IMT Atlantique
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6LoWPAN: Fragmentation, Reassembly & Fragment Forwarding

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Exercise 1

- Consider a case where the device A will transmit an IPv6 packet, which contains the already compressed by 6LoWPAN application data of **1460** Bytes to device B.

- IEEE Std 802.15.4 MAC protocol supports a MTU of 127 Bytes.

- How many transmissions will be required to send the IPv6 packet of 1460 Bytes, when the L2 **MAC Header** consists of **23** Bytes and L2 **Frame Check Sequence** (**FCS**) consists of **2** Bytes?

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- **Response**:
- For the 1st Fragment: 1460 – (127 - 23 – 2 - **4**) = 1362 Bytes
- For the 2nd – nth Fragment: 1362 / (127 - 23 – 2 - **5**) = 14,04
  - Considering that **it is not possible** to transmit 14,04 fragments, therefore it will be rounded to 15 fragments.
- Finally, **we need to add** the **1st fragment** as well, thus we get the total of 16 Fragments!

Exercise 2 (1/3)

- Device B, the receiver, allocates **3840 Bytes** for buffering the fragments to reassemble later.
- IEEE Std 802.15.4 MAC protocol supports a MTU of **127 Bytes**.
- How many IPv6 packets device B may handle concurrently when each packet comes with **4 fragments**?

Exercise 2 (1/3)

- Device B, the receiver, allocates **3840 Bytes** for buffering the fragments to reassemble later.

- IEEE Std 802.15.4 MAC protocol supports a MTU of **127 Bytes**.

- How many IPv6 packets device B may handle concurrently when each packet comes with **4 fragments**?

- **Response:**
- The total size of the IPv6 packet is 4 × the MTU of each fragment.
- In this case, the MTU of a fragment is equal to 127 Bytes, thus, we have 4 × 127 = 508 Bytes per IPv6 packet.

- As a result, B may handle 3840 / 508 = 7,5 → **7 IPv6 packets**.

Exercise 2 (2/3)

- Device B, the receiver, allocates **3840 Bytes** for buffering the fragments to reassemble later.
- IEEE Std 802.15.4 MAC protocol supports a MTU of **127 Bytes**.
- How many IPv6 packets device B may handle concurrently when each packet comes with **6 fragments**?

Exercise 2 (2/3)

- Device B, the receiver, allocates **3840 Bytes** for buffering the fragments to reassemble later.

- IEEE Std 802.15.4 MAC protocol supports a MTU of **127 Bytes**.

- How many IPv6 packets device B may handle concurrently when each packet comes with **6 fragments**?

- **Response:**
- The total size of the IPv6 packet is 4 × the MTU of each fragment.
- In this case, the MTU of a fragment is equal to 127 Bytes, thus, we have 6 × 127 = 762 Bytes per IPv6 packet.

- As a result, B may handle 3840 / 762 = 5,03 → **5 IPv6 packets**.

Exercise 2 (3/3)

- Device B, the receiver, allocates **3840 Bytes** for buffering the fragments to reassemble later.
- IEEE Std 802.15.4 MAC protocol supports a MTU of **127 Bytes**.
- How many IPv6 packets device B may handle concurrently when each packet comes with **8 fragments**?

Exercise 2 (3/3)

- Device B, the receiver, allocates **3840 Bytes** for buffering the fragments to reassemble later.

- IEEE Std 802.15.4 MAC protocol supports a MTU of **127 Bytes**.

- How many IPv6 packets device B may handle concurrently when each packet comes with **8 fragments**?

- **Response:**
- The total size of the IPv6 packet is 4 × the MTU of each fragment.
- In this case, the MTU of a fragment is equal to 127 Bytes, thus, we have 8 × 127 = 1016 Bytes per IPv6 packet.

- As a result, B may handle 3840 / 1016 = 3,77 → **3 IPv6 packets**.

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