HD Voice Enabling Email Addresses Via a SIP VoIP Nova Server

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I. New Beginning

Voice enabling the world's two billion email addresses offers a way to end VoIP's unhappy reliance on telephone network interconnection. Building an on-ramp to the PSTN falls far short of the promise motivating my decision to leave Bell Laboratories for VoIP pioneer Vocaltec Communications in 1996. Realizing that original promise requires revisiting the logic making telephone numbers the default address space for VoIP.

The black hole metaphor seems apt for the remarkable gravitational pull of the telephone network on voice communication - no light escapes. Halfway into the second decade since VoIP emerged, end user calling experience still remains unchanged and unimproved. The interconnection of VoIP implementations and the telephone network makes replicating telephone features and functions, not improving end user experience, the primary objective and result.

The failure of VoIP to thrive, like its elder sibling the world wide web, owes to the difference between telephone numbers and URI's. The 18 million email addresses (aka future SIP URI's) in circulation did not compare favorably to telephone numbers in 1996. The subsequent growth in the number of email addresses to a vicinity of two billion makes email a plausible alternative to telephone numbers today.

A decade of experience suggests the adoption of email addressing would benefit from a change in the usual approach to VoIP deployments. VoIP needs a server-in-the-middle mechanism similar to the role of a webserver and email server. The Nova server is a SIP addressed host for voice communication. Inserting an off-the-shelf SIP conference server into the call flow of every VoIP connection provides starting point for Nova server functionality. End users communicate by accessing a Nova server in precisely the same manner end users access web pages and email.

II. New Star - Nova Server

Visualize a Nova as a virtual room people enter in order to communicate. End user SIP devices connect to a SIP URI addressed conference room (aka Nova.) As a logical rather than physical entity, end users are free to create multiple Nova for different communication contexts on a temporary or permanent basis. As with the web, the action takes place in the server based Nova, not at the end user device.

The problematic status quo of connecting end user VoIP devices directly to each other parallels the obstacles encountered with direct user to user connections in the case of email before the (SMTP) email server and content before the (HTTP) web server. The Nova architecture also removes SIP registration servers from a role in call routing in favor of a model where registrars need only host device connection details and connect devices to the Nova.

The insertion of a Nova server in the call flow also helps address other pain points driving VoIP implementations to rely on the PSTN. Nova severs can address differences in how manufacturers implement SIP and provide transcoding between different codecs. The server based Nova offers a more reliable and capable point of connection for end user devices. The Nova provides a container for value add services such as transcription or recording.

The Nova architecture removes phone keypads from the addressing process in favor a web based control panel. A number of devices support the slow multi-touch entry of alphanumeric SIP URI's, but it remains the expectation that media (phone) and addressing (control panel) will get implemented separately. A more flexible control panel provides a means for users to pick between multiple Nova access control options as well as the option to replicate a traditional call flow.

III. HD Voice

The benefits of HD voice greet anyone willing to step outside the PSTN biosphere. There exists no difference from a Nova perspective between implementing standard definition and high definition voice. The Nova can support any codec end user devices support. SIP provides a mechanism for negotiating codecs on a call by call basis. Most of the SIP IP phones deployed in the last two years support the G.722 wideband codec.

The unitary nature of telephone voice quality

represents an anomaly among technology driven services. The voice quality option available to President Obama in conversations with world leaders or the CEO of Exxon in conversations with other executives is the same as the one available to teens planning a party. The static nature of voice makes it the last resort relative to rapidly improving non-voice options like email, instant messaging, and social media.

The lack of end user focused enhancements seems all the more remarkable given the cost-performance improvements available for the underlying component processors, memory, and storage media. Improvements in the availability and performance of broadband connections also failed to translate into voice quality improvements.

Even absent voice quality improvements, the telephone call remains the best option for the most urgent and complex communication contexts. Meeting in person represents the only alternative for situations where a telephone call is inadequate. The Nova architecture seeks to finally get a continuous improvement engine working on behalf of bridging the gap between a telephone call and being in-person.

IV. Open Nova Server - HDVCloud.com

An open Nova server hosted at the hdvcloud.com provides an easy means to experience a Nova call. Two or more people (up to 100) addressing the same SIP URI <anyname>@hdvcloud.com get connected to each other. This will work from any Internet connection and from any VoIP softphone or hardphone with a means to address SIP URI's.

Email addresses from any domain become voice enabled SIP URI's by adding a name server SRV record with hdvcloud.com as the target of SIP invites: udp._sip.yourdomain.tld IN SRV 0 0 5060 hdvcloud.com. This transforms <any name>@yourdomain.tld into a SIP URI pointing to the HD Nova hosted at hdvcloud.com. Pause for a minute to consider the implications. All two billion email addresses are a five minute DNS entry away from becoming HD voice SIP URI's.

By definition, Nova connections operate without metering by the location or duration of the connection. At the moment, the HDVCloud Nova server is set up to support a 1000 simultaneous connections. You can reach my personal HD Nova using dan@danielberninger.com as the voice SIP URI.

A more formal Nova implementation should include a end user registration process and Nova control panel giving users the ability to control the behavior of their Nova and reserve Nova room names associated with email addresses. As in the case of web or email servers, DNS records also provide the means for a single Nova implementation to support SIP URI's arriving from multiple domains (e.g. john.doe@gmail.com, tom.smith@microsoft.com, and ed.jones@exxon.com.)

V. The Road Ahead

The Nova concept leverages existing open standards, devices, and off-the-shelf SIP conference servers as a starting point. There will be a need for purpose built Nova server software, devices unburdened by legacy features, and standards if the concept gains traction. The overall approach revolves around removing the proprietary bottlenecks preventing innovation. As the presently dominant and proprietary VoIP offer, Skype represents the new AOL in this context.

The Nova model allows one to ignore the issues and complexity arising from efforts to interconnect with the telephone network. A Nova implementation has no use for telephone numbers, bilateral (or multi-lateral) peering agreements, or telephone bills (local vs LD, settlements, access fees, reciprocal comp.) There exists no purpose for keypads, DTMF, or the myriad of buttons associated with PBX functionality.

Nova servers might eventually join web and email servers as one of the routine network elements supporting all domains. Nova deployments require connectivity, SIP devices/registration, and the Nova server. Any one of these elements can produce significant complexities, but they are at least separable challenges. A Nova implementation must incorporate considerations of scale, performance, security, and reliability as with any IT activity.

The emergence of Nova implementations may displace some demand, but traditional and Nova voice services can co-exist as with the example of FM and AM radio. On the other hand, the piracy metaphor might get some reuse as the Nova model gives end users a communication self help option not unlike Napster. It did not serve Vonage well to underestimate the ability of Verizon to patent open standards and the power of forces determined to preserve the status quo.

Communication services provide an essential input for all economic activity. Everyone benefits anytime communication tools can better approximate the experience of meeting in-person. These new modes of communication can have a transformative effect, but only if they lead to new demand. This is the dimension in which VoIP remains a complete failure. The world needs better ways of getting together without being together.