Wireless Networks

Problem 10 Solutions

P10.2

What are the differences between OSI and TCP/IP protocol models? Explain clearly.
[Solution]
These are the differences between OSI and TCP/IP protocol models:
- The OSI model consists of *7* layers, whereas the TCP/IP model consists only *5* layers.
- In the TCP/IP protocol suite, the application layer serves the purpose of the three combined layers of application, presentation and session. The OSI model made a clear distinction between the top
three layers. Each application in the TCP/IP suite has to independently implement the session and presentation layer functions.
- The OSI suite was put forward before the protocols were invented whereas in the case of TCP/IP, the model was a description of the existing protocols.
- The OSI model supports connectionless and connection-oriented communication in the network layer, and only connection-oriented in the transport layer. TCP/IP supports only connectionless communication in the network layer, and provides a choice of both connectionless and connection-oriented communication in the transport layer

P10.7
With suitable examples? Explain the differences between a connection-oriented and connectionless protocols.
[Solution]
A connection-oriented protocol needs the client and the server to establish a connection with the help of control packets, before the transmission of any data packets. This is termed as a handshake between the client and the server. The handshake procedure serves to negotiate certain parameters such as determining the ‡ow control so as to prevent the receiver from being overwhelmed, establishing the sequence numbers between the two parties etc.
A connectionless protocol does not involve any handshaking mechanism between the two parties before data transfer. The sender can directly send a data packet to the receiver irrespective of whether the receiver is ready to accept it or not.
The advantage of a connectionless protocol is that it does not require the overhead involved with establishing a connection, thereby improving the time required for the first packet to be received by the receiver. This is useful when the sender needs to intermittently send a few packets, and so the time spent on establishing the connection is not justified.

P10.11
What are the particular advantages and disadvantages of using a split TCP approach for wireless networks?
[Solution]
The advantage of the split TCP approach for wireless networks is that it hides the mobility of the receiver from the sender. Its disadvantage is that the TCP connection between the sender and the receiver gets split at the intermediate BS and does not maintain end to end.

P10.16

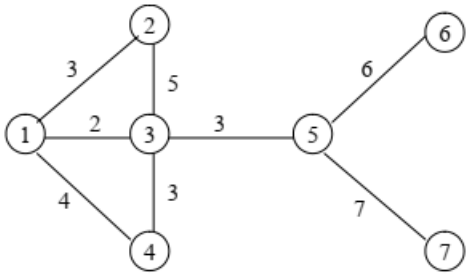
Both I-TCP and M-TCP are split TCP approaches to improving the performance of wireline TCP over wireless networks. What is the difference between these two approaches?

[Solution]

In M-TCP, the receiver can make the sender enter the persist mode by advertising a zero window size in presence of frequent disconnections. In I-TCP, all the support needed for handling the mobility related problems, is built into the wireless side of the interaction. Handoff between two differences MSRs is supported on the wireless side without having to re-establish the connection at the new MSR.

P10.19

How many iterations are needed to calculate the shortest path to all nodes from node 3? Find the shortest distance to each node and what is the path used for each one of them?



2 iterations are required to calculate shortest paths from node 3.

The shortest paths from node 3 are:

Destination Node	Distance	Path using Nodes
1	2	3-1
2	5	3-2
4	3	3-4
5	3	3-5
6	9	3-5-6
7	10	3-5-7