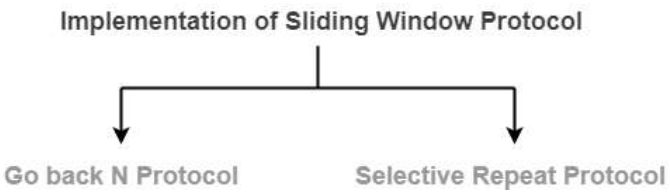
Selective Repeat | Sliding Window Protocol

Computer Networks

Sliding Window Protocol-

Before you go through this article, make sure that you have gone through the previous article on **Sliding Window Protocol**.

The two well known implementations of sliding window protocol are-



1. Go back N Protocol
2. Selective Repeat Protocol

In this article, we will discuss about Selective Repeat protocol.

Learn about **Go back N Protocol**.

Selective Repeat Protocol-

Selective Repeat protocol or SR protocol is an implementation of a sliding window protocol.

The features and working of this protocol are explained in the following points-

Point-01:

> In SR protocol, sender window size is always same as receiver window size.

In SR protocol,

- Sender window size = Receiver window size

- The size is of course greater than 1 otherwise the protocol will become **Stop and Wait ARQ**.
- If n bits are available for sequence numbers, then-

$$\text{Sender window size} = \text{Receiver window size} = 2^n/2 = 2^{n-1}$$

Point-02:

SR protocol uses independent acknowledgements only.

In SR protocol,

- Receiver acknowledges each frame independently.
- As receiver receives a new frame from the sender, it sends its acknowledgement.

Point-03:

SR protocol does not accept the corrupted frames but does not silently discard them.

In SR protocol,

- If receiver receives a frame that is corrupted, then it does not silently discard that frame.
- Receiver handles the situation efficiently by sending a negative acknowledgement (NACK).
- Negative acknowledgement allows early retransmission of the corrupted frame.
- It also avoids waiting for the time out timer to expire at the sender side to retransmit the frame.

Point-05:

SR protocol accepts the out of order frames.

In SR protocol,

- Consider receiver receives a frame whose sequence number is not what the receiver expects.
- Then, it does not discard that frame rather accepts it and keeps it in its window.

Point-06:

SR protocol requires sorting at the receiver's side.

In SR protocol,

- Receiver window is implemented as a linked list.
- When receiver receives a new frame, it places the new frame at the end of the linked list.
- When the received frames are out of order, receiver performs the sorting.
- Sorting sorts the frames in the correct order.

Point-07:

SR protocol requires searching at the sender's side.

In SR protocol,

- Receiver does not reject the out of order frames.
- Receiver accepts the out of order frames and sort them later.
- Thus, only the missing frame has to be sent by the sender.
- For sending the missing frame, sender performs searching and finds the missing frame.
- Then, sender selectively repeats that frame.
- Thus, only the selected frame is repeated and not the entire window.
- That is why, the protocol has been named as "**Selective Repeat Protocol**".

Point-08:

SR protocol leads to retransmission of lost frames after expiry of time out timer.

In SR protocol,

- Consider a frame being sent to the receiver is lost on the way.
- Then, it is retransmitted only after time out timer expires for that frame at sender's side.

Efficiency of SR Protocol-

Efficiency of any flow control protocol is given by-

$$\text{Efficiency} = \text{Sender Window Size in Protocol} / (1 + 2a)$$

In selective repeat protocol, if sender window size = N, then-

$$\text{Efficiency of SR Protocol} = N / (1 + 2a)$$

To gain better understanding about Selective Repeat ARQ,

Watch this Video Lecture

Next Article- Practice Problems On Selective Repeat Protocol

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Watch video lectures by visiting our YouTube channel **LearnVidFun.**

Summary

$$\text{Efficiency } (\eta) = \frac{\text{Number of frames sent in one window}}{\text{Total number of frames that can be sent in one window}}$$

OR

$$\text{Efficiency } (\eta) = \frac{\text{Sender Window Size in the Protocol}}{\text{Optimal Sender Window Size}}$$

OR

$$\text{Efficiency } (\eta) = \frac{\text{Sender Window Size in the Protocol}}{1 + 2a}$$

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