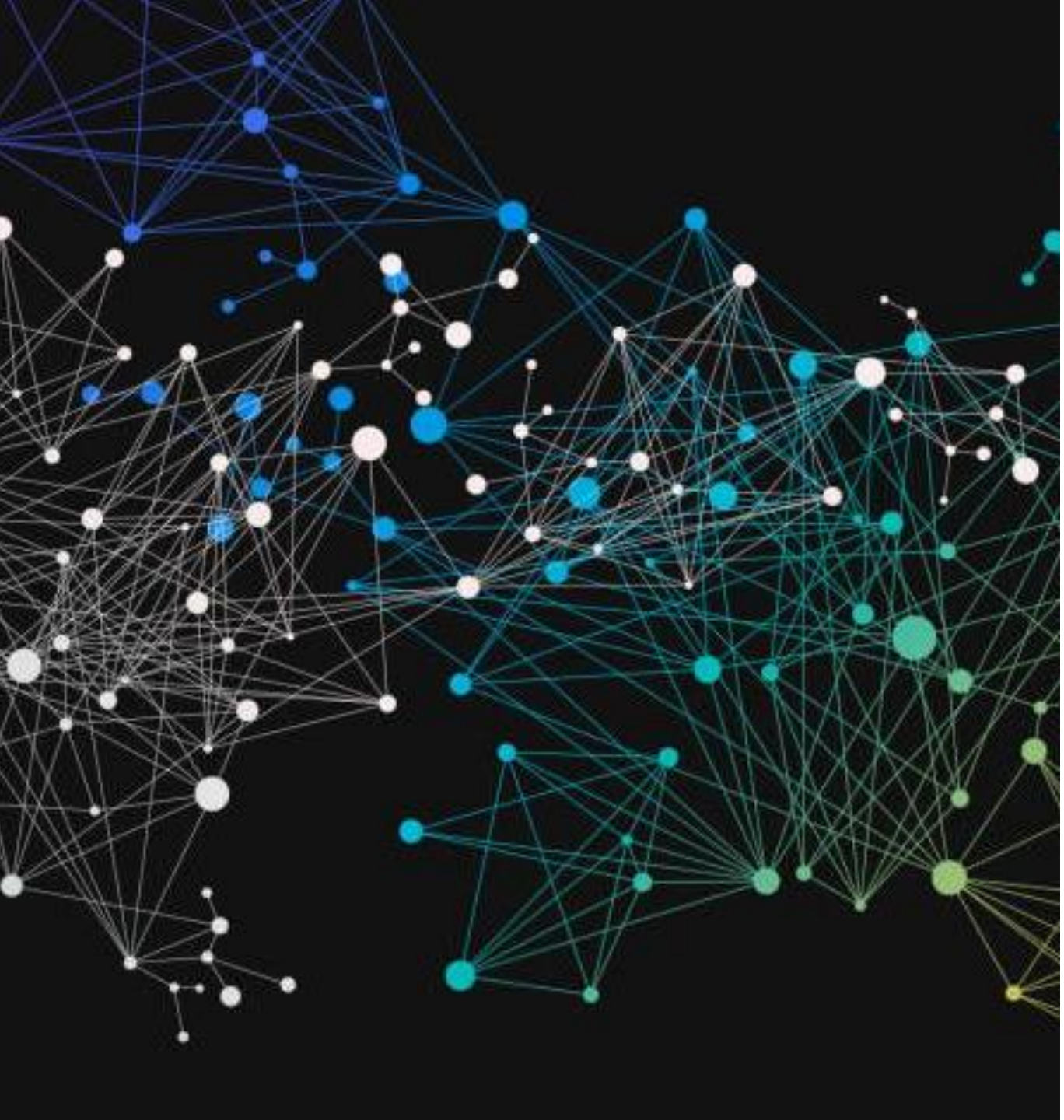

Group 4

Network Simulation

Concepts:

1. Ad-hoc Network
2. CSMA/CA Protocol
3. RTS/CTS Scheme
4. CSMA/CA with and without RTS/CTS

Contribution

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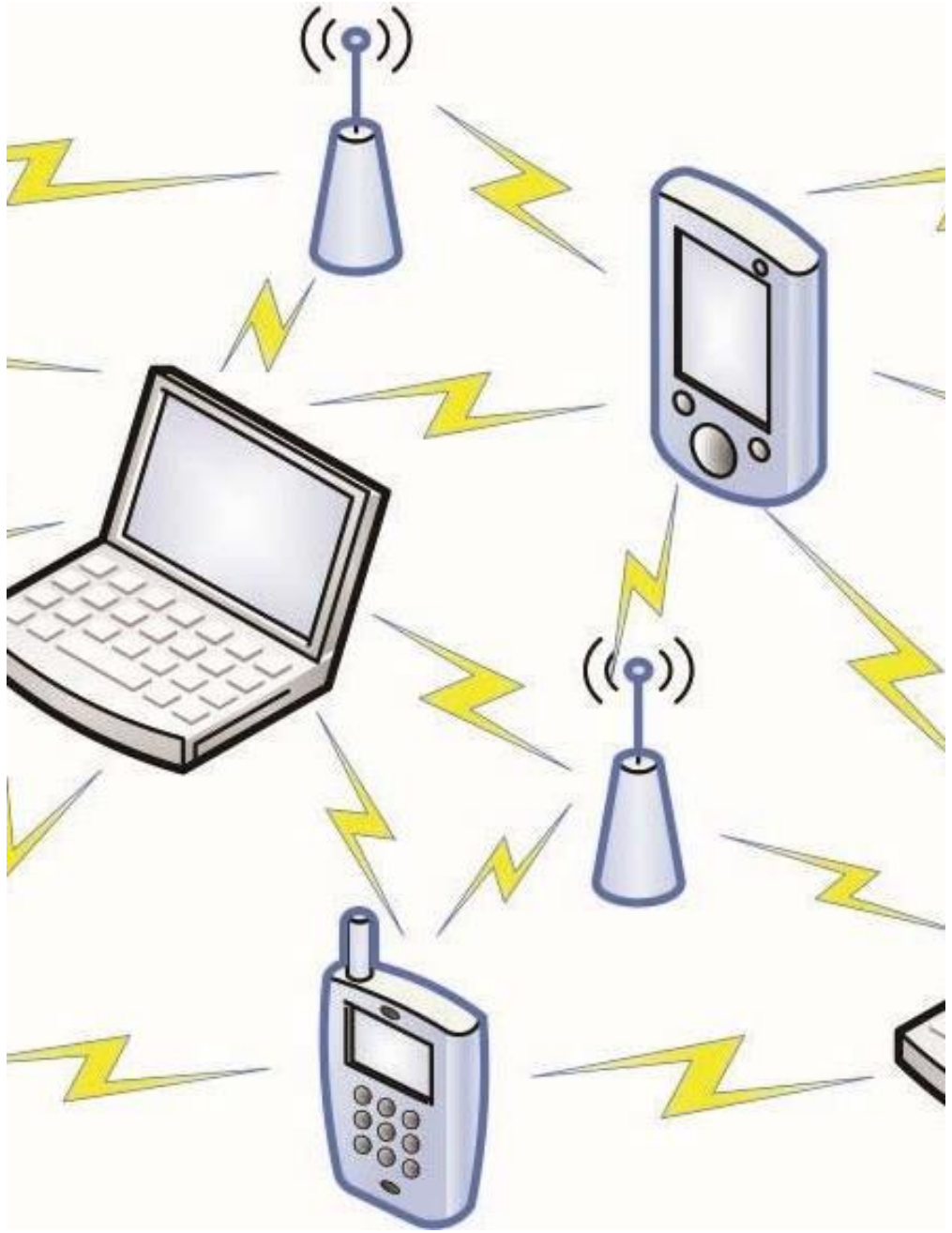
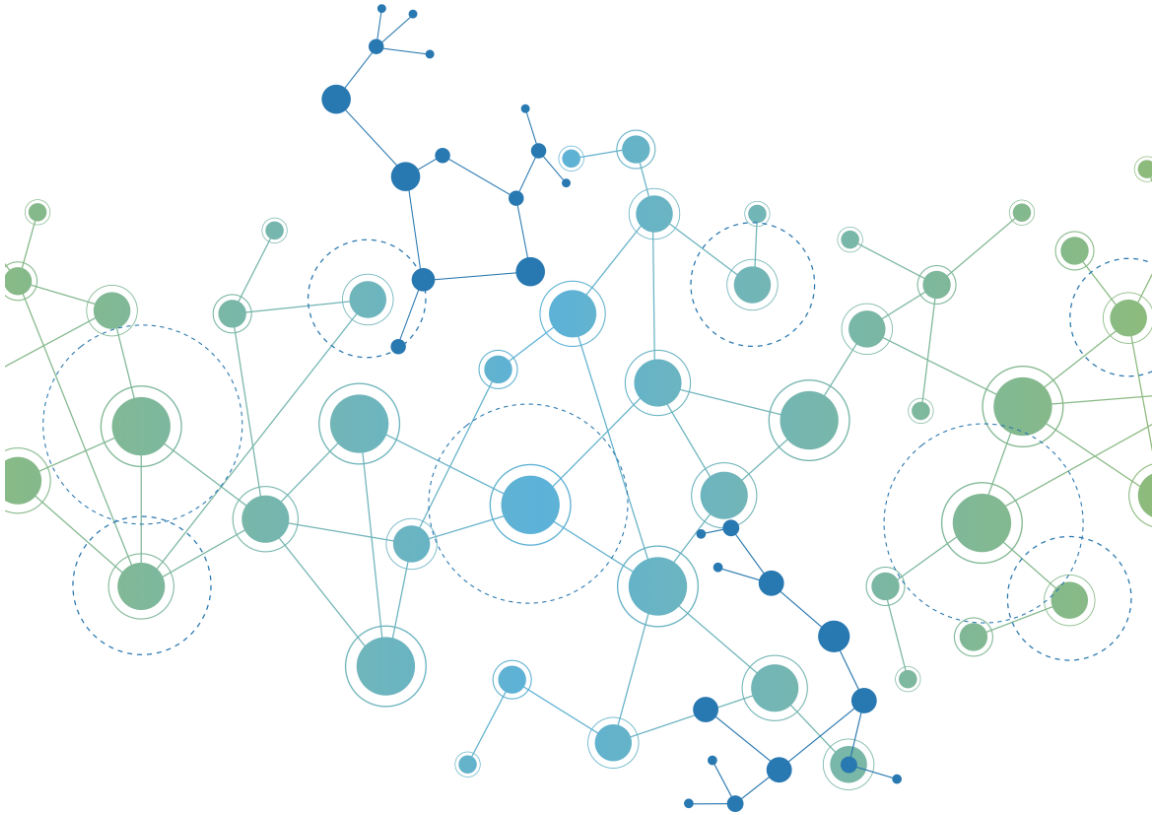
Ad-hoc Network



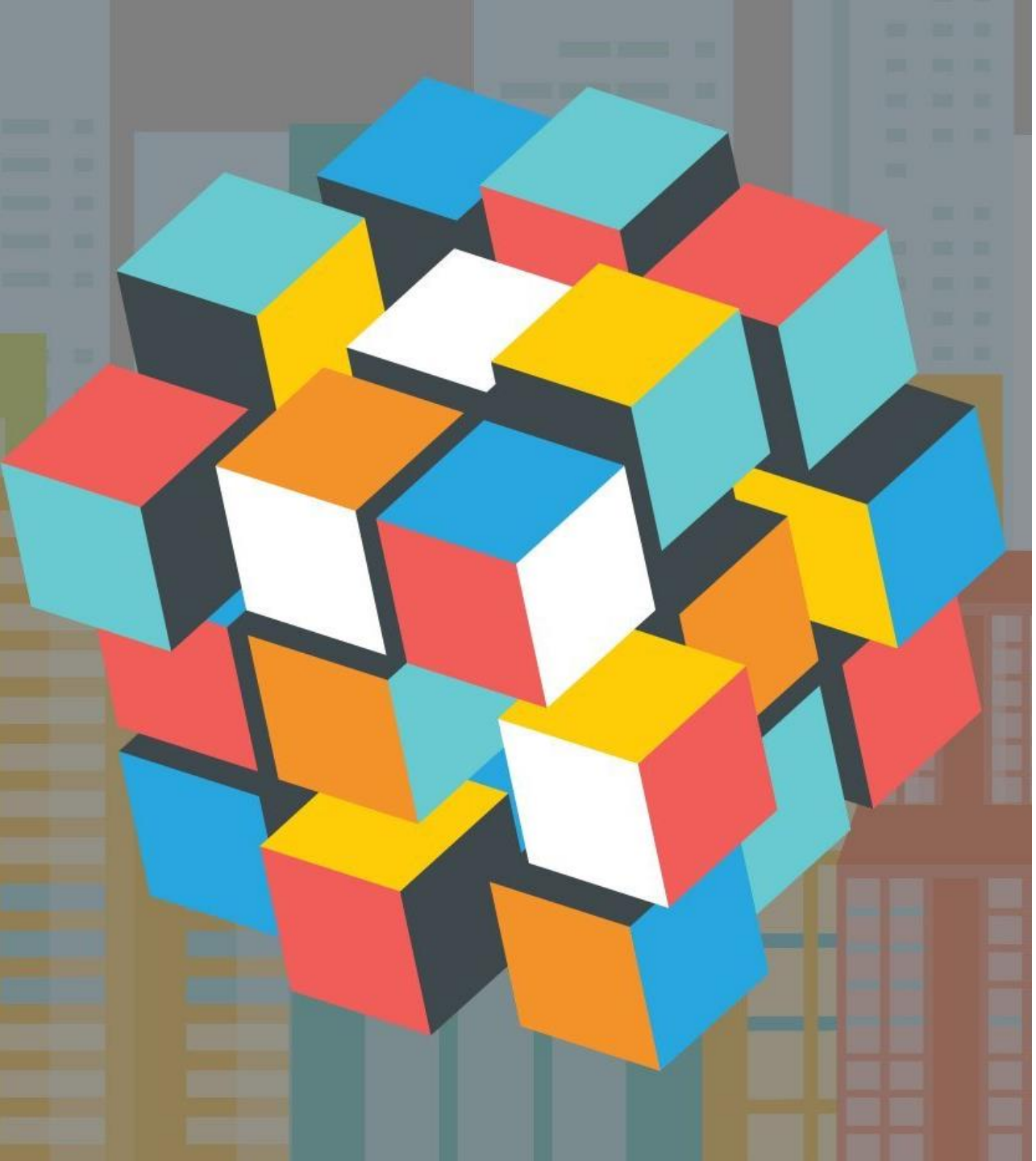
Ad-hoc Network

An ad-hoc network is one that is **spontaneously formed** when devices connect and communicate with each other.



Ad-hoc Network

Devices can communicate directly with each other (peer-to-peer mode). An additional feature in the 802.11 set of standards.

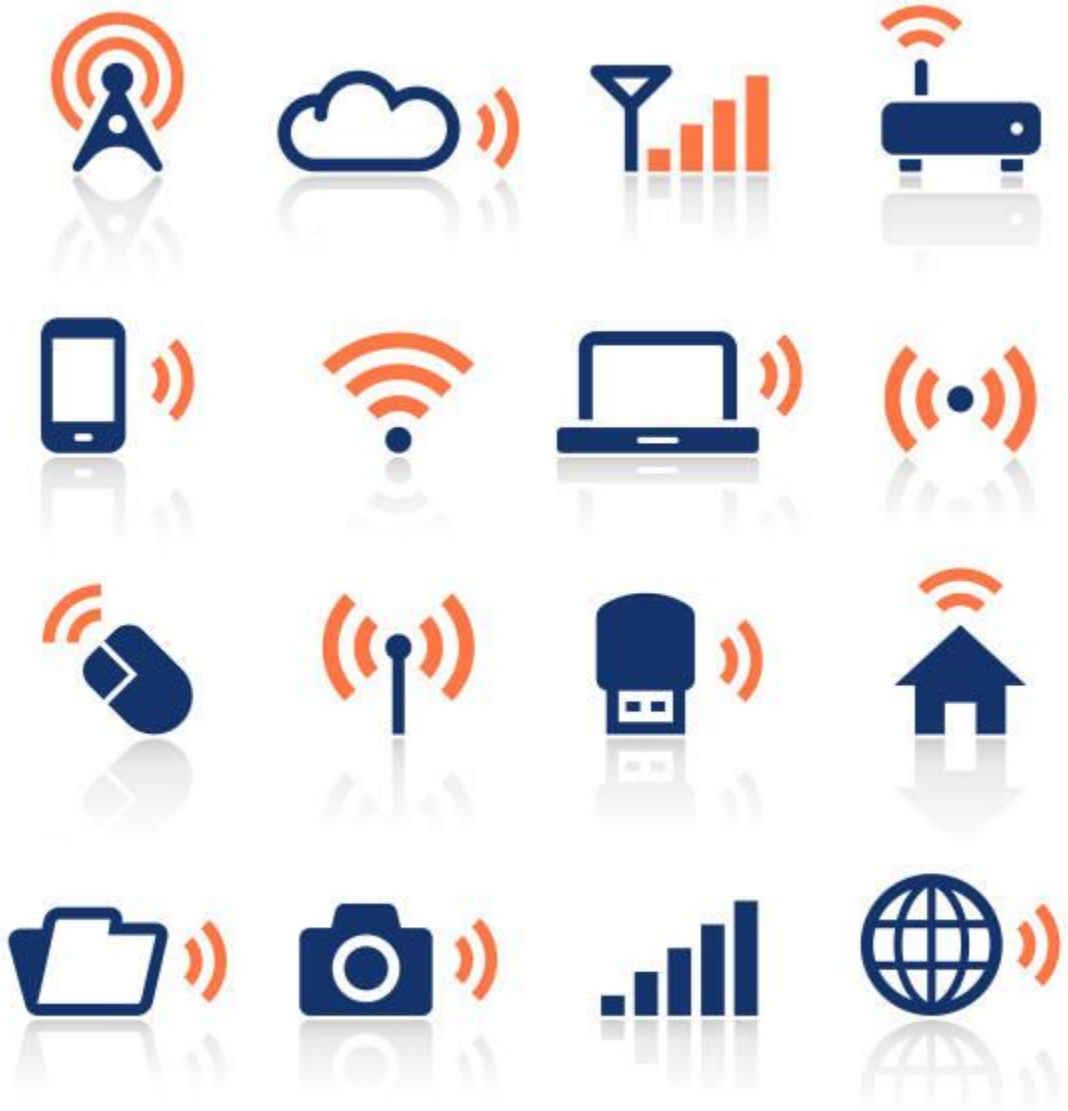


CSMA/CA Protocol

CSMA/CA is used on wireless networks.

CSMA/CA Is a protocol for carrier transmission in 802.11 networks.

To minimize the chance of signal collisions among devices in a network



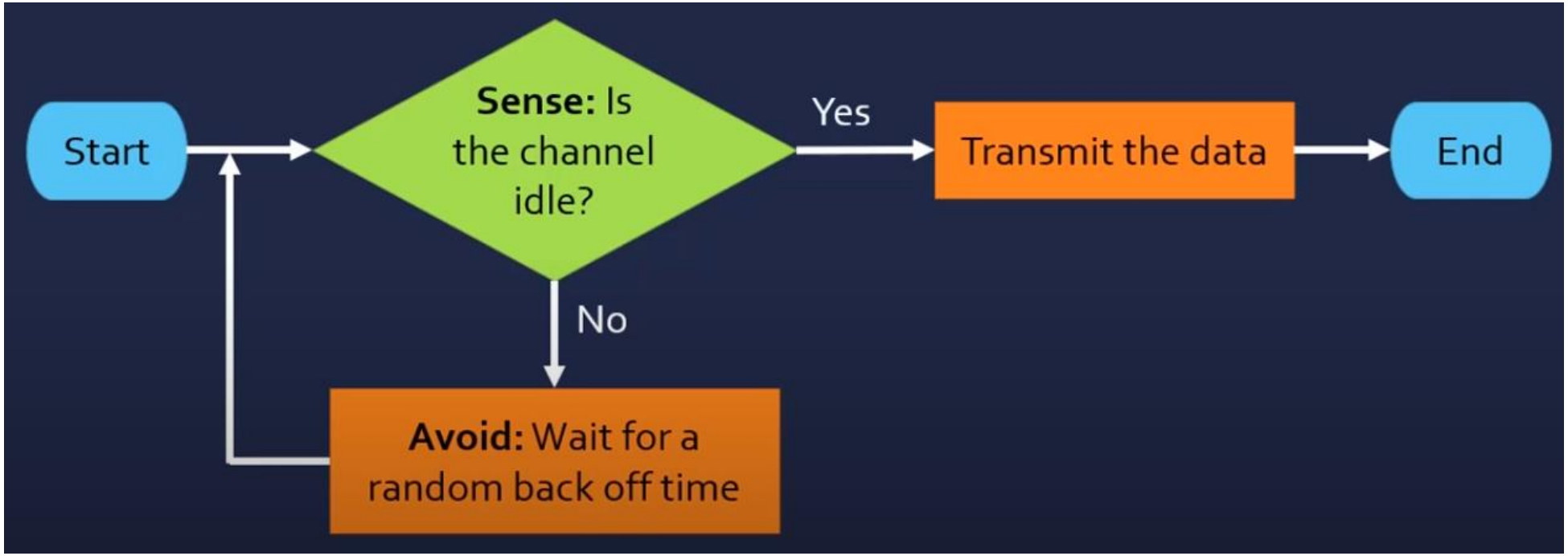
CSMA

- Node listen to the shared channel
- If the medium is not idle, they won't transmit

CA

These collisions are mostly avoided by waiting for a random ***amount of time*** when the channel is busy

Work-flow


Start
Sense: Is the channel idle?
Yes
Transmit the data
End
No
Avoid: Wait for a random back off time

RTS/CTS Scheme

Overview

The overall steps we took as followed:

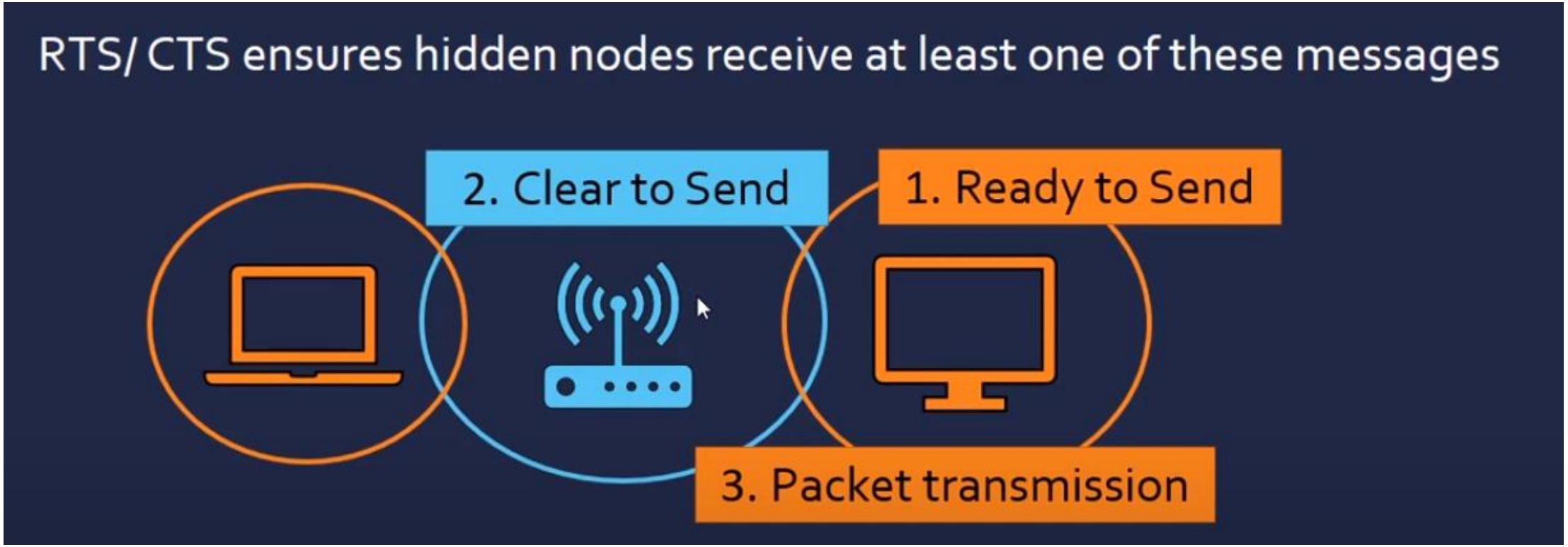
- RTS/CTS (Request To Send / Clear To Send) is the mechanism used by the 802.11 wireless networking protocol
- To reduce frame collisions introduced by the hidden node problem
- Used by CSMA/CA as an optional protocol.
- WAP or Wireless Access Point serves as a traffic controller

Basic Process

1. The sender (computer) sends a RTS (ready to send) signal to a WAP (Wireless Access Point/Modem) to inform that it is ready to send data over.
2. The receiver (a modem) on receiving the RTS signal grants this request, temporarily stops the communication to other devices and responds with a CTS signal (Clear To Send) to the sender which tells it to send the data over.

Pros

RTS/CTS prevents the hidden node problem

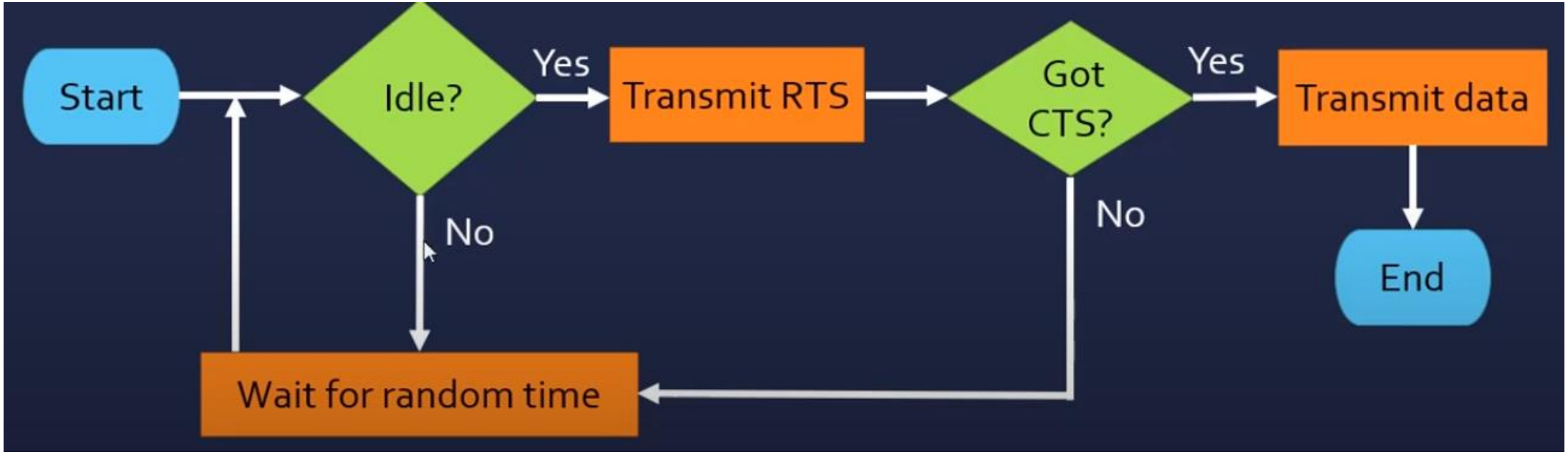


Cons

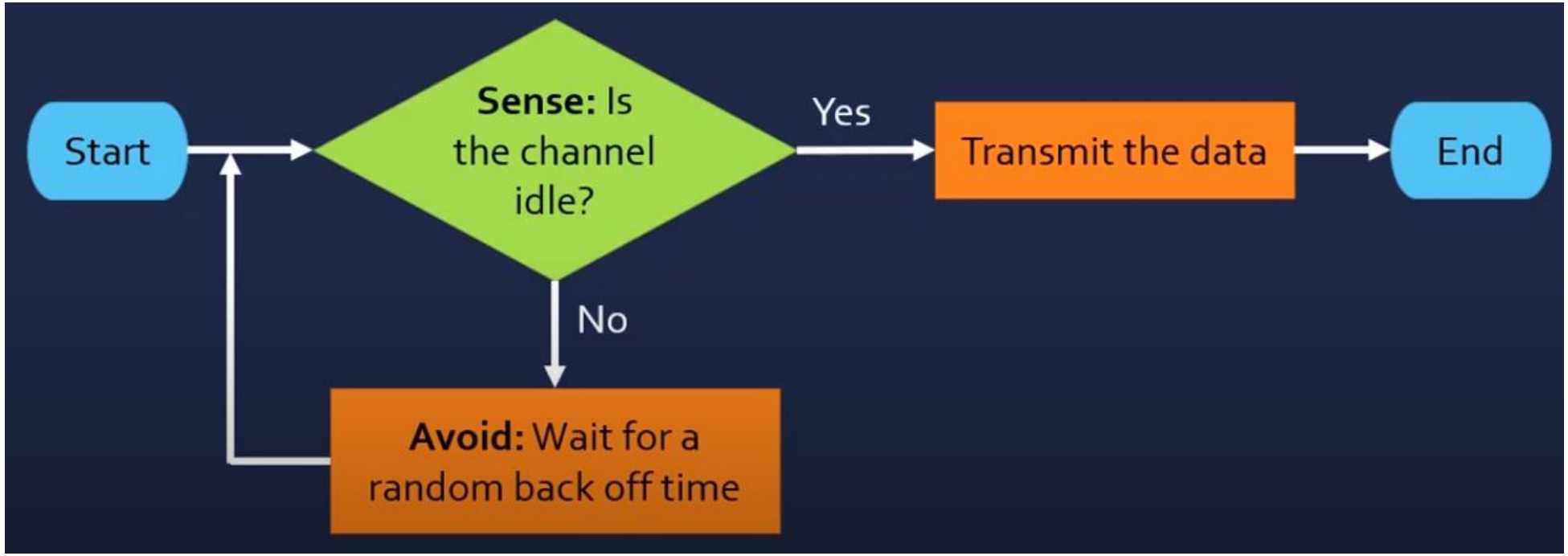
- RTS/CTS add an overhead or the information that must be sent with data being routed through the network toward a destination, to each packet, which increases the load and worsens the congestion.
- It is advisable to remove RTS/CTS for small packages.

CSMA/CA *with* and *without* RTS/CTS

CSMA/CA with RTS/CTS



CSMA/CA without RTS/CTS



Q&A