# M4. Explain TCP, ﬂow control, and congestion control

## TCP (Transmission Control Protocol)

TCP bring a system with good service when sending packages, guarantees delivery of application layer messages to its destination.

* Fixed delivery
  1. Packages arrives in the same order they were sent
* Flow Control
  1. Sender and receiver, matches speed
  2. Problems can happen if the sender is faster than the receiver and packages are lost and not cached.
* Congestion Control
  1. Used to control quantity of data when connections are overloaded, e.g. done by reducing the speed of the packages.
* Sequence numbering
  1. Used to identify every single byte of data.
  2. Confirmation is given with acknowledgement from the receiver, when receiving packages.

I OSI-modellen er TCP det mellemliggende lag mellem Internetprotokol og applikationen.

Applikationer har som oftest brug for stabile datastrømme, hvilket Internetprotokollen ikke tilbyder. Den tilbyder blot levering af datapakker mellem to værter. I daglig tale benytter man dog i praksis forkortelsen ***TCP/IP*** som betegner sammenkoblingen mellem TCP og Internetprotokollen.

## Flow control

Manages the pacing of data transmission between two nodes to prevent a faster sender from outrunning a slow receiver.

*Sliding window flow control:*  The receiver specifies the **amount of additional data** that it is willing to buffer for the connection. The sending host must then **not exceed this amount** before waiting for an acknowledgement.

If a window size of 0, the sender stops sending data and starts a **persist timer**. The persist timer is used to prevent deadlocks in the TCP. The host waits until another acknowledgement is received, when the persist timer has expired the host sends another package, smaller than the previous package.

## Congestion control (Overbelastnings kontrol)

Manages flow in a network to avoid congestion collapse, the congestion mechanism controls the rate of data entering the network keeping the data flow below a rate that would trigger a collapse on the network.