The channel allocation

We can classify the channels as static and dynamic. The static channel is where the number of users are stable and the traffic is not bursty. When the number of users using the channel keeps on varying the channel is considered as a dynamic channel. The traffic on these dynamic channels also keeps on varying.

- **Static channel allocation**

The usual way of allocating a single channel among the multiple users is frequency division multiplexing (FDM). If there are N users, the bandwidth allocated is split into N equal sized portions. FDM is simple and efficient technique for small number of users. However when the number of senders is large and continuously varying or the traffic is bursty, FDM is not suitable.
The same arguments that apply to FDM also apply to TDM. Thus none of the static channels allocation methods work well with bursty traffic we explore the dynamic channels.

- **Dynamic channels allocation in LAN's and MAN's**

Before discussing the channel allocation problems that is multiple access methods we will see the assumptions that we are using so that the analysis will become simple.

Assumptions:

1. **The Station Model:**

The model consists of N users or independent stations. Stations are sometimes called terminals. The probability of frame being generated in an interval of length Δt is $\lambda.\Delta t$, where λ is a constant and defines the arrival rate of new frames. Once the frame has been generated, the station is blocked and does nothing until the frame has been successfully transmitted.

2. **Single Channel Assumption:**

A single channel is available for all communication. All stations can transmit using this single channel. All can receive from this channel. As far as the hard is concerned, all stations are equivalent. It is possible the software or the protocols used may assign the priorities to them.

3. **Collisions:**

If two frames are transmitted simultaneously, they overlap in time and the resulting signal is distorted or garbled. This event or situation is called a collision. We assume that all stations can detect collisions. A collided frame must be retransmitted again later. Here we consider no other errors for retransmission other than those generated because of collisions.

4. **Continuous Time**

For a continuous time assumption we mean, that the frame transmission on the channel can begin any instant of time. There is no master clock dividing the time into discrete intervals.

5. **Slotted Time**

In case of slotted time assumption, the time is divided into discrete slots or intervals. The frame transmission on the channel begins only at the start of a slot. A slot may contain 0, 1, or more frames. The 0 frame transmission corresponds to idle slot, 1 frame transmission corresponds to successful transmission, and more frame transmission corresponds to a collision.

6. **Carrier Sense**

Using this facility the users can sense the channel. i.e. the stations can tell if the channel is in use before trying to use it. If the channel is sensed as busy, no station will attempt to transmit on the channel unless and until it goes idle.

7. **No Carrier Sense:**

This assumption implies that this facility is not available to the stations. i.e. the stations cannot tell if the channel is in use before trying to use it. They just go ahead and transmit. It is only after transmission of the frame they determine whether the transmission was successful or not.