SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECE308- WIRELESS TECHNOLOGIES FOR IOT

UNITII ARCHITECTURE AND DESIGN PRINCIPLES FOR IOT

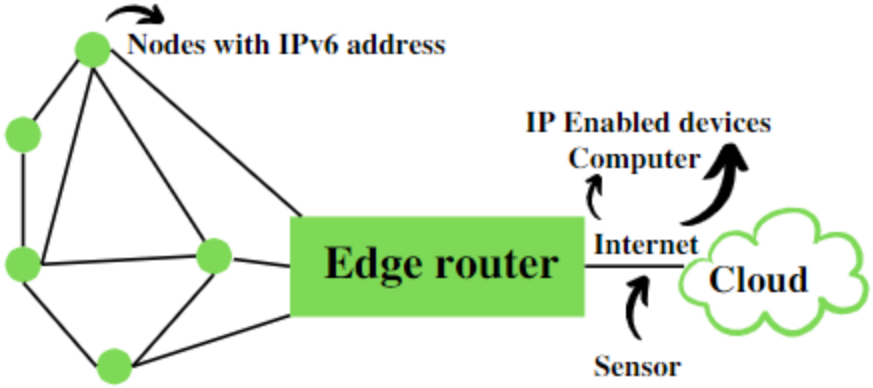
TOPIC 4 –6 LowPAN

6LoWPAN Features

- IETF recommended methods for reassembly of fragments
- IPv6 and UDP (or ICMP) headers compression (6LoWPAN-hc adaptation layer)
- Neighbour discovery (6LoWPAN-nd adaptation layer) and supports mesh routing

Data Stack

- Uses 6LoWPAN protocol at adaptation layer
- Adaptation layer data stack transmits to IPv6 Internet layer
- Nodes having low speed and low power. For example, Wireless Personal Area Network (WPAN) nodes.



IPv6 over IEEE 802.15.4 standard network nodes

- Headers, security and Application data in a frame
- Total device node frame size = 127B .
- IPv6 header = 40B;
- UDP header = 8B;

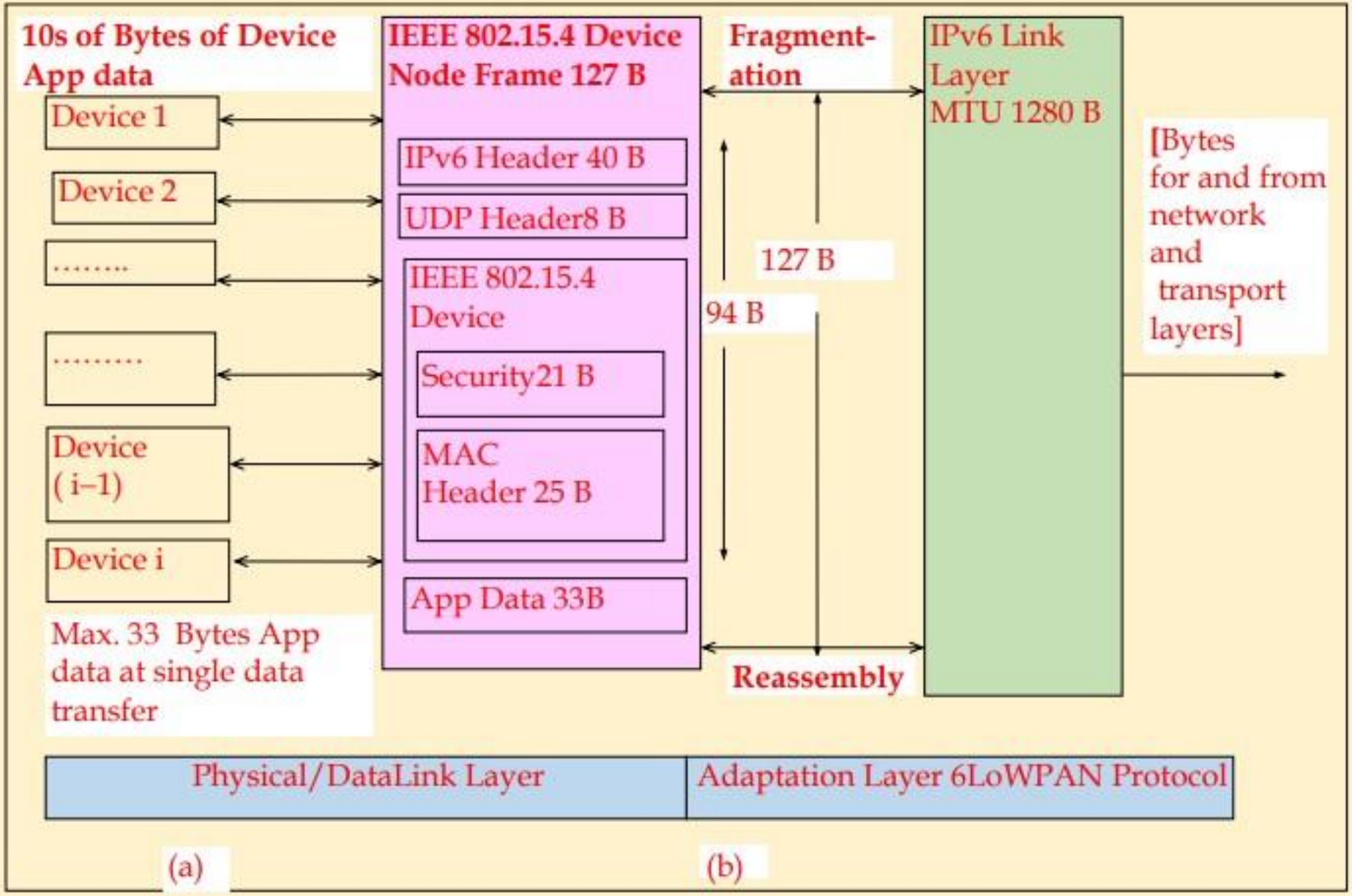
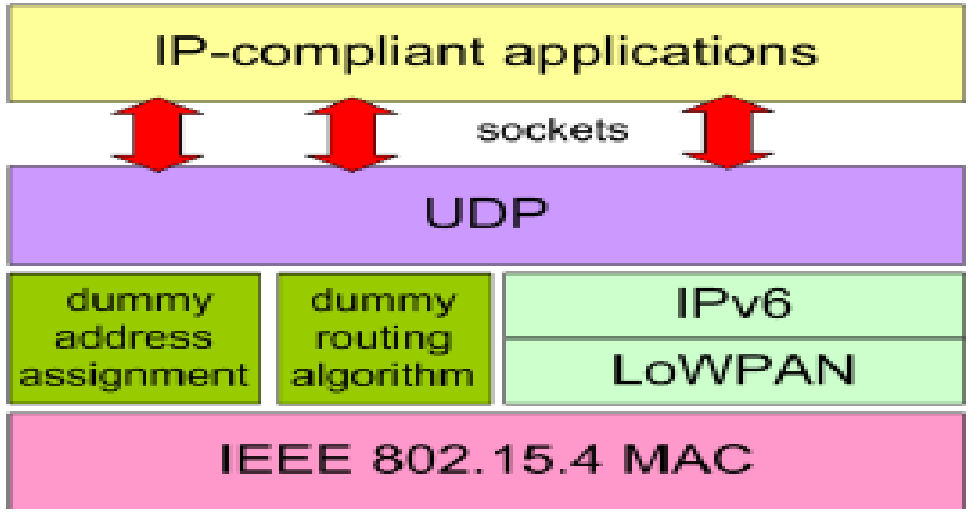


Fig. 4.5(a) Physical layer IEEE 802.15.4 network devices (b) Adaptation layer 6LoWPAN protocol 127 B fragmented frames reassembly into IPv6 maximum 1280 B or fragmentation of IPv6 MTU 1280B into 127 B frames for transfer to a device.

IPv6 over IEEE 802.15.4 standard network nodes

- Device node MAC (Media Access Control) = 25 B;
- AES-128 security = 21 B;
- Remaining Application data



The frame MTU

6LoWPAN Adaptation Layer

- Needs to make IEEE 802.15.4 comply with IPv6's MTU size of 1280 bytes
  - IEEE 802.15.4's MTU is 127 bytes
  - MAC header: ≤ 25 bytes
  - Optional security header: ≤ 21 bytes
- Provides three main services
  - Packet fragmentation and reassembly
  - Header compression
  - Link-layer forwarding

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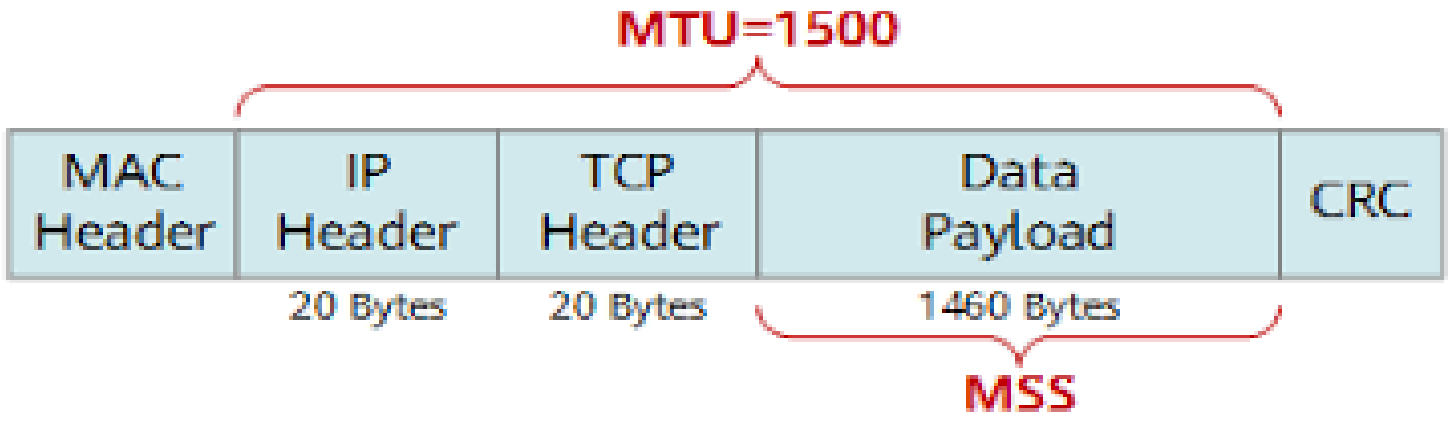
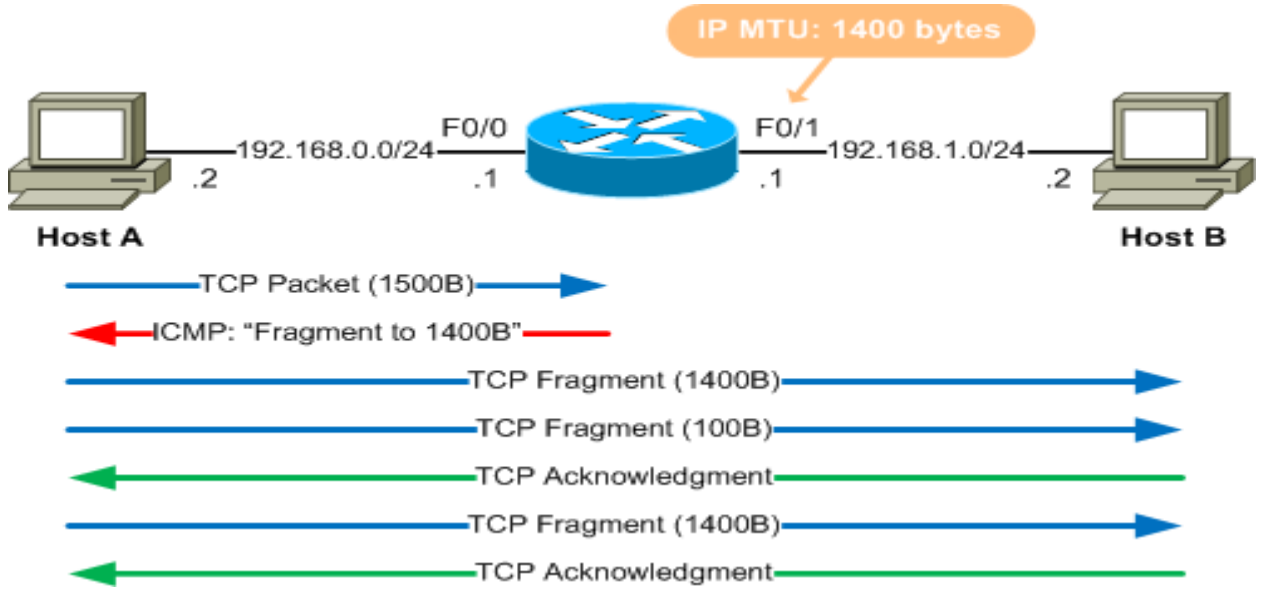
IPv6 MTU at data link layer

- 1500 B fragments into frame of 20 B each for single transfer to a device node to data payload



IPv6 MTU (maximum transmission unit)

- •Link layer = 1280 B
- •Link layer frame fragmentation needed in order to
- communicate frame of 127 B over IEEE 802.15.4
- nodes (device).



Assessment

Challenges in Security and Interoperability with 6LoWPAN

Security:

6LoWPAN security is ensured by the AES algorithm, which is a link layer security, and the transport layer security mechanisms are included as well.

Interoperability:

6LoWPAN is able to operate with other wireless devices as well which makes it interoperable in a network.

THANK YOU