Switching Techniques

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COMPUTER NETWORKS
A Bottom up approach
Switching Techniques

Outcomes

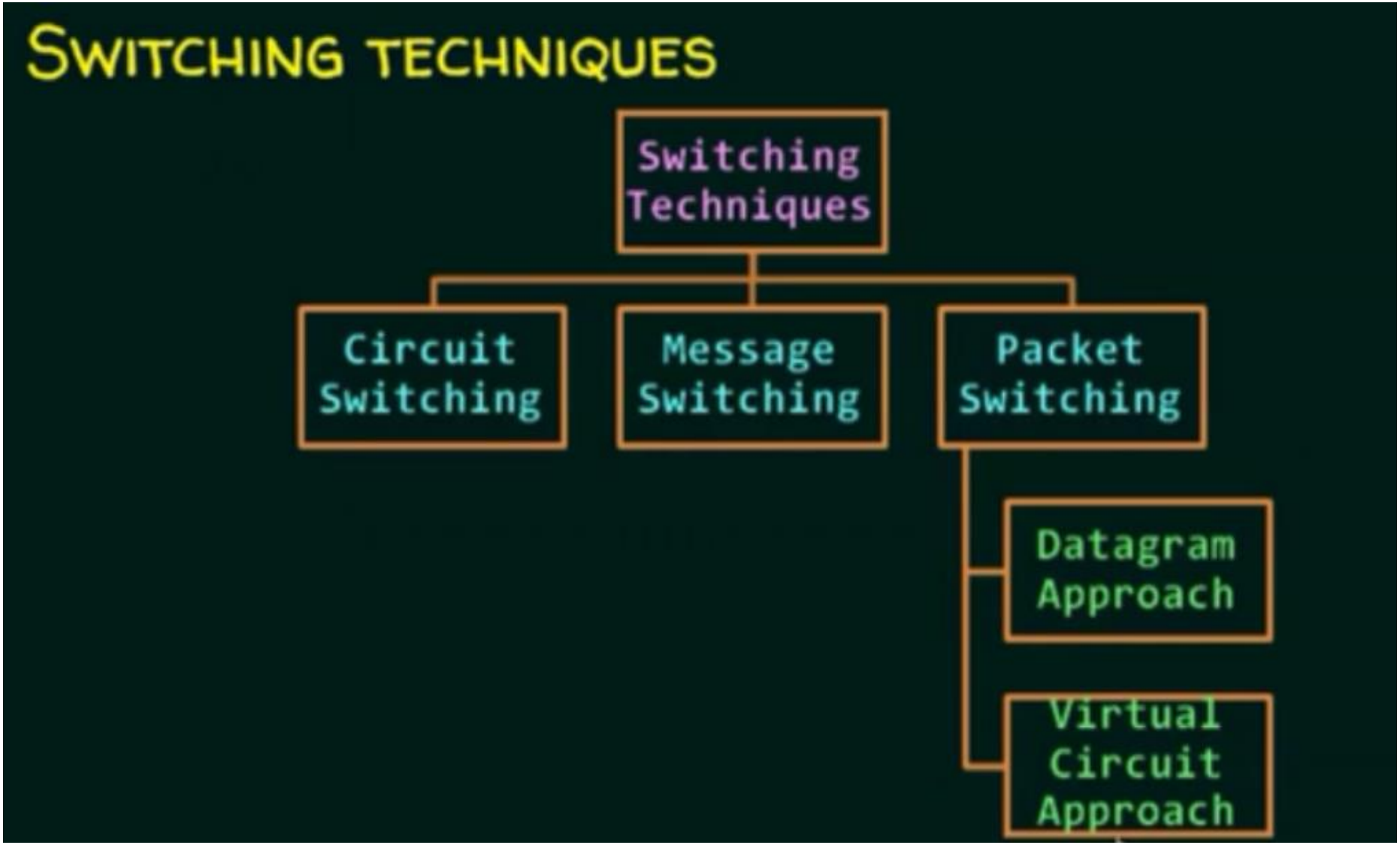
Upon the completion of this session, the learner will be able to

- ★ Understand switching.
- ★ Understand various switching techniques such as circuit switching, message switching and packet switching.

SWITCHING

★ Switching in computer network helps in deciding the best route for data transmission if there are multiple paths in a larger network.

★ One-to-One connection.


SWITCHING TECHNIQUES
Switching Techniques
Circuit Switching
Message Switching
Packet Switching
Datagram Approach
Virtual Circuit Approach

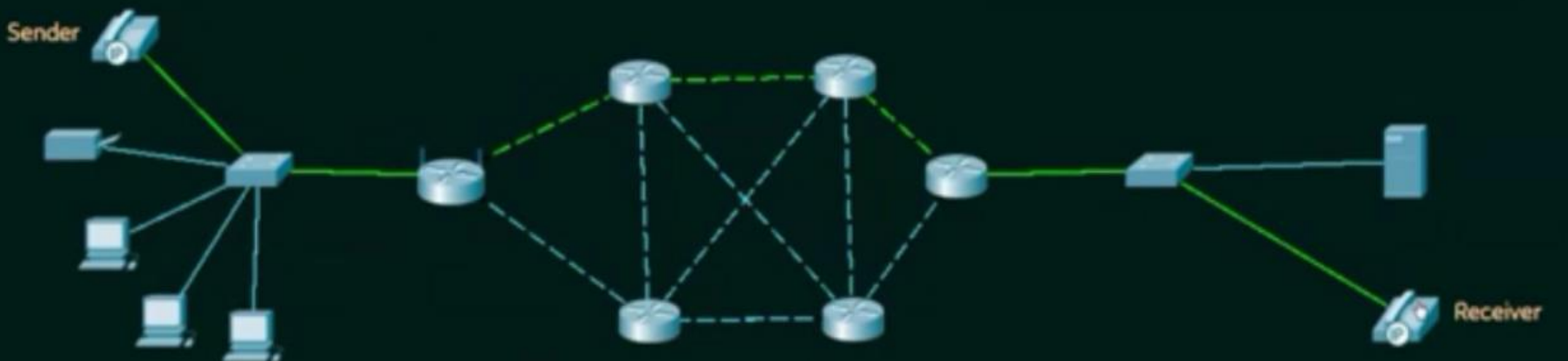
Circuit switching

- ★ A dedicated path is established between the sender and receiver.
- ★ Before data transfer, connection will be established first.
- ★ Example: Telephone network.

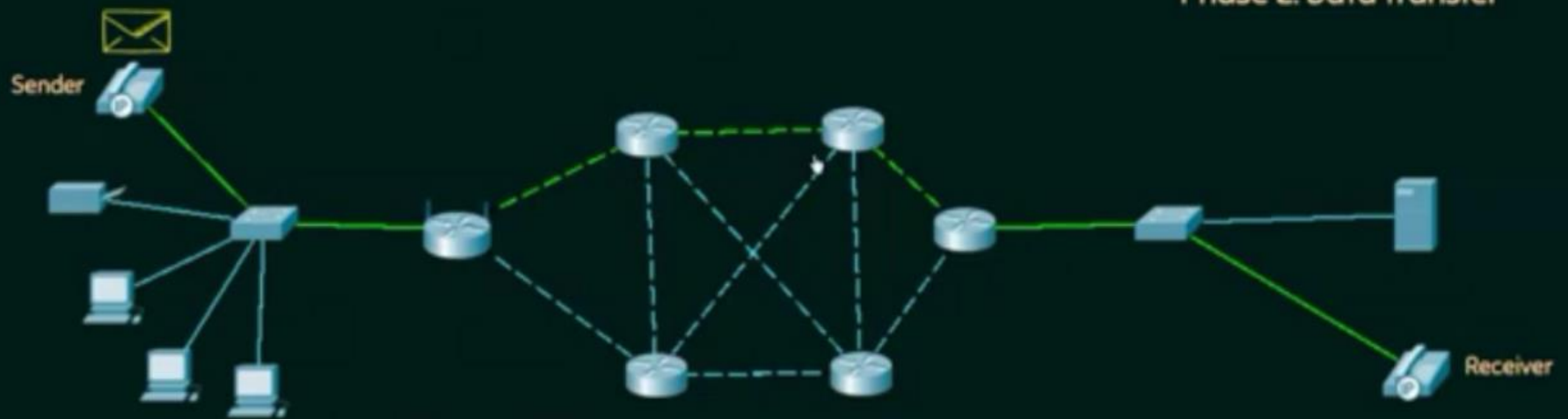
3 phases in circuit switching:

1. Connection establishment.
2. Data transfer
3. Connection Disconnection.

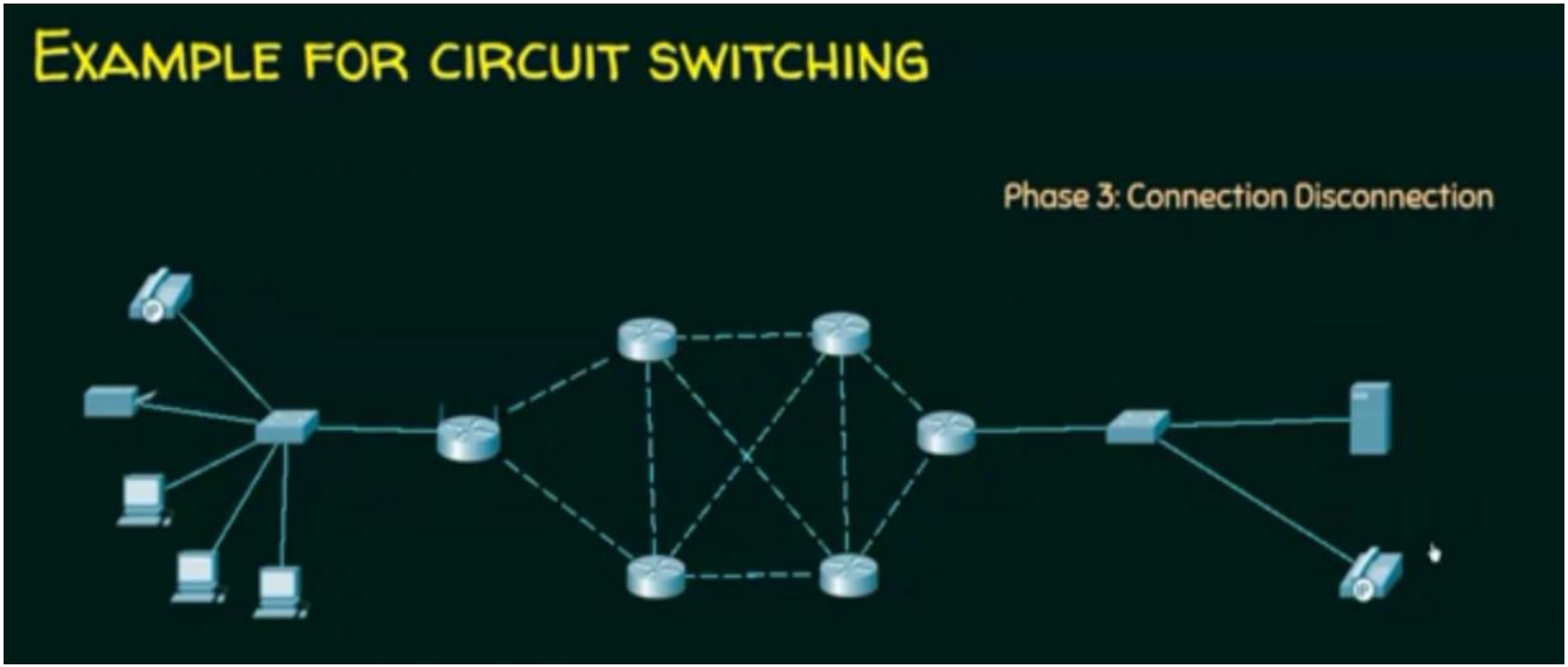
Example for circuit switching



Example for circuit switching



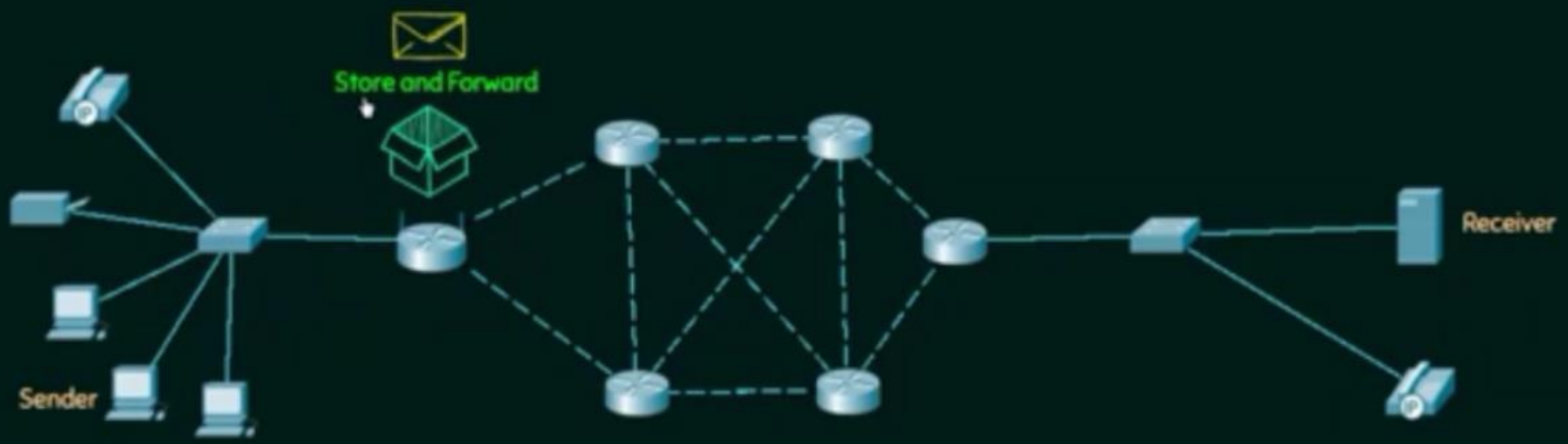
Example for circuit switching



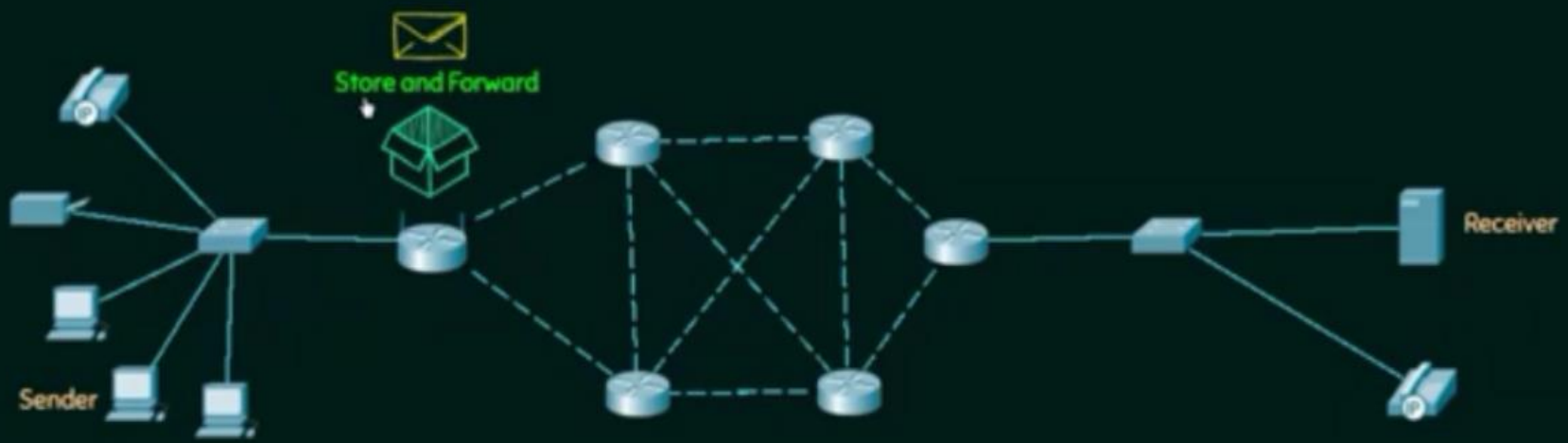
Message switching

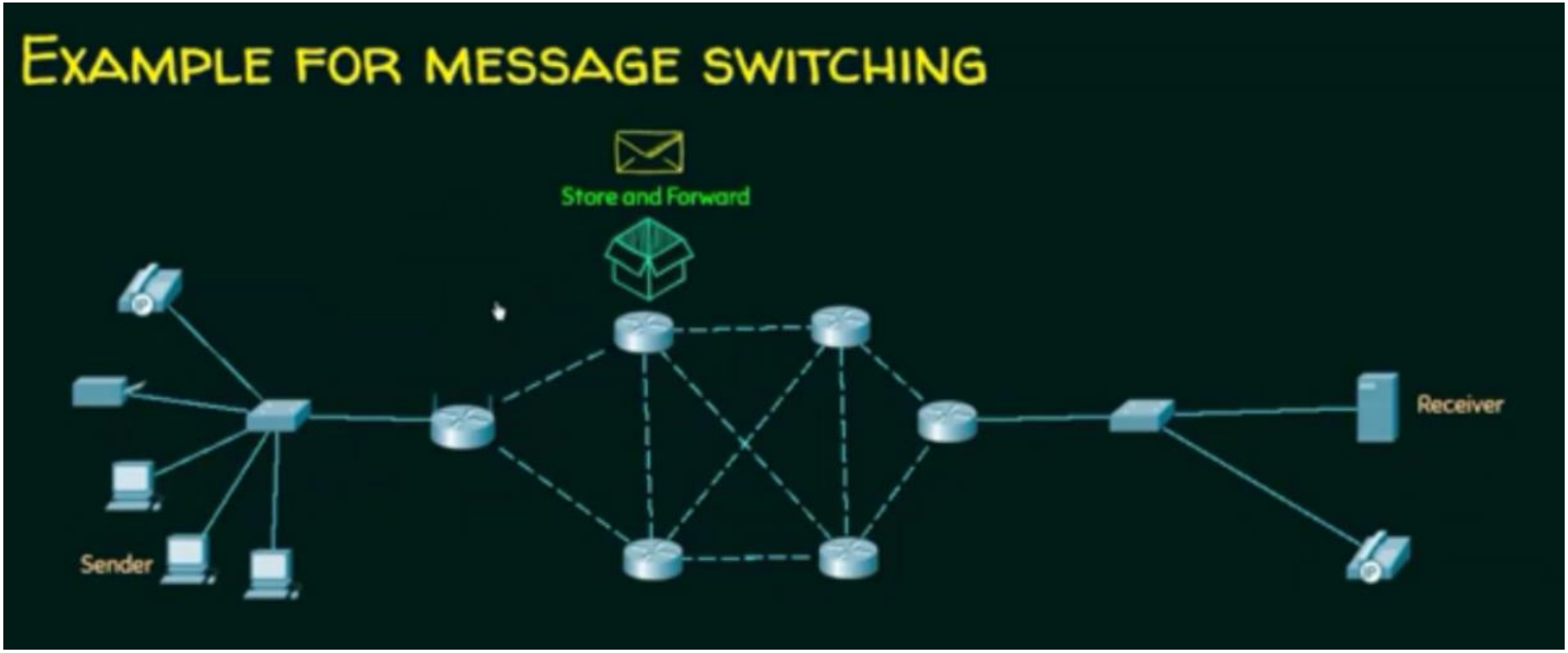
- ★ Store and forward mechanism.
- ★ Message is transferred as a complete unit and forwarded using store and forward mechanism at the intermediary node.
- ★ Not suited for streaming media and real-time applications.

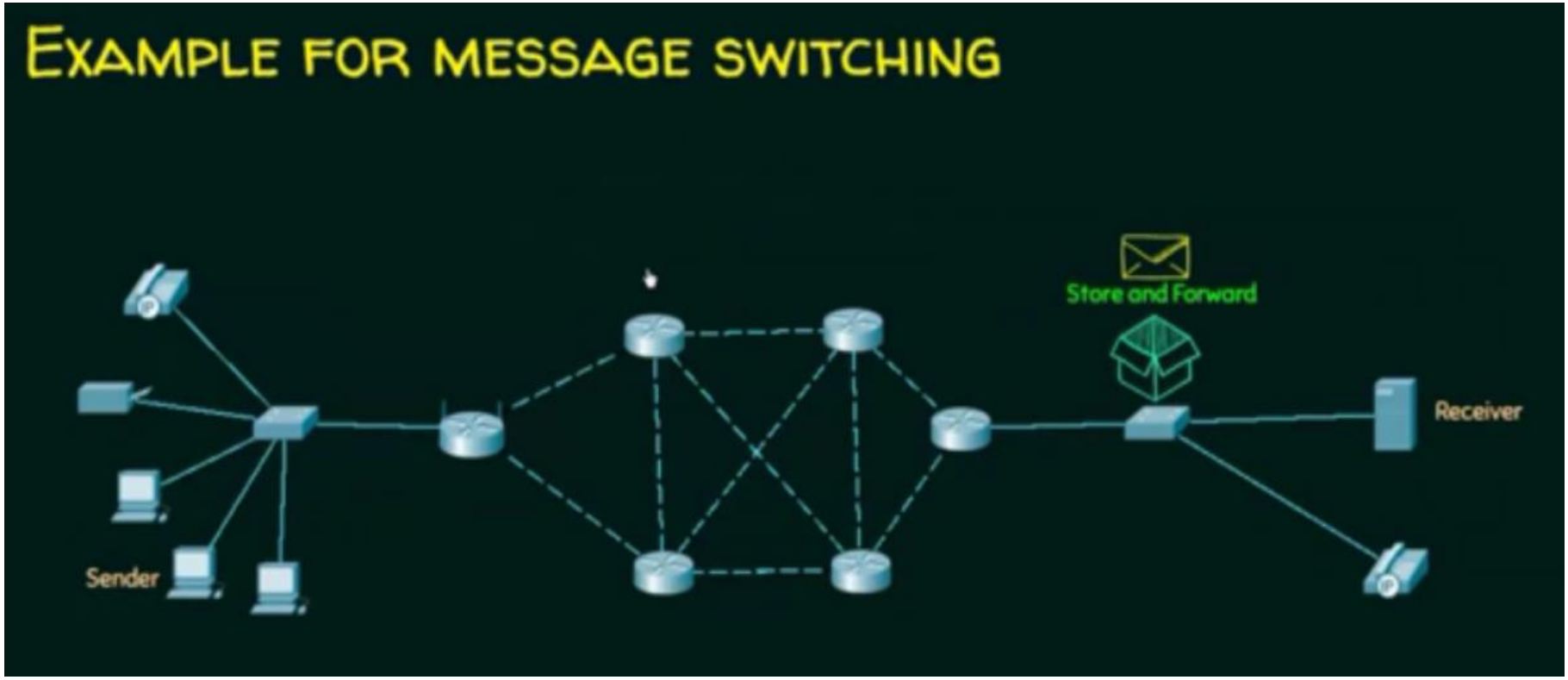
Example for packet switching



Example for packet switching




EXAMPLE FOR MESSAGE SWITCHING
Store and Forward
Receiver
Sender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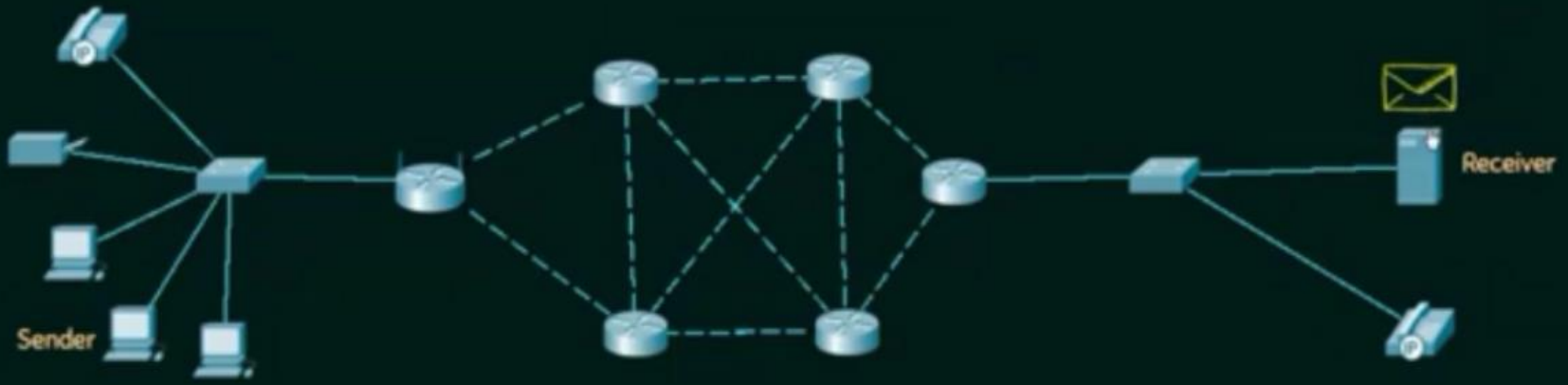
Example for message switching



Message switching

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Packet switching

- ★ The internet is a packet switched network.
- ★ Message is broken into individual chunks called as packets.
- ★ Each packet is sent individually.
- ★ Each packet will have source and destination IP address with sequence number.
- ★ Sequence numbers will help the receiver to
  - Reorder the packets.
  - Detect missing packets and
  - Send acknowledgments.

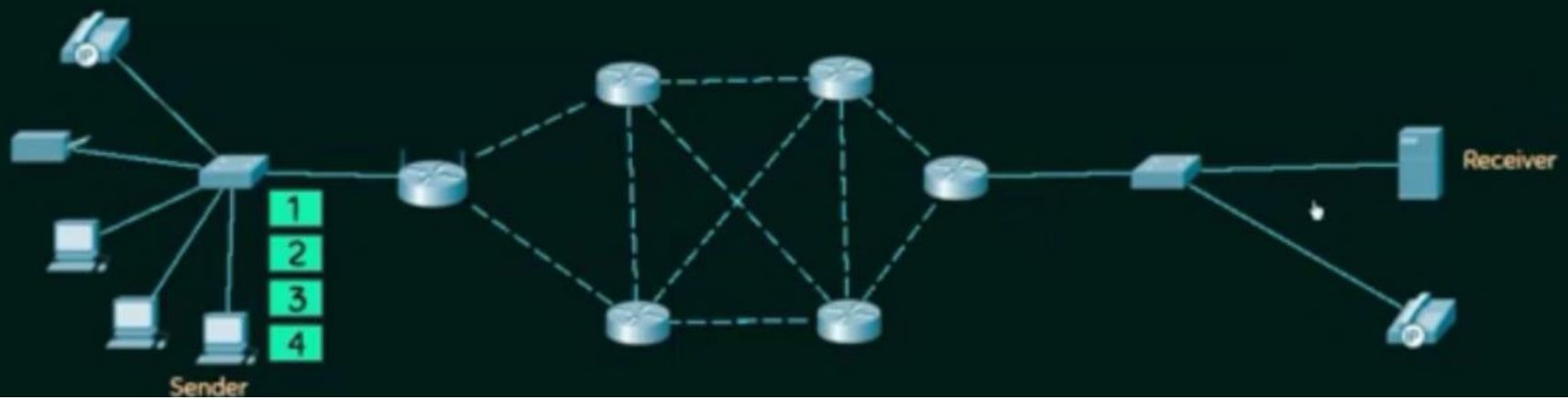
Two approaches to packet switching

1. Datagram Approach.
2. Virtual Circuit Approach.

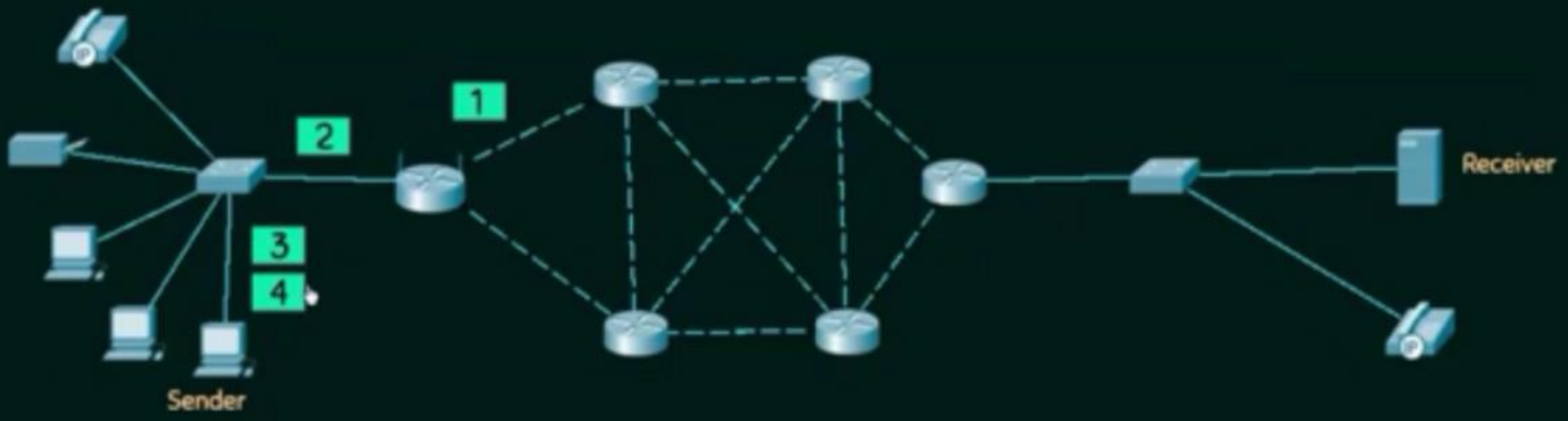
Packet switching – Datagram approach

- ★ Datagram Packet Switching is also known as connectionless switching.
- ★ Each independent entity is called as datagram.
- ★ Datagrams contain destination information and the intermediary devices uses this information to forward datagrams to right destination.
- ★ In Datagram Packet Switching approach, the path is not fixed.
- ★ Intermediate nodes take the routing decisions to forward the packets.

Example for packet switching – datagram



Example for packet switching – datagram



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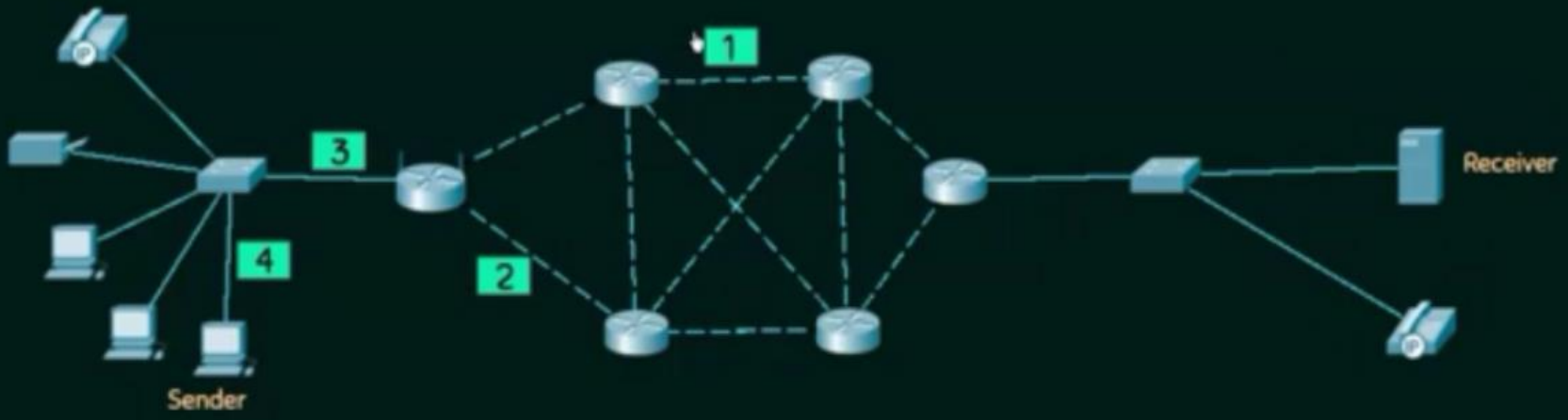

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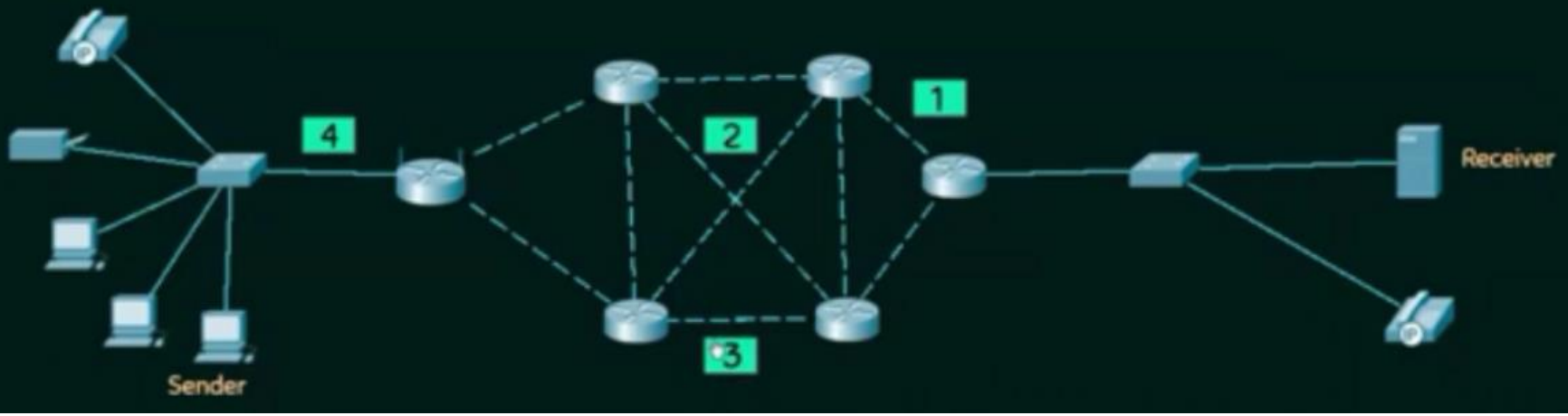
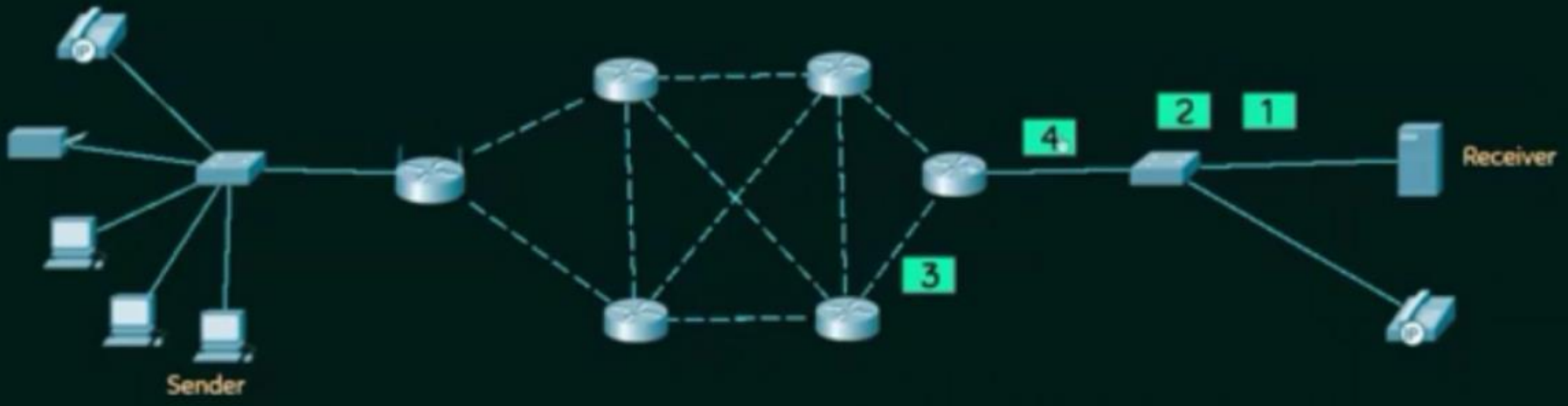
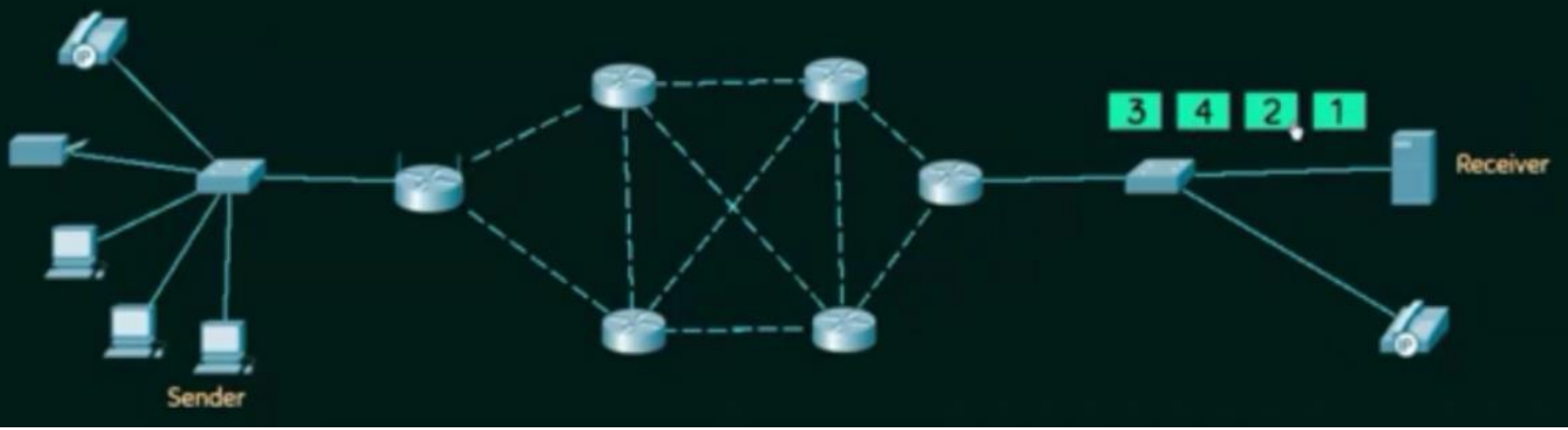
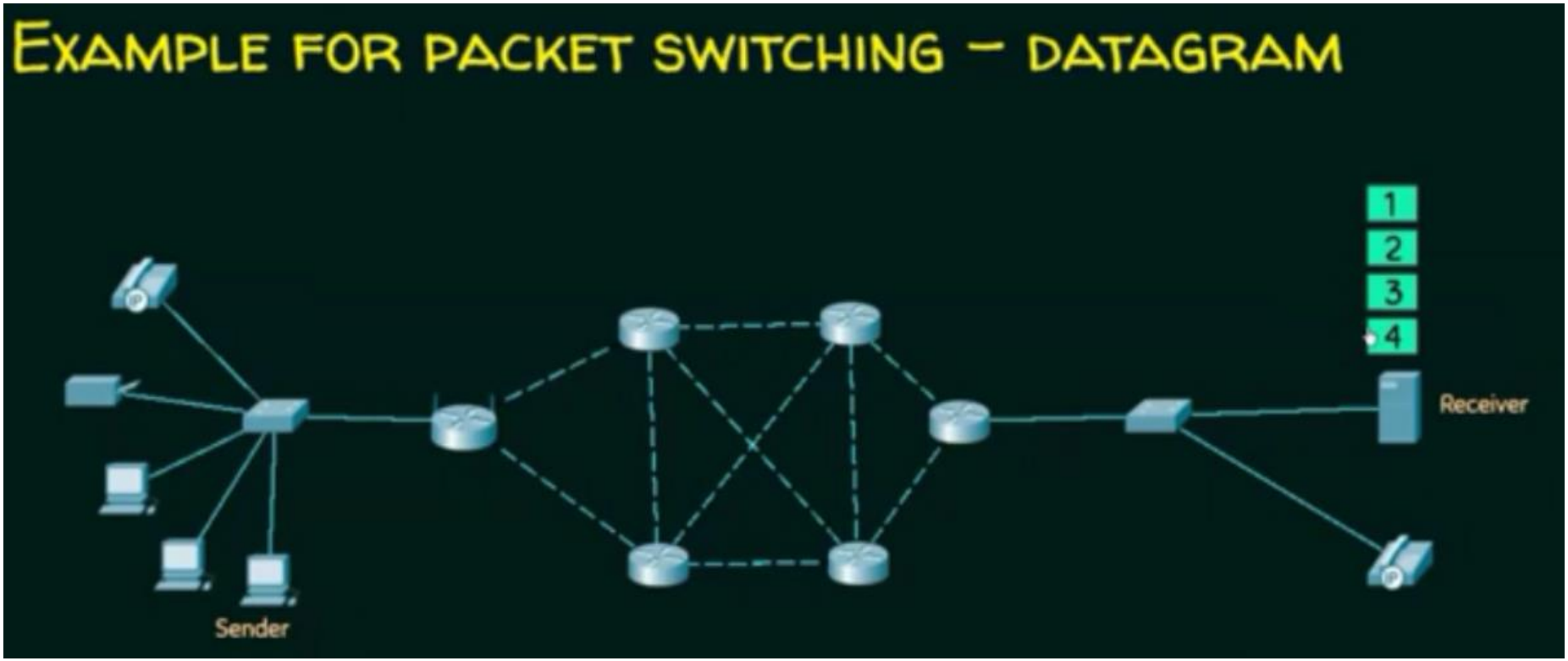


Example for packet switching – datagram



Example for packet switching – datagram

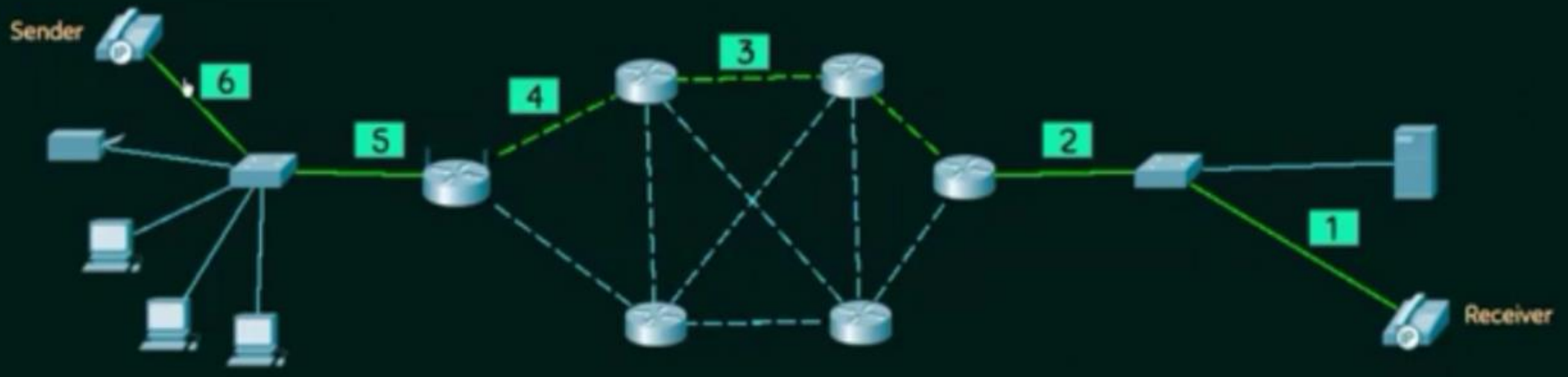



EXAMPLE FOR PACKET SWITCHING – DATAGRAM
1
2
3
4
Receiver
Sender

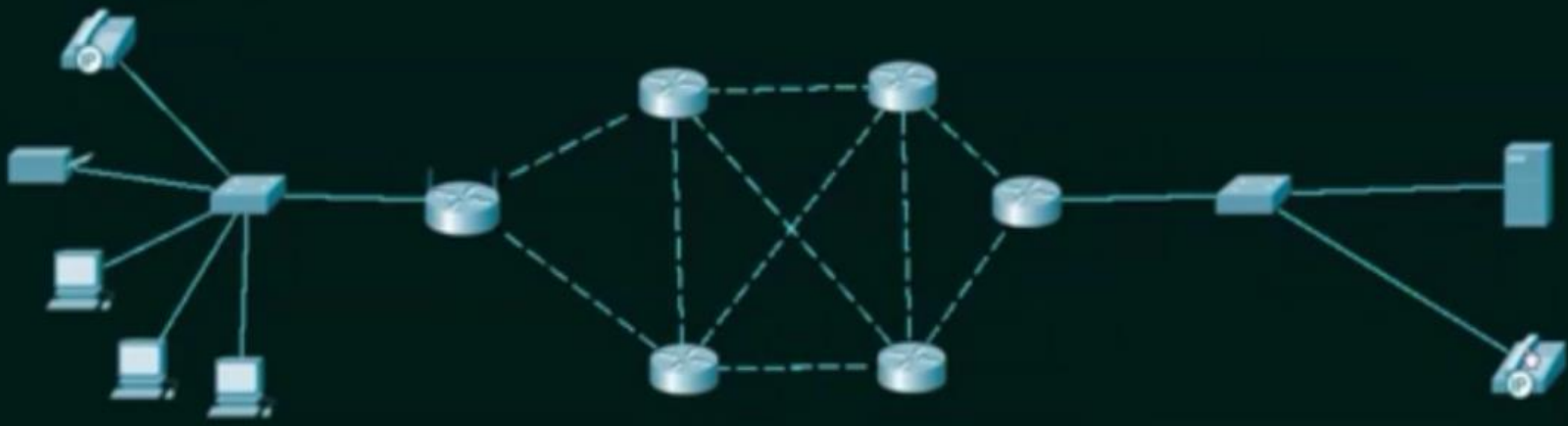
Packet switching – Virtual Circuit approach

- ★ Virtual Circuit Switching is also known as connection-oriented switching.
- ★ In the case of Virtual circuit switching, a preplanned route is established before the messages are sent.
- ★ Call request and call accept packets are used to establish the connection between sender and receiver.
- ★ In this approach, the path is fixed for the duration of a logical connection.

Example for packet switching – virtual circuit



Example for packet switching – virtual circuit



Questions


THANK YOU!