WHAT IS VOICE OVER IP (VOIP) – PART 1

Internet telephony refers to communications services—voice, facsimile, and/or voice-messaging applications—that are transported via the Internet, rather than the public switched telephone network (PSTN). The basic steps involved in the establishment of an Internet telephone call are:

- Conversion of the analog voice signal to digital format
- Compression and packaging into Internet protocol (IP) packets
- Transmission over the Internet

We shall start by looking at the conversion of analogue to digital.

Converting analogue to digital

To convert analogue to digital we apply a process known as Pulse Code Modulation (PCM). The process consists of the following steps to convert the analogue to digital:

Step 1 – sampling
Step 2 – digitising

Step 1: pulse code modulation takes the analogue telephony signal of 300 to 3,400Hz and takes samples of the analogue signals at a rate of 4,000 per second. Each sample is like a photograph of the analogue signal at a point in time. The best way to think of this is in terms of a movie. When you go to the movies what you are seeing are 24 still pictures per second but your eye merges them together giving you the feeling you are seeing motion. In the case when we sample voice instead of being 24 samples per second we take 4,000 samples per second. When we play these samples back the human ear thinks it is hearing the original analogue signal.

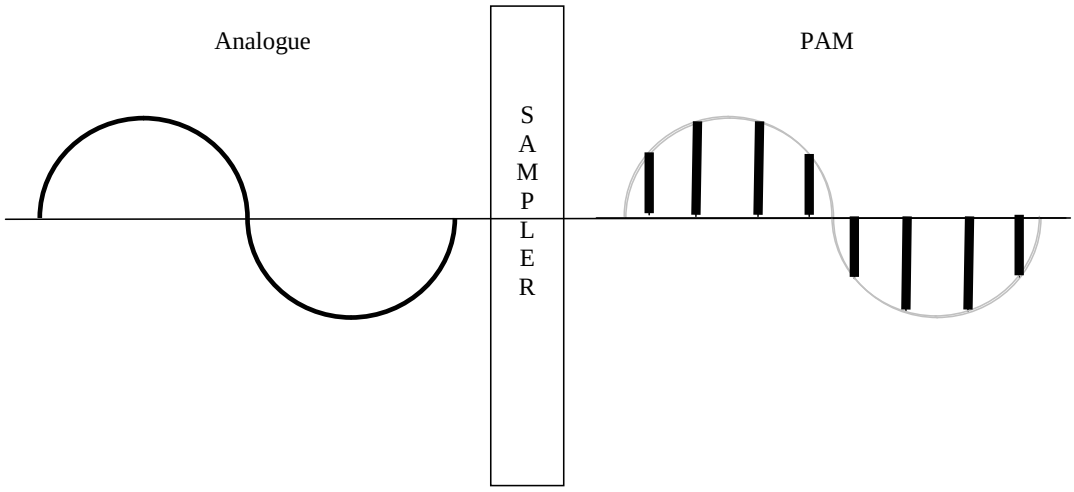

Figure 1 Sampling an analogue waveform

Step 2: in this stage we take each sample created in the sampling process and convert it into an8 bit word. As we said earlier on the analogue signal is 4,000 samples per second and each sample gets converted to an 8 bit word, this produces a 64Kbps bit stream.

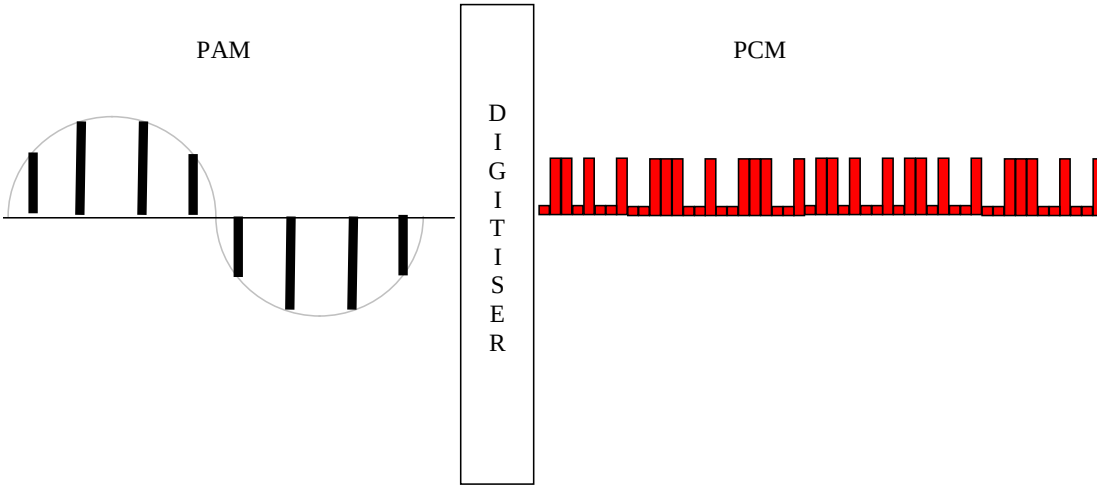

Figure 2 Converting the analogue samples to 8 bit digital words

For those who want to be more technical the conversion from PAM to PCM is done using a digitiser that converts the PAM to PCM using a coding system known as the A-Law or µ-Law. This is to make sure the voice quality is consistent for those of us that talk loud to those that talk softly.