We study the perceived quality of voice over IP networks (VoIP) in the best-effort context of the current Internet. As the Internet does not provide any Quality of Service guarantee, the VoIP stream is usually degraded during transmission.

In order to improve the stream quality in the presence of network losses, we can use FEC. This error correction mechanism [1] consists of piggybacking a compressed copy of the contents of packet N in packet N+1 (i.e. being eventually variable in order to compensate for variable loss–burst sizes).

In our basic context, Users X and Y are having a VoIP conversation. The perceived quality at each end strongly depends on the encoding parameters and network conditions.

We have also analyzed the performance of FEC in a wireless context. We considered a home network where several devices are connected to the Internet and among them via a Wi-Fi AP/router. We used a stochastic model to simulate the Wi-Fi network working at different loads and with different fractions of background and real-time traffic. We found that the performance is generally not acceptable for VoIP, even when using FEC. In this context, further QoS mechanisms and dynamic quality control techniques need to be used.

We have performed an analysis of the performance of a media-dependent FEC scheme on wired and wireless networks. Based on the results we obtained, we conclude that:

- The use of FEC is advisable in all the contexts we considered.
- For wired networks, the use of FEC allows to obtain acceptable quality levels even for very high load values.
- In the case of Wi-Fi networks, even though FEC–protected flows have a noticeable better quality than unprotected ones, the perceived quality is often below acceptable values. This suggests that further QoS mechanisms are needed in this context.

We are currently working on several related issues, including:

- The development of dynamic quality control mechanisms based on PSQA’s ability to provide accurate assessments in real-time. We are considering several options for enhancing the perceived quality, ranging from application-level adjustments to Diffserv.
- Refining our wireless simulations to include the 802.11e QoS improvements and the impact of the control protocols that we are working on.

References