

Proposal: HD Internetworking Committee

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The HD Voice Future

The prospect of moving telecom from standard definition (SD - 3.5KHz) to high definition voice (HD - 7KHz) remains a little discussed consequence of expanding IP based phone and networking gear deployments. HD voice offers a means of addressing the forces shrinking wireline and wireless voice traffic. Realizing this promise requires a means of linking fragmented VoIP networks without relying on the regulatory centric approach applied in traditional voice network interconnection. The proposed HD Internetworking Committee (HDIC) represents a self-regulatory means of HD voice interconnection.

The motivation for the HDIC arises from the fact interconnection disputes historically provide the triggering events for regulatory intervention. Disputes arise where the withholding of interconnection gets applied as a means of preserving market power. The proliferation of non-interconnected service providers at the beginning of the 20th century led to the Kingsbury Commitment, and, eventually, the creation of the FCC in the US and similar developments elsewhere. Skype's refusal to interconnect and the still persisting fragmentation of SIP based VoIP networks illustrates the unsolved nature of the problem.

The HDIC proposal departs from earlier attempts addressing this issue by focusing on the alignment the network owner business motivations rather than a specific technology solution. The HDIC facilitates internetworking via an opt-in process and adoption of a uniform commercial internetworking agreement (UCIA). Participants in the HDIC process obtain introductions and access to the template UCIA. Companies representing the full range of scale and market power benefit from preserving the unregulated status and potential for HD internetworking to win new voice services revenue.

The status quo gives unregulated innovation driven companies like Apple, Google, and Facebook increasing leverage in the communication landscape. Consider, for example, the 5x differential between the enterprise value-to-revenue multiple of regulated carriers versus their unregulated infotech cousins. This outcome owes to both the regulator's control over a carrier's destiny and the impact of static voice quality on revenue growth. A decades old voice quality standard provided an opening for the displacement of voice by all manner of Internet enabled communication alternatives.

HD Voice versus SD Voice

The HDIC mission of facilitating HD voice may seem superfluous to some industry observers. Industry wisdom tends to confuse correlation with cause and equate declining voice traffic or embrace of cell phones as evidence for a lack of interest in voice services or voice quality. The loss of demand for standard definition voice represents a natural consequence of competition from email, instant messaging, and even search engines. Prior to 1996, obtaining the answer to many questions required a telephone call. At this point, telephone calls represent the last resort for situations where urgency or complexity preclude any other means of communication.

The inherent demand for high fidelity voice communication seems self-evident given voice remains by far the dominant mode of in-person communication. People do not type their interactions in-person or rely on apps. Standard definition drops 2/3's of voice energy and imposes a relatively severe hearing impairment on callers. A similar inability to hear in-person leads to an audiologist visit and hearing aids. The utility of communication as an alternative to meeting in-person would seem well served by improvements in voice quality. Very few people know the possibility of HD voice exists, so pointing to a lack of demand does not represent much of a counter argument.

The gap between the utility of a telephone call and meeting in-person has diminished only slightly since Harvey Fletcher's work at Bell Laboratories established the standard frequency response of telephone calls in the 1930's. His testing found the 3000Hz between 300Hz and 3300Hz represents a minimum requirement for preserving the intelligibility of speech. The difficulty of establishing intimacy absent the frequencies below 300Hz and the difficulty of hearing consonant sounds (frequencies above 3300 Hz) necessary to detect the beginning and end of words was not addressed by the testing.

Fletcher also assumes the presence of a shared context to aid word recognition which fails in the case non-

native speakers. Fletcher did not consider the difficulty of understanding speech in the presence of background noise or in the context of a conference call. He did not consider non-speech applications like conveying high fidelity music. The limitations of telephone calls are so long standing people do not notice the necessary adaptations of speaking louder or more slowly when using the telephone. People hardly notice the oddity of using military alphanumeric code to make a dinner reservation.

The set of all possible voice communication applications greatly exceeds the subset possible in spite of the voice quality limitations of a traditional telephone call. Standard definition voice quality emerged a decade before the invention of the transistor. SD seems a troubling anachronism given the importance of telephone calls as an input to the global economy and the magnitude of transactions relying on telephone calls. Addressing the injury to productivity and cost of misunderstandings due to poor voice quality seems long over due. Telephone usage never exceeded 12 minutes per day per person on average. In-person voice communication as a point of reference certainly proves handy for more than 12 minutes per day.

Industry Dynamics

Aside from the regulatory/interconnection obstacles, the forces of change point favorably to a HD voice transformation of telecom. New equipment investments utilize HD compatible packet based technologies. No one doubts the superior cost efficiency of IP to IP VoIP network interconnections. A HD option already gets included with business grade desk phones and the dominant DECT standard for cordless consumer phones. The latest generation of 3G and coming 4G wireless networks support HD voice. FT-Orange already started to roll out a HD offering for its 210 million wireline and wireless customers during 2010.

The usual arguments for extending regulatory burdens to interconnected VoIP have less force in the case of HD voice. The nature of HD requires an end-to-end IP connection. The several categories of regulatory reform associated with intercarrier compensation and universal service do not easily apply in the case of HD voice. There does exist a strong desire for universal service, E911, CALEA, and disability access in a HD voice context, but a fresh start preserving incentives for innovation and investment represent the best means of achieving these objectives.

The preference for giving nascent services time to develop without the weight of legacy regulation applies. Opt-in self regulation may prove more effective in addressing the sorts of abuses and arbitrage leaving regulations in a permanent state of reform. A private sector HDIC can address the global nature of HD traffic more easily than local and national regulatory bodies. There already exist a range of standards and technology options to the extent two companies desire to exchange HD traffic. There exist extensions to traditional device numbering schemes applicable to HD voice connections and the option of applying SIP URI's.

The HDIC via the uniform commercial internetworking agreement addresses business motivation obstacles keeping the companies operating at different scales or via different end user devices or addressing different end user verticals disconnected. UCIA bilateral negotiation provides a template to address all the dimensions of interconnection, and, in particular, pricing. The solution in the case of similarly situated companies with symmetrical traffic may not involve payments, but the template does not presume the suitability of bill-and-keep arrangements.

Organizational Structure and Interconnection Imperative

The HDIC can adopt as a starting point the steering committee and working group organizational structure applied in the case of HDTV by the Advanced Television Systems Committee and its precursors. A steering committee with delegates assigned by CEO's of companies responsible for at least 51% of HD voice traffic would make the body representative. The steering committee should also include participants making it representative of the different types of companies (carrier, cable, independent, etc) with retail HD voice offers.

The interests of vendors and wholesale providers can get addressed by the formation of working groups addressing specific issues and different aspects of implementation. The working groups can similarly adopt as a starting point the approach of regular meetings and organizational structure applied in the case of the ATSC. The steering committee can assemble a relatively liberal method for creating working groups to help provide a comprehensive vehicle for participation and a flexible means of addressing HD voice implementation challenges.

The fact of universal interconnection of world's existing voice networks accounts for a significant portion of the value of the PSTN to end users. The fact of this interconnection, however, owes primarily to government regulation and fiat. The universal data interconnection associated with Internet similarly drives the value of

Internet connectivity for end users, however, data interconnection agreements owe to the unique history of the Internet as a US government funded network.

Universal interconnection at the application layer (i.e. email, web, ftp) of the Internet has proven the exception rather than rule for applications emerging after the 1995 (e.g ICQ/AIM, Skype, Facebook, Twitter.) There exists a small window of opportunity while traffic remains modest to learn from past mistakes and set the HD voice application in motion down a different path. The HDIC and an interconnection imperative can make HD voice the long sought engine for carrier revenue and enterprise value growth.

Biography - Daniel Berninger

Daniel Berninger joined GoCipher Software after working for a decade as a Washington, DC based independent technology analyst and communication architect. Active in VoIP since 1995, Daniel worked on the original assessment of VoIP at Bell Laboratories, the founding of Free World Dialup, and led the first VoIP deployments at Verizon, HP, and NASA while at VocalTec Communications. He won a VON Pioneer Award as a co-founder of the VON Coalition. Daniel's startup work includes leading the founding teams, creating the business model, and recruiting the CEO's for ITXC (Tom Evslin/NASDAQ: ITXC) and Vonage (Jeffrey Citron/NYSE: VG).

Companies participating in HD voice events include:

3 UK, 8X8, Alcatel-Lucent, AT&T, AudioCodes, Avaya, Broadcom, Broadsoft, CableLabs, Cablevision, Cisco, Cox Communications, DECT Forum, Deutsche Telekom, Dialogic, Dolby Labs, Ericsson, Gigaset USA, Global IP Solutions, Google, Huawei, Time Warner, Neutral Tandem, NTT, Ooma, Orange, Polycom, PGI, Qualcomm, RADVISION, Samsung, Skype, Snom, Telstra, Uniden, Unisys, Verizon, Verizon Business, Vivox, VoiceAge, WydeVoice, Xconnect, and ZipDX