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FACULTY OF EGINEERING AND TECHNOLOGY

WSN (MCS-033)

LECTURE -19

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OUTLINE

- Issues in Designing Mac Protocol for Ad Hoc Wireless Network
- Bandwidth efficiency
- Quality of service support
- Synchronization
- Hidden and exposed terminal problems
- Error-prone shared broadcast channel
- Distributed nature/lack of central coordination
- MCQ
- Reference

Issues in Designing Mac Protocol for Ad Hoc Wireless Network

The main issues in designing MAC protocol for ad hoc wireless network are:

Bandwidth efficiency

- Bandwidth must be utilized in efficient manner
- Minimal Control overhead
- BW = ratio of BW used for actual data transmission to the total available BW

Quality of service support

- Essential for supporting time-critical traffic sessions
- They have resource reservation mechanism that takes into considerations the nature of wireless channel and the mobility of nodes

Issues in Designing Mac Protocol for Ad Hoc Wireless Network

The main issues in designing MAC protocol for ad hoc wireless network are:

Synchronization

- MAC protocol must consider synchronization between nodes in the network
- Synchronization is very important for BW (time slot) reservation by nodes
- Exchange of control packets may be required for achieving time synchronization among nodes

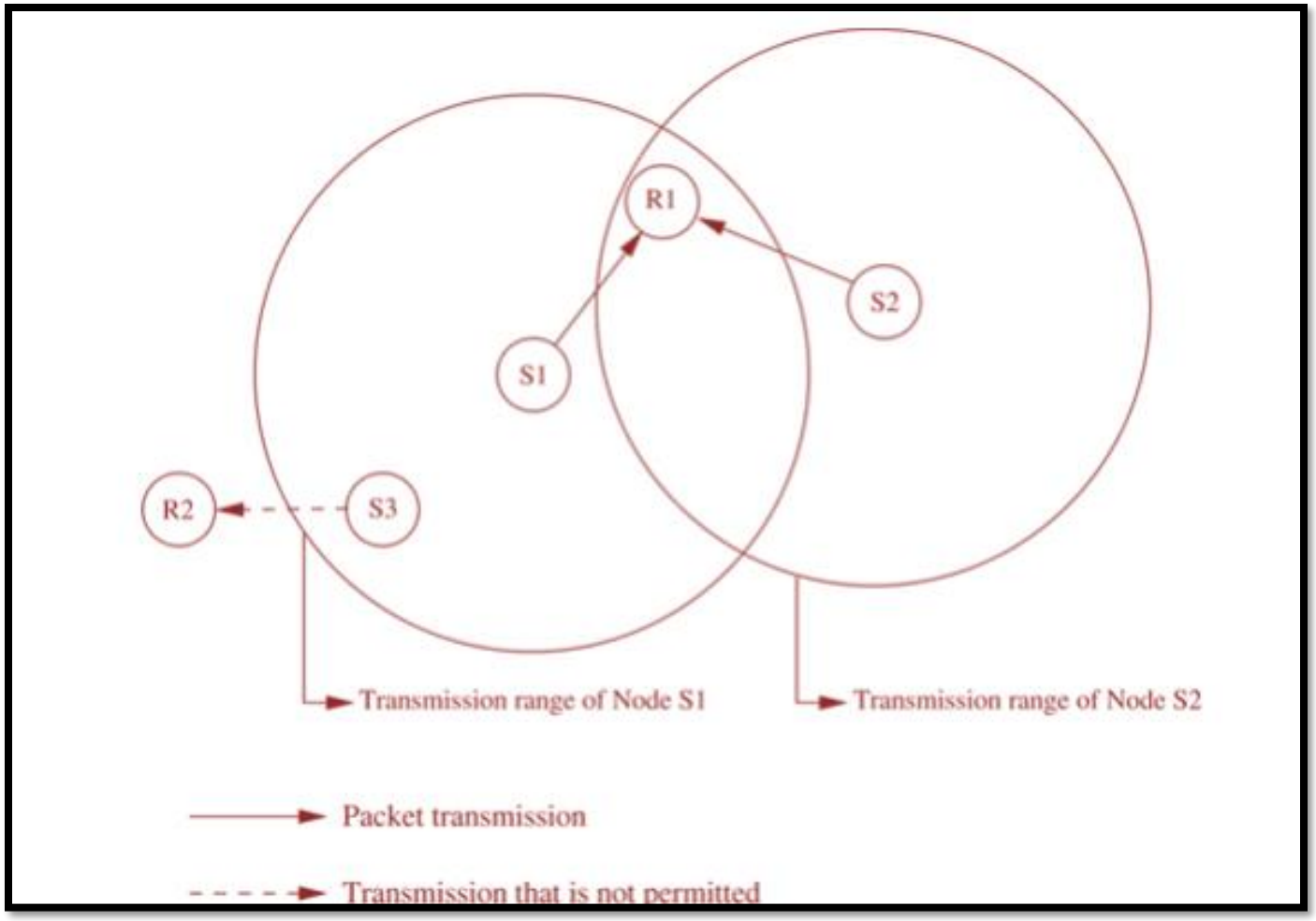
Hidden and exposed terminal problems

- The hidden terminal problem refers to the collision of packets at a receiving node due to the simultaneous transmission of those nodes that are not within the direct transmission range of the sender but are within the transmission range of the receiver.
- Collision occurs when both nodes transmit packets at the same time without knowing about the transmission of each other.

Hidden and exposed terminal problems

- S1 and S2 are hidden from each other & they transmit simultaneously to R1 which leads to collision.
- The exposed terminal problem refers to the inability of a node, which is blocked due to transmission by a nearby transmitting node, to transmit to another node .
- If S1 is already transmitting to R1, then S3 cannot interfere with on-going transmission & it cannot transmit to R2.
- The hidden & exposed terminal problems reduce the throughput of a network when traffic load is high

Hidden and exposed terminal problems



MAC PROTOCOL

Error-prone shared broadcast channel

- When a node is receiving data, no other node in its neighborhood should transmit
- A node should get access to the shared medium only when its transmission do not affect any ongoing session
- MAC protocol should grant channel access to nodes in such a manner that collisions are minimized
- Protocol should ensure fair BW allocation

Distributed nature/lack of central coordination

- Do not have centralized coordinators
- Nodes must be scheduled in a distributed fashion for gaining access to the channel
- MAC protocol must make sure that additional overhead, in terms of BW consumption, incurred due to this control information is not very high

Mobility of nodes

- Nodes are mobile most of the time
- The protocol design must take this mobility factor into consideration so that the performance of the system is not affected due to node mobility

MCQ

1. MAC addresses are very useful in diagnosing network issues.

a) True b) False

2. On wireless networks _____ filtering is the security measure.

a) OUI

b) IP

c) NIC

d) MAC

3. MAC addresses are used as _____

a) Network addresses

b) IP address

c) Hardware address

d) Burned in address

4. IEEE standards for Institute of Electrical and Electronics Engineers.

a) False b) True

10. The original IEEE 802 MAC address comes from_____

a) MAC address

b) IP address

c) Ethernet address

d) Http

REFERENCES

- https://www.academia.edu/25414253/UNIT-2_MAC-1_2.1_Issues_in_Designing_Mac_Protocol_for_Ad_Hoc_Wireless_Network