

WHAT IS VOICE OVER IP (VOIP) – PART 4

In the previous article we introduced the concept of packet switching and provided a high level diagram of what is a packet, here we shall continue and start with the format of a packet as used in Local Area Networks.

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Preamble	SFD	Destination Ethernet Address	Source Ethernet Address	Length	LLC data and PAD	Frame Check Sequence

Figure 1 actual packet structure used in LAN office networks.

Figure 1 shows an example of a packet structure as used Local Area Network on offices and it is called Ethernet. It is based on a standard IEEE 802.3 Packet Format packet. A couple of things to note in the packet are:

Preamble – the preamble is used to alert the receiving device that a packet is being received. In technical terms it allows the receiver to synchronise itself.

SFD – Start of Frame Delimiter indicates the beginning of the packet.

Destination Ethernet Address – it's not a home address but a set of numbers which uniquely identifies the receiver.

Source Ethernet address – it's not a home address but a set of numbers which uniquely identifies the sender.

Length – tells you how long the packet will be, just like the post office you can only have a maximum weight envelope.

LLC data and PAD – this is where your message goes in.

Frame Check Sequence – this is something the post office does not have, a way of checking the integrity of the letter but in data communications this is used to determine that the incoming data has not been corrupted.

So if we now look at how packet switching works, we can review what we learnt about the post office:

1. We create a message “the Data” such as a text message, word document, voice, music etc.
2. The computer encapsulate the data “the packet”
3. The computer enters the destination address based on whom you are communicating with. This is a unique series of numbers that the user is using at the time of communications such as 193.256.25.26. An IP Address is a unique number just like a telephone number and it identifies a unique location in the Internet.
4. The computer creates the source address which is also a unique number.
5. The computer sends the packet out to the switches
6. At the switch the system looks at the Destination address and determines where to forward the packet to.

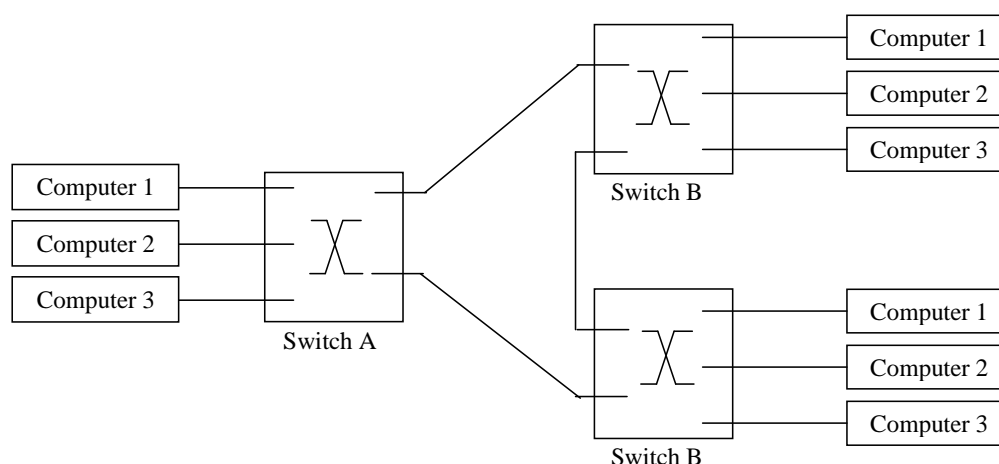


Figure 2 Packet Switching system

With reference to Figure 2 if you are sending a message from Computer 1 to Computer 3 then the address would be of the kind:

Computer 1 – A.1 where the A refers to the switch you are connected to and the 1 to the specific computer connected to that switch.

Unlike circuit switching where there is a point to point connection between the two parties communicating in packet switching each bit of data being transmitted is encapsulated into this thing called a packet like an envelope which contains the source and destination address.

Transmission over the Internet

To get any voice, data, video, music or any other such information transmitted via the internet we need to encapsulate the data into an Internet Protocol (IP) packet. So your computer or IP phone will create the IP packet with the necessary source and destination address and send it via your internet connection. The only tricky thing with Voice over IP is, when sending packets of voice via the internet the packets need to be prioritised to ensure you don't have gaps in your conversation.

The only other issue that needs to be looked at is in the case of VoIP is the voice communications between:

1. Internet to internet users
2. Internet to PSTN users

Internet to internet users

If the communications is Internet to internet user then it is the same as your computer sending e-mail messages to any other computer in the net, as long as you know their address you can establish a connection.

Internet to PSTN users

In the case where the communications is between an internet user and a PSTN user then you need to go via a gateway. A gateway is a device that takes the details of the internet and converts to the format required on the PSTN and vice versa.