

第三次作业

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Question: Suppose that your department has a local DNS server for all computers in the department. You are an ordinary user (i.e., not a network/system administrator). Can you determine if an external website was likely accessed from a computer in your department a couple of seconds ago? Explain.

Answer: Yes, it can be determined. If a site was accessed recently, it will be stored in a local cache. On a Windows computer, the command line tool `ipconfig /displaydns` can be used to check the cache. On a Linux computer, the `dig` command can be used. If the website appears in the output of these commands, then it has likely been accessed recently.

2

Question:

1. The first port number is larger than 1023 and the second port number is 21. What does this indicate?
2. Identify the protocol used based on port 21.

Answer:

1. The first port number (dd47=56455) is larger than 1023, and the second port number (0015=21) indicates that this segment is sent by the client to the server.
2. The protocol used is FTP (File Transfer Protocol) because port 21 is commonly used for FTP.

3

Question: In the Go-Back-N (GBN) protocol and Selective Repeat (SR) protocol, the sender maintains a window of packets that can be sent without waiting for acknowledgments. Discuss the implications of having a sender window that is too large in both protocols.

Answer:

In both protocols, having a sender window that is too large can lead to various issues. Let's consider each protocol separately:

1. **GBN Protocol:** In the GBN protocol, the sender can have a window size up to $(N-1)$, where (N) is the sequence number space size. If the sender window is larger than $(N-1)$, it may result in problems such as unnecessary packet retransmissions or acknowledgments for already received packets. This occurs because the receiver has a finite buffer for storing out-of-order packets, and a large sender window may cause the receiver buffer to overflow. Therefore, the largest allowable sender window in the GBN protocol is $(N-1)$.
2. **SR Protocol:** In the SR protocol, the sender can have a window size up to $(N/2)$, where (N) is the sequence number space size. Having a larger sender window in SR can lead to the SR receiver dilemma problem. This dilemma arises when the receiver receives out-of-order packets and has limited buffer space. If the sender window size exceeds $(N/2)$, it increases the probability of receiving out-of-order packets at the receiver, which may cause buffer overflow and result in unnecessary retransmissions. To avoid this dilemma, the largest allowable sender window in the SR protocol is $(N/2)$.

4

Statements and Answers:

1. **Statement:** With the SR protocol, it is possible for the sender to receive an ACK for a packet that falls outside of its current

window.

- **Answer:** True. It is conceivable that in a network communication scenario, if an acknowledgment (ACK) from a certain group of packets does not reach the sender within a specified time period and is considered as a timeout for retransmission, there is a possibility that when the delayed ACK eventually arrives at the sender, the sender's window may have shifted. As a result, the ACK for the resent packet may fall outside of the current window, which can lead to potential issues in the reliable delivery of data.
2. **Statement:** With GBN, it is possible for the sender to receive an ACK for a packet that falls outside of its current window.
- **Answer:** False. In the Go-Back-N (GBN) protocol, the sender maintains a window of outstanding packets, while the receiver does not have a window. The receiver accepts packets in sequential order and discards any out-of-order packets it receives. Since the receiver only sends acknowledgments (ACKs) for the highest in-order packet it has received, it will never send an ACK for a packet that falls outside of the sender's current window.
3. **Statement:** The alternating-bit protocol is the same as the SR protocol with a sender and receiver window size of 1.
- **Answer:** True. The Alternating-Bit Protocol (ABP) can be seen as a specific case of the Selective Repeat (SR) protocol where the window size is limited to 1. In ABP, the sender transmits one packet at a time and waits for an acknowledgment before sending the next packet. This behavior is equivalent to SR with both the sender and receiver having a window size of 1, where packets are individually acknowledged.
4. **Statement:** The alternating-bit protocol is the same as the GBN protocol with a sender and receiver window size of 1.
- **Answer:** True. The Alternating-Bit Protocol (ABP) can also be viewed as a specific case of the Go-Back-N (GBN) protocol with a window size of 1. In the GBN protocol, the sender can have multiple outstanding packets, but if any

packet within the window is lost or corrupted, all packets from the lost/corrupted one until the end of the window must be retransmitted. In the case of ABP, where the window size is limited to 1, this behavior is equivalent to the sender sending only one packet at a time and waiting for acknowledgment before proceeding.