

Bahan Ajar

Chapter 12



Materi Pembelajaran

Matakuliah :

WIRELESS SENSOR NETWORKS

Kode Matakuliah : SKO 20428

Prodi : **SISTEM KOMPUTER**

Dosen Pengampu Matakuliah:

Bayu Nugroho, S.Kom., M.Eng

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TCP (RFC 793)

TCP uses network services provided by IP layer, with the objective of offering reliable, orderly, controllable, and elastic transmission. TCP operation consists of three phases:

1. Connection establishment.
2. Data transmission.
3. Disconnect.

UDP (RFC 768)

UDP is a connectionless transport protocol.

It exchanges datagrams without a sequence number, and if information is lost in the process of exchange between the transmitter and the receiver, this protocol does not have the mechanisms to recover it.

The basic idea behind TFRC is to provide almost identical throughput to both TCP and UDP when they are present on a connection.

Mobile IP

Mobile IP is proposed as a global mobility management technique in the network layer to provide terminal mobility in an all-IP network. The initial design of TCP/IP did not take mobility into consideration.

The IP address is currently used both as a terminal identifier and to identify the terminal location in that network.

Feasibility of Using TCP or UDP for WSNs

Following are other problems that make either TCP or UDP unsuitable for implementation in WSNs:

- TCP is a connection-oriented protocol. However, in WSNs, the number of sensed data for event-based applications is usually very small. The three-way handshake process required for TCP is a large overhead for such a small volume of data

Feasibility of Using TCP or UDP for WSNs

- In TCP, segment loss can potentially trigger window-based flow and congestion control.

This will reduce the transmission rate unnecessarily when, in fact, packet loss may have occurred as a result of link error and there may be no congestion.



Feasibility of Using TCP or UDP for WSNs

- TCP uses an end-to-end process for congestion control. Generally, this results in longer response to congestion, and in turn, will result in a large amount of segment loss.
- TCP uses end-to-end ACK and retransmission when necessary. This will result in much lower throughput and longer transmission time when RTT is long, as is the case in most WSNs.
- Sensor nodes may be within a different hop count and RTT from the sink. The TCP operates unfairly in such environments.

Feasibility of Using TCP or UDP for WSNs

As a connectionless transport control protocol, UDP is also not suitable for WSNs. Here are some reasons:

- Because of the lack of flow and congestion control mechanisms in UDP, datagram loss can result in congestion. From this point of view, UDP is also not energy efficient for WSNs.
- UDP contains no ACK mechanism; therefore, the lost datagrams can be recovered only by lower or upper layers, including the application layer.

Other transport protocols for WSN

- CODA (Congestion Detection and Avoidance)
- ESRT (Event-to-Sink Reliable Transport)
- RMST (Reliable Multisegment Transport)
- PSFQ (Pump Slowly, Fetch Quickly)
- GARUDA
- ATP (Ad Hoc Transport Protocol)



Tugas Mandiri (teori):

1. Apa fungsi Protokol pada WSN? Jelaskan.
2. Jelaskan keuntungan dan kerugian menggunakan TCP dan UDP dan protokol lainnya dalam WSN.

Tugas Mandiri (praktikum):

Rancang komunikasi antar node menggunakan protokol TCP dan UDP menggunakan Network Simulator.

end

