SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECE308- WIRELESS TECHNOLOGIES FOR IOT

III ECE / VI SEMESTER

UNIT 2 – for IoT/M2M devices. UNITII ARCHITECTURE AND DESIGN

PRINCIPLES FOR IOT

TOPIC 3 –IPv4 and IPv6 Protocols

IPv4 Protocol headers and data stacks

- TCP Header plus data consist of stack from the transport layer
- From internet layer, each packet consists of 5-words basic IP header fields of 160 bits and extended header up to n words.
- 1 word = 32 bits
- n = total number of header words added at IP layer

Internet layer

- Receives and forwards data to next stage
- Uses IP version 4 (IPv4),
- Uses IP version 6 (IPv6) protocol or
- [IPv6 Routing Protocol for Low Power Lossy Networks (LLNs)] in IoT/M2M
- 6LoWPAN in IoT/M2M

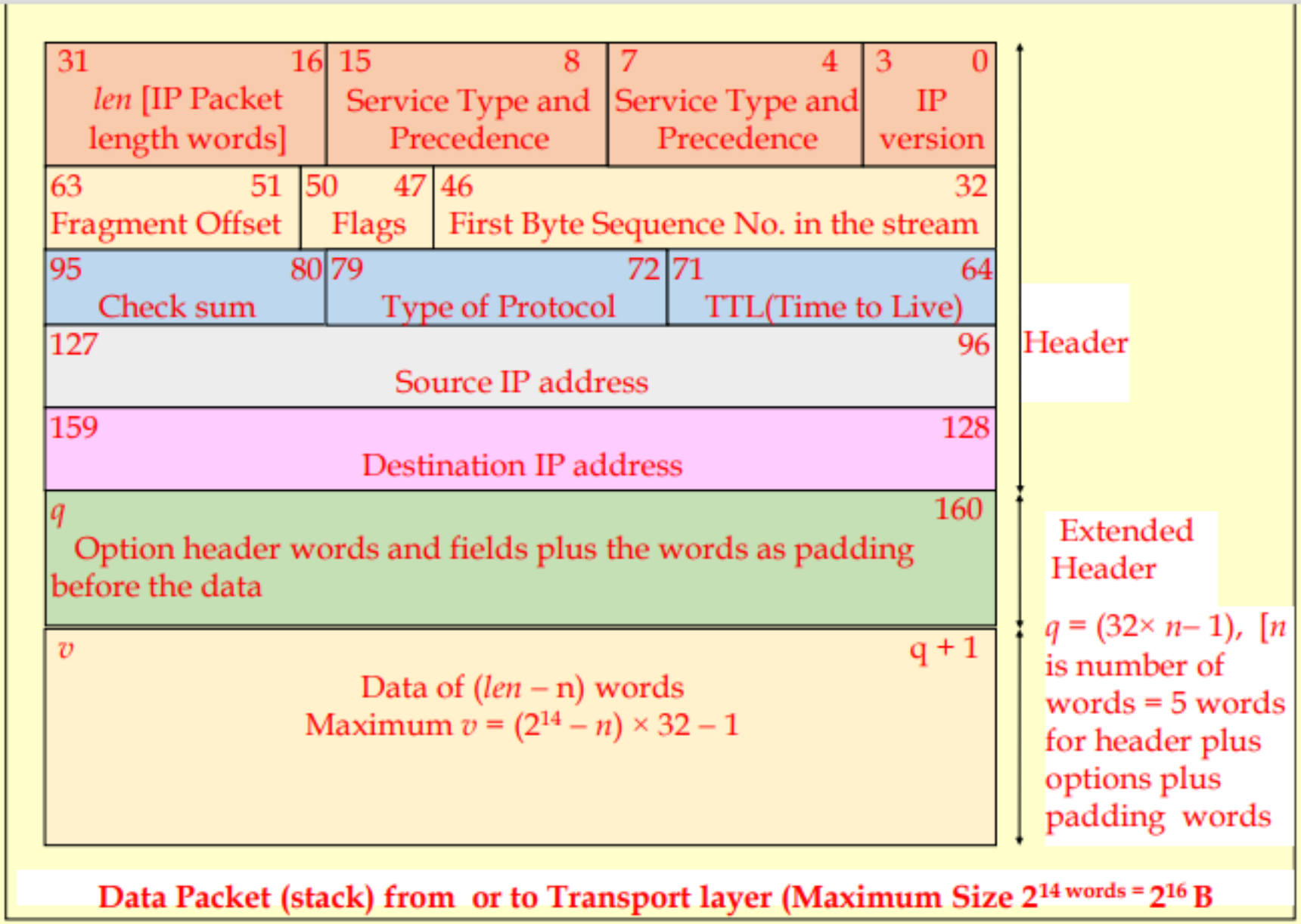

Fig. 4.3 Data stack received or transmitted at or to transport layer, and packet consisting of IP header fields of 160 bits and extended header ($n - 5$) words (when required) plus data stack of maximum v words from or for the transport layer

IPv4 Header and Data Stack (Packet Size) to next stage

- IP header first consists of five words
- The header extends by using option words and padding words
- Data stack to network layer has maximum V = (n + len) words where V <= (2 to the power 14 -n) words
- Packet maximum 2 to the power 14 word meaning 2 to the power 16 B

Header first word field

- • b31-b16 len [IP Packet length in words]
- • b15-b4 Service Type and Precedence
- • b3-b0 IP version (=0100 for version 4)

Header second word fields

- • b63-b51 Fragment Offset (specify which data stack len words consist of which fragment in the data stack of transport layer)
- b50-b47 Flags
- b46-b32 first Byte Sequence Number in the packet of the TCP stream

Header third word fields

- b95-b80 checksum (sum of header bits)
- b79-b72 type of protocol (for example, is it ICMP)
- b71-b64 time to live (number of hops try to reach to destination

Header fourth and fifth word fields

- b127-b96 32-bit source IP address
- • b159-b128 32-bit destination IP address

IPv6 Protocol features

- Large addressing space and
- Route aggregation
- IPv6 addresses of 128 bits
- Vastly enlarged address space compared to IPv4
- An Pv6 address field provides a numerical label

Label in IPv6

- •IPv6 addresses of 128 bits
- • Vastly enlarged address space compared to IPv4
- • An Pv6 address field provides a numerical label

IPv6

- Permitting the hierarchical address allocation
- Thus route aggregation across the Internet
- Thus limit the expansion of routing tables.
- Provisions additional optimization for the delivery of services using routers, subnets and interfaces,
- Manages device mobility, security, and configuration Aspects.
- Expanded and simple use of multicast addressing
- Provisions jumbo grams (big size datagram)
- Permits extensibility of options

SUMMARY

- IPv4 and IPv6 protocol basic features
- 32-bit IP4 addresses
- 32-bit IPv6 addresses

Internet layer in IPv6 receives and transmits from/to adaptation layer when using IEEE 802.15.4 WPAN devices