Class 9

- A data link layer hop is when you take the data link layer and remove it and replace it with a new source/destination.
- A network layer disgram would be the same but only inlcudes the comptuers. No cables.

Network Layer

- Provies end to end delivery of messages by chaining together multiple DLL hops.

Network Operator

- 'Owner' of a network - Controls all aspects of data flow on that network.
- Autonomous system (AS) : Collection of IP "address prefixes". Owner by a single network operator.

`limitations for the data link layer:`

- There is no organizational system for the MAC address.
- MAC addresses dont change.
- If we did have a DLL only protocol all intermediate MAC addresses would need to be encoded.

`IP Address:` 32 bit address field used to identify a computer connected to the internet.

Classful addressing (Historical) :

- Three classes for networks.
    - Class A: 0-127 and the amount of devices they can support is 2^24 -2
    - Class B: 128- 192 and the size is 2^16 -2
    - Class C: 193- 224 and the size is 2^8 -2. (For small buisneses because size is so small)

  `The problem with this is that there are so many IPs being wasted due to the large gaps between classes.`

    - `Things we like:` Prefix identifies the network , network and host portions encoded in IP address.
    - `Things we dont like:` The problem of jumping by x255 everytime you run out of IP addresses.

Classless interdomain routing (CIDR) :

- No more classes.
- There is a '/' at the end of an IP address which is used to tell you how many bits are significant for the network portion.