Lecture-20
SDe

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Date 14/09/18
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Error control in TCP

TCP is a reliable transport layer protocol.
TCP provides reliability using error control
Mechanisms -

- checksum
- Acknowledgement
- Time-out

Detects corrupt segments, lost segments, out of order segments, duplicated segments
Time-out : when the transmission has not been acknowledged.

Checksum

TCP uses a 16-bit checksum that is mandatory in every segment
checksum field in each segment is required to check for a corrupted segment.
If the segment is corrupted, it is discarded by the destination TCP and is considered as lost.
TCP checksums are calculated over the entire segment, both the header and the data.
The entire segment is divided 16 bit pieces & added up.

Acknowledgement

- TCP uses acknowledgement to confirm the receipt of the segment
- Ack segments are never acknowledged.

Note :

The bytes of data in each connection are numbered by TCP.
The numbering starts with a randomly generated number
The value in the sequence no field of a segment defines the no. of the first data byte contained in that segment
~~The value of the ackno field is :~~
Acknowledgment no is cumulative.

Sequence numbers

Sequence 1 ⇒ Sequence no 10,001 (range: 10,001 to 11000)

Sequence 2 ⇒ Sequence no. 11,001 (range = 11,001 to 12000)

Notes

The SYN segment cannot carry data, but it consumes one sequence number.

A SYN+ACK segment cannot carry data, but does consume one sequence number.

An ACK segment, if carrying no data, consumes no sequence no.

The FIN segment consumes one sequence no. if it doesn't carry data.

The FIN+ACK segment consumes one sequence no if it does not carry any data.

Normal operation