

Why Voice over Internet Protocol (VoIP) Sounds Better

Article by Andrew Cox

Published in Exchange Magazine May 2003

Users will soon prefer VoIP to PSTN voice because of better audio quality and price

Packet voice is improving out of sight because it uses more of the original audio bandwidth than analogue and the coding technologies can now handle the packet loss and latency typical of the public internet. So, PSTN carriers watch out you are about to be hit by a disruptive technology.

According to the ancient proverb “If Mohammed can’t go to the mountain then the mountain must come to Mohammed” Engineering IP networks to achieve the qualities required to carry conventional voice services has proven an intractable problem. Instead the voice technologies are being re-engineered so that they work really well over packet switched networks. The result is a new set of voice encoding technologies which sound richer, clearer and better over the ordinary internet than the best quality sound available over the traditional telephone network.

Those of us who experimented with PC telephony a few years ago wrote it off as a bad experience. However, I recently had PC to PC telephone conversations with individuals in Canada and Scandinavia where the audio quality was amazingly better than a conventional telephone call. The audio quality of the new standard for wideband voice telephony (dubbed G722.2 by the ITU and AMR-WB by the 3G standards body). sounds more like a high quality stereo than a telephone. G.722.2 samples natural voice in the range of 50 to 7,000 Hz compared to traditional telephone speech at 200-3,400 Hz. According to the developers, “The wider sample improves the intelligibility and naturalness of speech, adds a feeling of transparent communication and eases speaker recognition. The low-frequency enhancement from 50 to 200 Hz contributes to increased naturalness, presence and comfort while the high-frequency extension from 3,400 to 7,000 Hz provides improved intelligibility” Regardless of all that it sounds just brilliant.

The same high audio quality will be an inducement for adoption of 3G mobile telephones as they will sound so much better than the old GSM phones. It is likely that consumers who experience 3G mobile phone will then expect the same high quality audio experience on their fixed phone. IP telephony providers will find it much easier to offer the G722.2 codec compared to PSTN providers.

In parallel with this, other companies are redesigning conventional voice codecs such as G.711 and G.729 to make them more tolerant to packet loss and variable network quality. (see www.globalipsound.com) This has severe implications for the incumbent telcos.

Many operators believe that VoIP can only be delivered across networks which provide end to end quality of service. This has prevented attempts to roll out VoIP services over the growing base of DSL connected customers because of the unpredictable service



quality available over the medium. The new voice encoding technologies challenge that assumption. Carriers use a measure called MOS or Mean Opinion Score. MOS, which is a quality assessment based on a subjective listening test. There is also now electronic test equipment which correlates quite well to human scoring. MOS provides a scale from 1 being the worst to 5 being the best. Anything above MOS 4 is considered carrier grade. If you have high packet loss (say 10-20%) and can still deliver high quality voice (say MOS 4) ,then you can deliver a credible voice service over an ordinary DSL network.

Since DSL services are typically delivered with a subscriber voice service VoIP does not have to replace the PSTN for inbound calls and emergencies such as power failure. Subscribers may keep the old PSTN service for emergency calls and their inbound service but direct all outbound calls to their VoIP provider.

In the USA intense competition for voice services has emerged from VoIP providers such as Vonage Digital Voice who offer free local calls and unlimited national calling for USD39.99 per month (www.vonage.com). Similar competitive offerings are emerging in Europe. In recent years Australian service providers have enjoyed the benefits of being a low priority global market with relatively low competitive intensity. This is unlikely to continue as the Australian broadband rollout gathers pace and more and more VoIP service providers emerge looking for fat protected markets to attack. The aggressors will enjoy much lower cost structures since their systems are built on the open source software and they have provisioning processes which are eCommerce enabled from end to end.

It will be interesting to observe what defensive strategies emerge among the Australian voice providers as these global trends start to bite in the domestic market