virtuous cycle.

D. Voice Service Fragmentation Threatens The Public Interest

The circuit-switched PSTN remains in the call flow for nearly every telephone call on the planet for a simple reason. There remains significant value in the cohesion available through the well-established federation of network operators underlying the telephone network. Preserving the cohesion of voice services should represent an important objective of the IP transition. Inherent fragmentation makes over-the-top services an inadequate substitute for the universality of legacy voice services.

Closed and proprietary implementations increasingly dominate communication services.³ Sustaining the benefits of uniform voice services requires addressing a significant collective action problem, which can be addressed in the IP transition in connection to the migration to HD voice.

E. **Migration To HD Voice Adds No Incremental Cost Or Complexity To The IP Transition**

The global redeployment of universal voice service to IP networks represents an enormous undertaking. However, the decision to upgrade voice services through a common HD implementation adds no incremental cost or complexity to the challenge associated with the IP transition. The nature of Internet Protocol leaves the vast majority of issues arising in the IP transition independent of decisions regarding particular services or voice codec.⁴ To the extent service-specific issues arise, the distinctions between standard definition and HD do not affect cost or complexity.

First, HD voice is readily enabled from an equipment standpoint. Network equipment vendors already include HD in software revisions. Smart phones and LTE-capable handsets in the mobile realm includes HD voice support by default, and all enterprise IP phones sold in the last five years support HD voice. The Cordless Advanced Technology (CAT iQ) standard associated with DECT phones already supports HD through G.722.⁵

Second, upgrading the provision of telephone numbers to support HD voice from a network perspective imposes no costs on end users. End users can delay upgrading devices to IP or HD at their option by using one of the many IP adapters on the market.

³ Email, web, and other IP services with unified addressing trace to the period before commercialization of the Internet in 1995. Subsequent IP services development include no successful examples of network service federations upon which the PSTN was successfully built.

⁴Standards for the compression and decompression preserving HD fidelity of the voice signal include G.722, AMR-WB, Opus.

⁵See DECT Forum <http://dect.org>.

Third, there exist no significant differences in the consumption of bandwidth by HD and standard definition connections. Thus, migration to HD voice will not come at the expense of other broadband offerings.

In short, all the costs and complexities associated with the IP transition exist whether or not the Commission supports a common HD implementation.

F. HD Voice Migration Will Help Facilitate IP Network Interconnection

Expanding the IP transition to include HD voice would help resolve the controversies and market distortions arising from proposals to extend the legacy PSTN interconnection regime to IP networks.⁶ Three factors that have contributed to demands to mandate IP network interconnection dissolve with the migration to HD voice:

1. Linking physical connectivity and service layer interconnection in the PSTN allows network owners to control services. The IP transition decouples connectivity and services, so withholding interconnection no longer assures service revenue as demonstrated by the robust market for over-the-top services.

2. The limitation of the PSTN to a fixed service offer and largely fixed revenue base makes interconnection a zero sum allocation of scarcity. Service interworking in the context of the IP transition can support a vibrant expansion of services. The contribution of new IP services to average revenue per user benefits operators independent of network size and independent of any market power that such operators may wield.

3. The value of TDM networks and by extension the enterprise value of network operators in the case of the PSTN reflect scale and operating efficiency as the only sources of value when there exists no prospect for new types of service revenue. By contrast, the value of IP networks and by

⁶See *Petition For Declaratory Ruling That tw telecom inc. Has The Right To Direct IP-to-IP Interconnection Pursuant To Section 251(c) Of The Communications Act, As Amended, For The Transmission And Routing Of tw telecom's Facilities -Based VoIP Services And IP-In-The-Middle Voice Services*, WC Docket No. 11-119 (filed June 30, 2011).

extension the enterprise value of IP network operators reflect network functionality that is dependent upon IP service interworking.

Collapsing demand for standard definition voice pushes network operators into irreconcilable disputes over the allocation of diminishing revenues. Interconnection disincentives become even more intense due to the complex cross-subsidies built into the legacy interconnection regime. The unwinding of the market distortions arising from these arrangements through the reforms of universal service and intercarrier compensation in the ICC/USF Transformation Order are underway but not yet complete, which leaves significant financial distortions in place for the next several years.⁷ This source of inertia to the more efficient IP service interworking necessary for the IP transition exists only as long as standard definition voice remains the only source of voice revenue. The emergence of HD voice as an alternative to standard definition voice entirely alters the revenue maximizing calculus.

The Commission can include support for a common HD implementation as a function of its broad numbering authority. All forms of HD voice require an end-to-end IP connection; no operator can claim to offer end users HD voice services without extending IP service interworking to all other operators. Physical data layer IP interconnections already exist and benefit from a robust unregulated commercial ecosystem. Attempts to intervene with rules regarding the interworking of IP services threatens substantial unintended and unknowable consequences. Implementing the HD voice migration through the Commission's numbering authority (as opposed to other statutory bases) would avoid the jurisdictional uncertainties and legal controversies arising from the reality or perception that the Commission would be "regulating the Internet."

G. Migration To HD Voice Offers Numerous Other Benefits

⁷See *Report and Order and Further Notice of Proposed Rulemaking, Connect America Fund et al.*, 26 FCC Rcd 17663 (2011)

In addition to bolstering the economic viability of networks and avoiding interconnection disputes, the migration to HD voice offers numerous offer public benefits.

First, HD voice would enhance the quality of voice communications for all consumers, particularly the disabled. The benefits of HD for accessibility reflect the value of a broader frequency response for the hearing impaired and the visually impaired relying exclusively on voice communication. HD voice also would address lost productivity and routine errors associated with standard definition voice, which is often marked by requests that a caller repeat words, speak slowly, or speak louder – requests that underscore the deficiency of standard definition as a basis for communication.

Second, the migration to HD voice would improve the global competitiveness of communications infrastructure in the United States. The country already lags seventy countries around the world pursuing HD voice migration from China to Rwanda. Voice communications underlie all economic activity, which are largely based on personal relationships. There are significant risks in allowing the United States to fall further behind in the deployment of advanced communications services such as HD voice.

Third, an IP transition with an explicit upgrade of services through the HD voice migration avoids delays and complications associated with the Section 214 service discontinuance process. Section 214 provides that “[n]o carrier shall discontinue, reduce, or impair service to a community, or part of a community, unless and until there shall first have been obtained from the Commission a certificate that neither the present nor future public convenience and necessity will be adversely affected thereby.” 47 U.S.C. § 214(a). There may persist uncertainty around the direct substitution of broadband services for legacy voice services,⁸ but a comprehensive HD voice migration would provide a path to upgrade (not to “discontinue, reduce, or impair”) all the modalities of legacy voice services.

⁸See *Petition of USTelecom, Petition of USTelecom For Forbearance Under 47 U.S.C. § 160(c) From Enforcement of Certain Legacy Telecommunications Regulations*, WC Docket No. 12-61, at 59-63 (filed February 16, 2012).

Fourth, including the migration to HD voice as part of the IP transition would provide a clear means for tracking progress as the transition unfolds. Progress in the IP transition becomes quantifiable in terms of upgrading the 700 million numbers in circulation in the United States to support HD voice by the 2018 date certain identified by the FCC Technical Advisory Council.⁹ The Commission can include other features and functions as a part of defining the IP transition as a transition of telephone numbers to “IP numbers.”¹⁰

Fifth, the HD voice migration provides a means to engage the communicating public actively in the IP transition. The existing promise to “Do No Harm” does not qualify as a public benefit or seem likely to ease the anxieties of consumers who view communications services as essential to daily life. By contrast, because the public already equates HD with quality, the prospect of an upgrade in voice services from standard definition to HD resulting from the IP transition would offer a far more compelling narrative than the present vague association of the IP transition with future and unquantified benefits.

Finally, the positive narrative associated with the HD voice transition can serve as the foundation for a charm offensive by network operators to speed the IP transition. The risks of costly delays in the IP transition due to public reluctance around real or imagined disruptions makes it imperative to frame the IP transition as an upgrade of communications infrastructure and services. An upgrade offers the prospect of an ultimate payoff as the basis for risking disruption. The migration to HD voice highlights the new alignment of the interests of network operators and end users resulting from the IP transition. The value of IP networks from an investment perspective and the utility of

⁹*FCC Technology Advisory Council, Status of Recommendations*, at 11, 15-16 (June 29, 2011) (recommending the Commission establish 2018 as a date certain for the “PSTN sunset”), <http://transition.fcc.gov/oet/tac/TACJune2011mtgfullpresentation.pdf>.

¹⁰The road map for the HD voice transition of the 350 million numbers associated with mobile devices already exists as HD voice represents the default mode for deployment of Voice over LTE.

networks from an end user perspective both require a steady expansion of network functionality that HD voice represents.

III. CONCLUSION

The urgency of improving the value proposition of voice services represents the singular lesson of the 21st century communications landscape. The declining revenues of standard definition voice services reflects the unassailable verdict of the communicating public. The FCC can join with network operators in a commitment to expand the value proposition of voice services through a Notice of Inquiry on the migration to HD Voice and give the communicating public a powerful new reason to support the IP transition.

Respectfully submitted,



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