ICN LoWPAN

draft-gundogan-icnrg-ccnlowpan-02

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[1] HAW Hamburg

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March 20, 2018

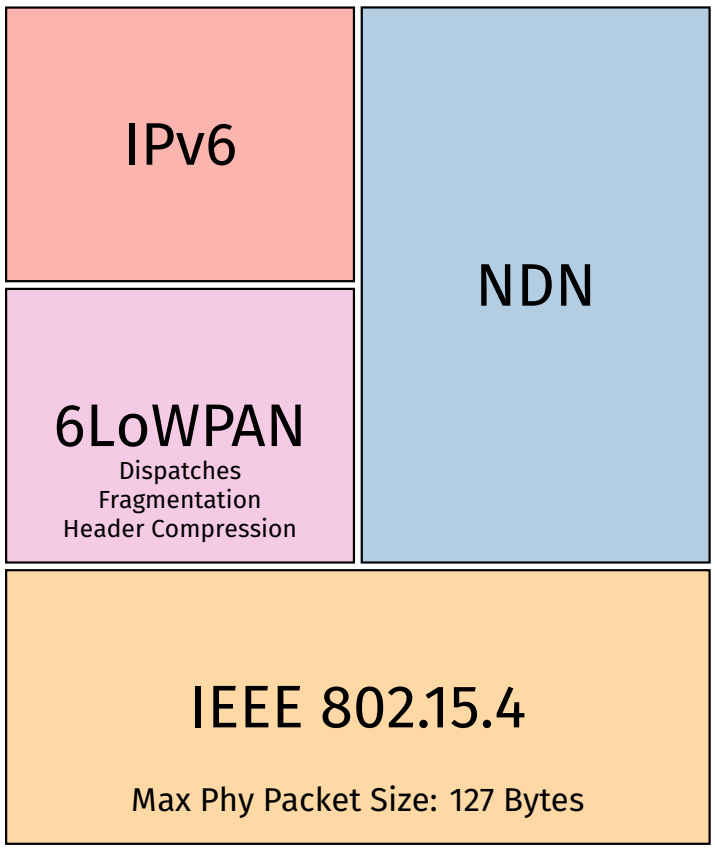
Agenda

ICN LoWPAN Recap

Draft Updates

Implementation & Next Steps

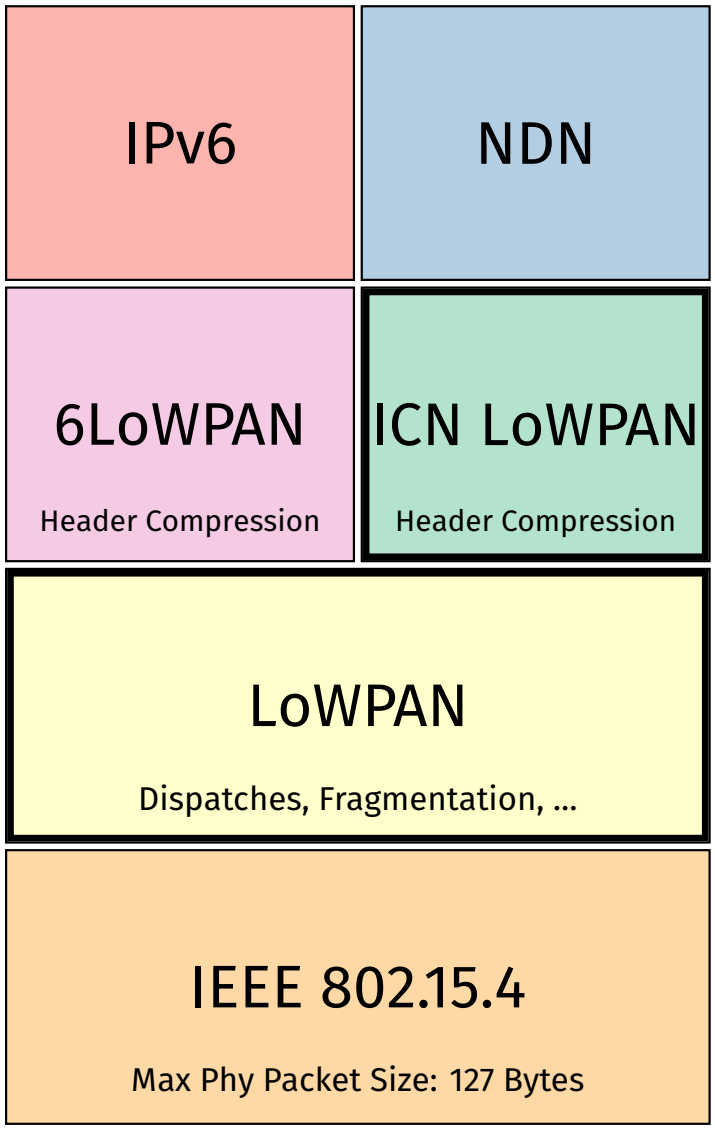
ICN LoWPAN Recap



Problems:

1. No Protocol Identifier
2. Small Phy. Packet Size

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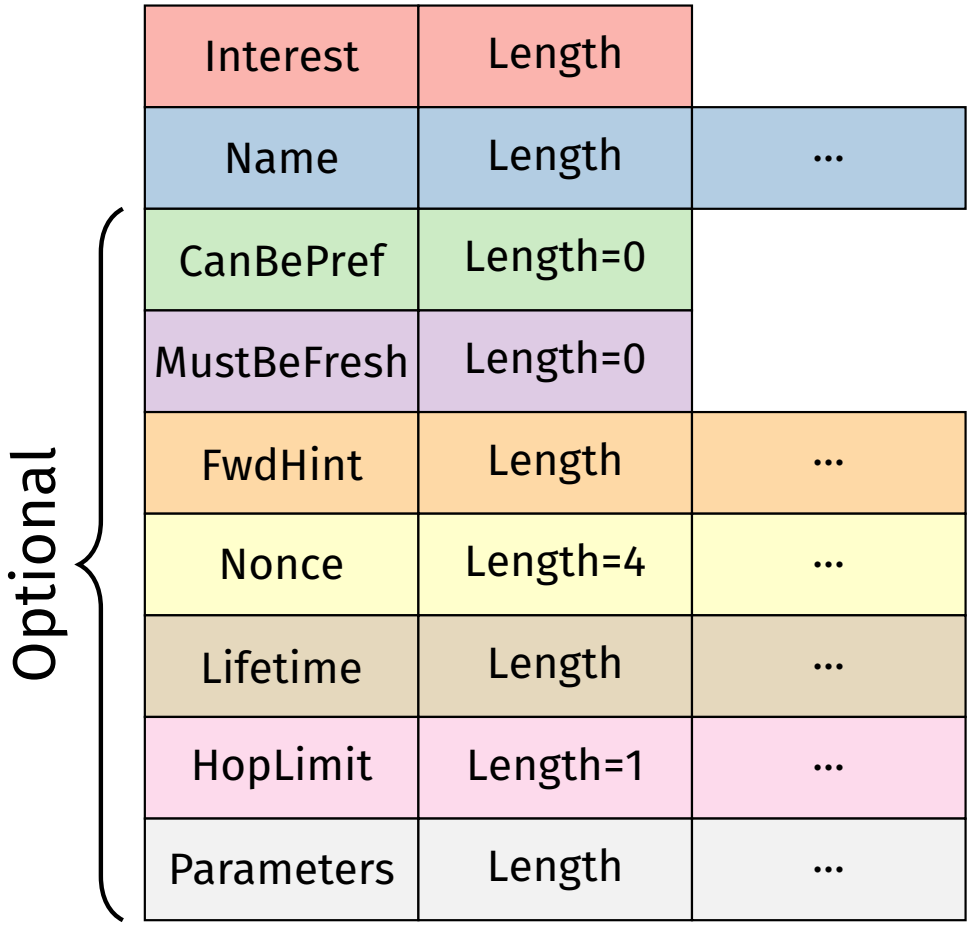
Implementation & Next Steps

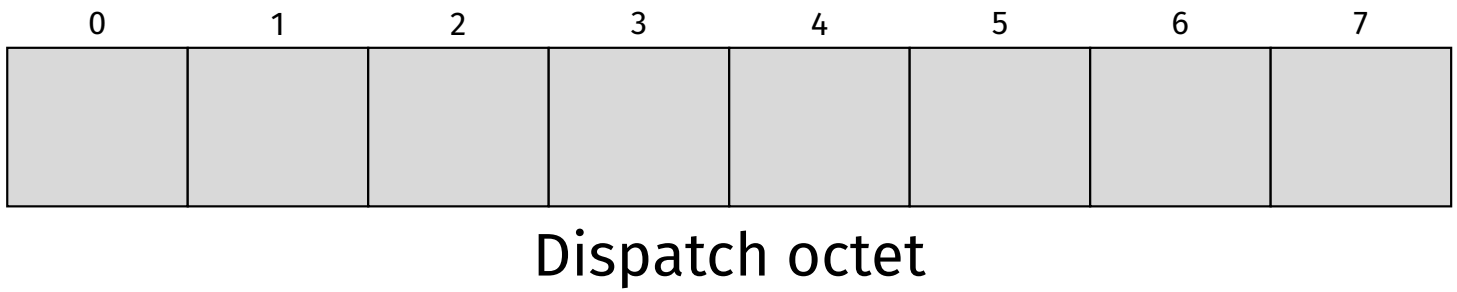
Draft Updates

Update since -01

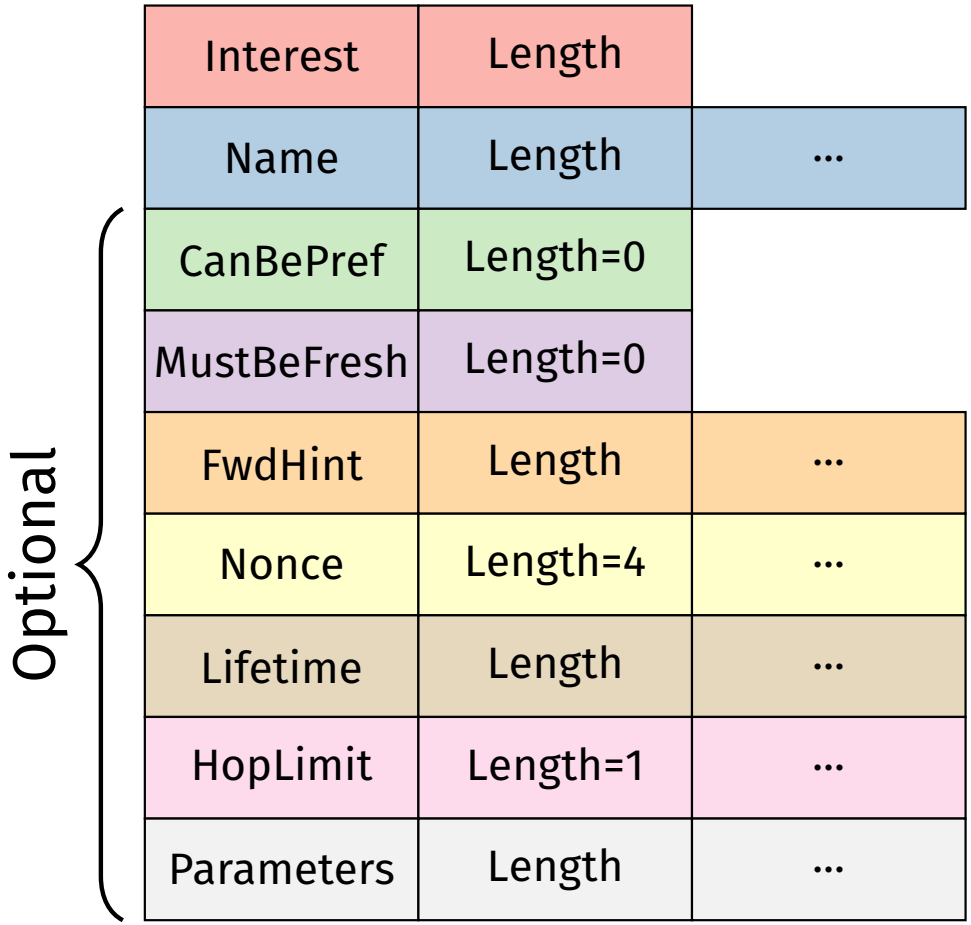
- NDN packet format version bump (v0.3)
- Restructure ICN LoWPAN dispatch bytes
- Name encoding enhancements
- Added theoretical evaluation

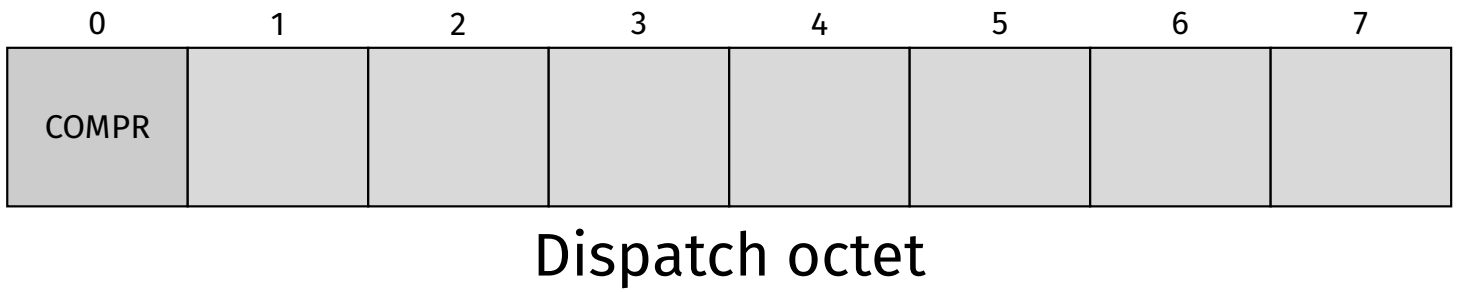
NDN Interest Encoding (v0.3)



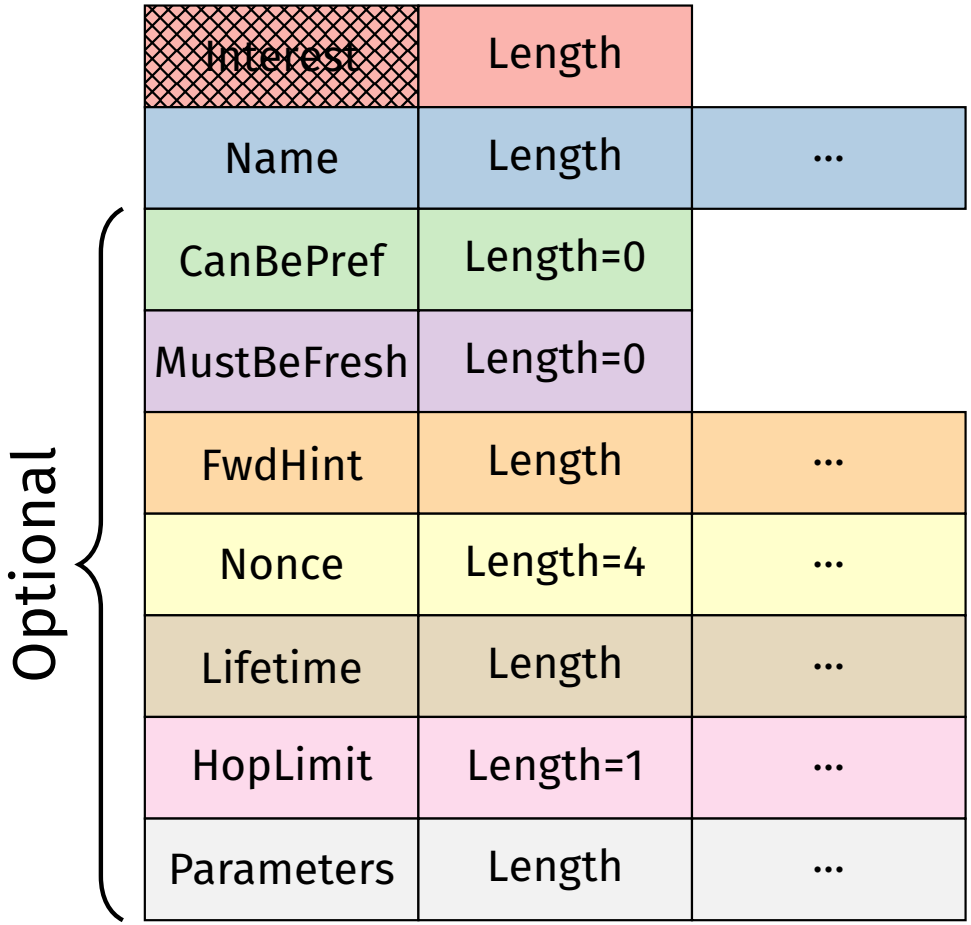


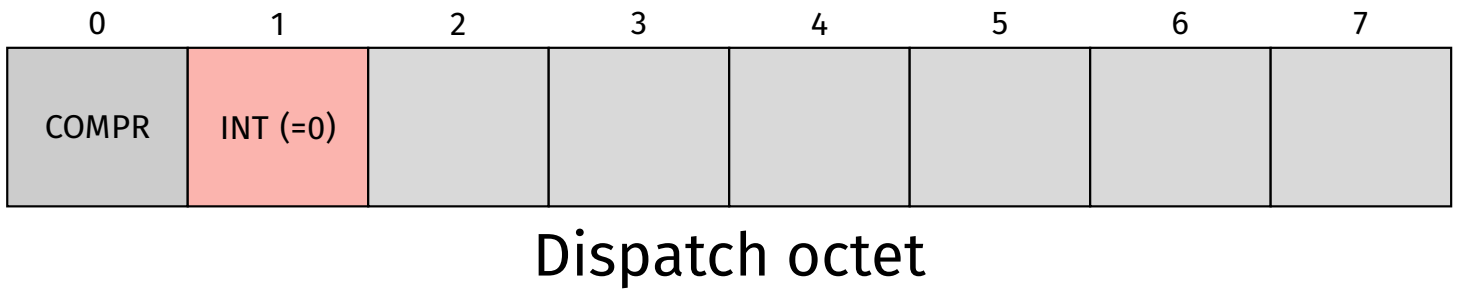
NDN Interest Encoding (v0.3)



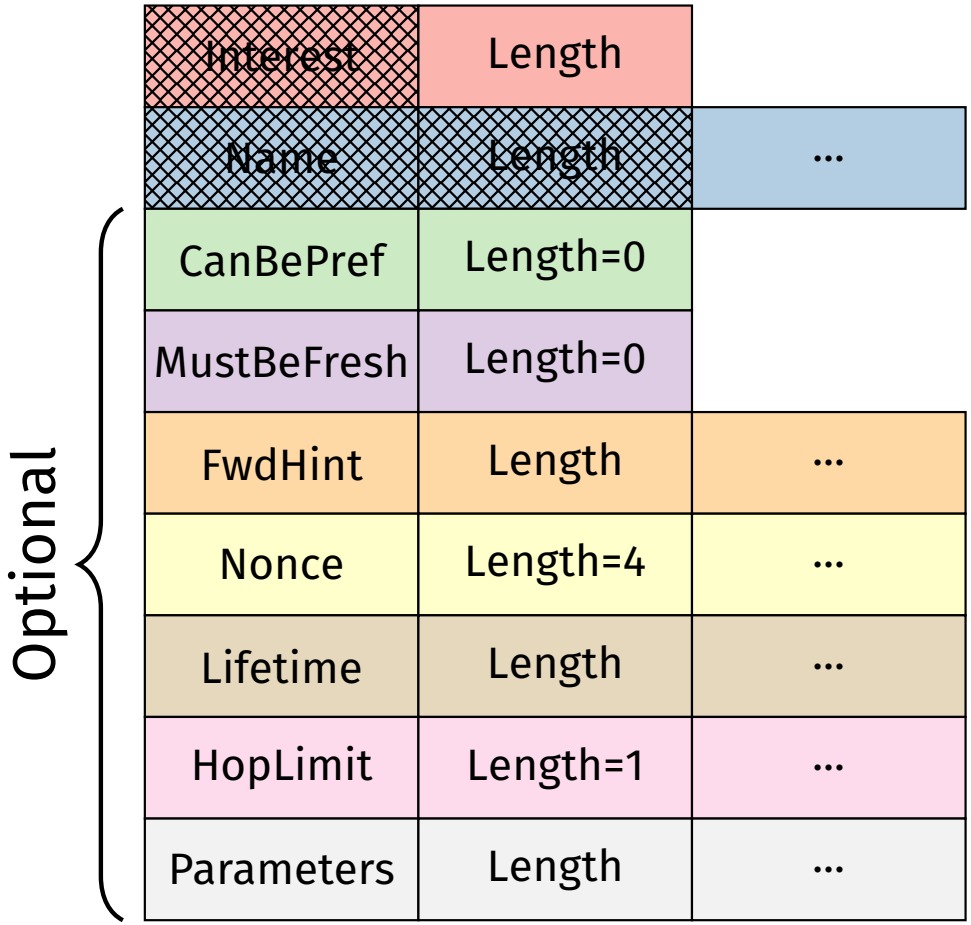


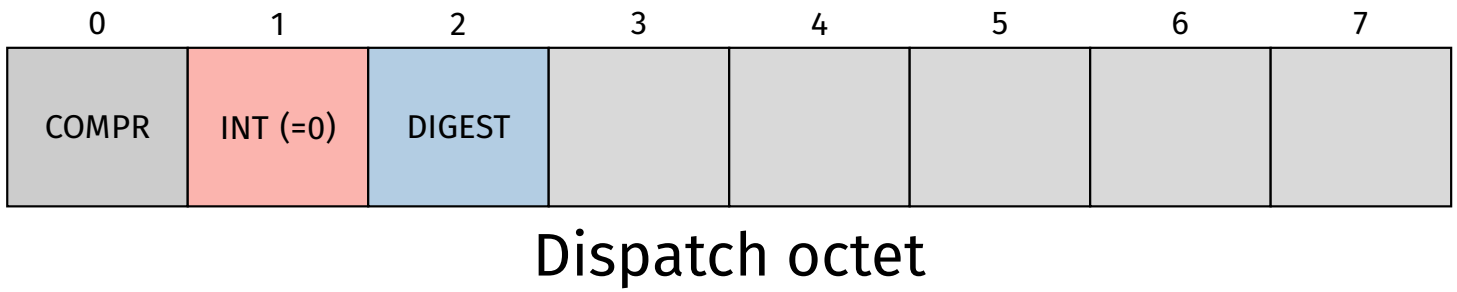
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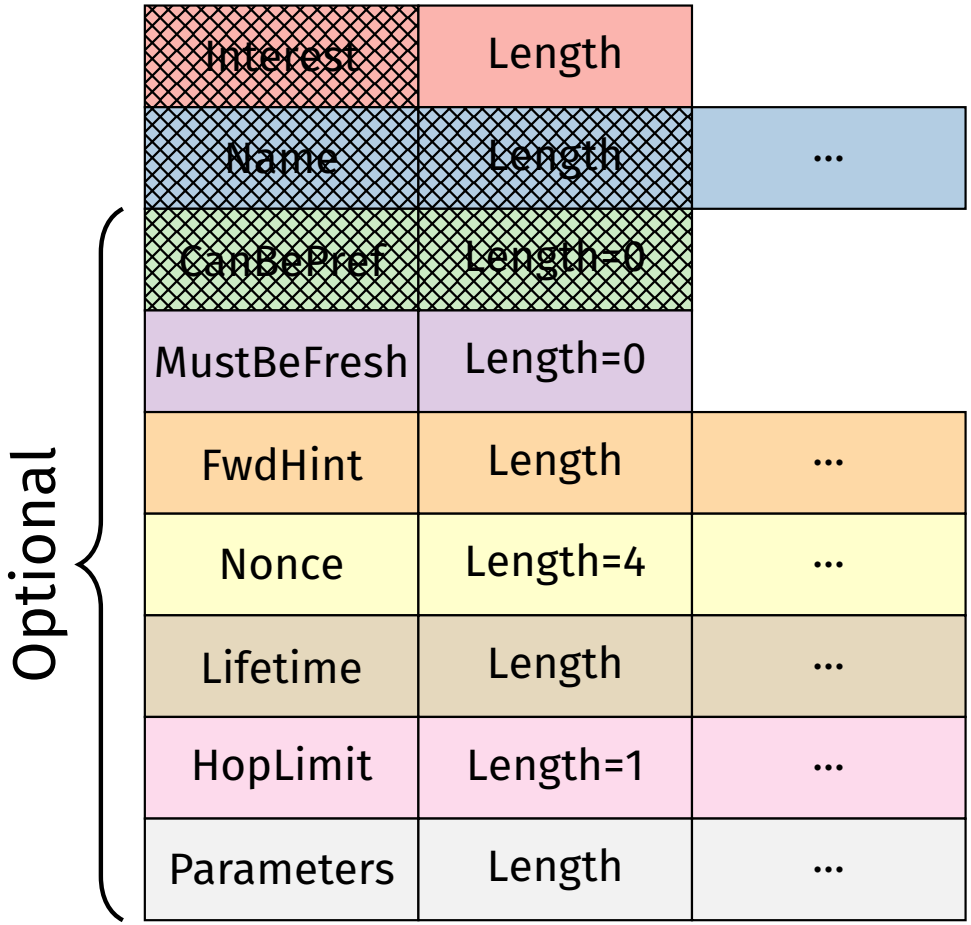


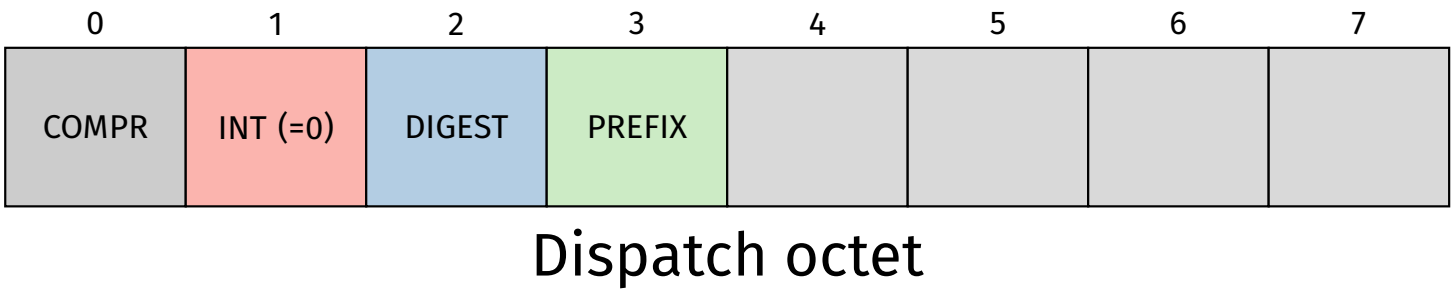
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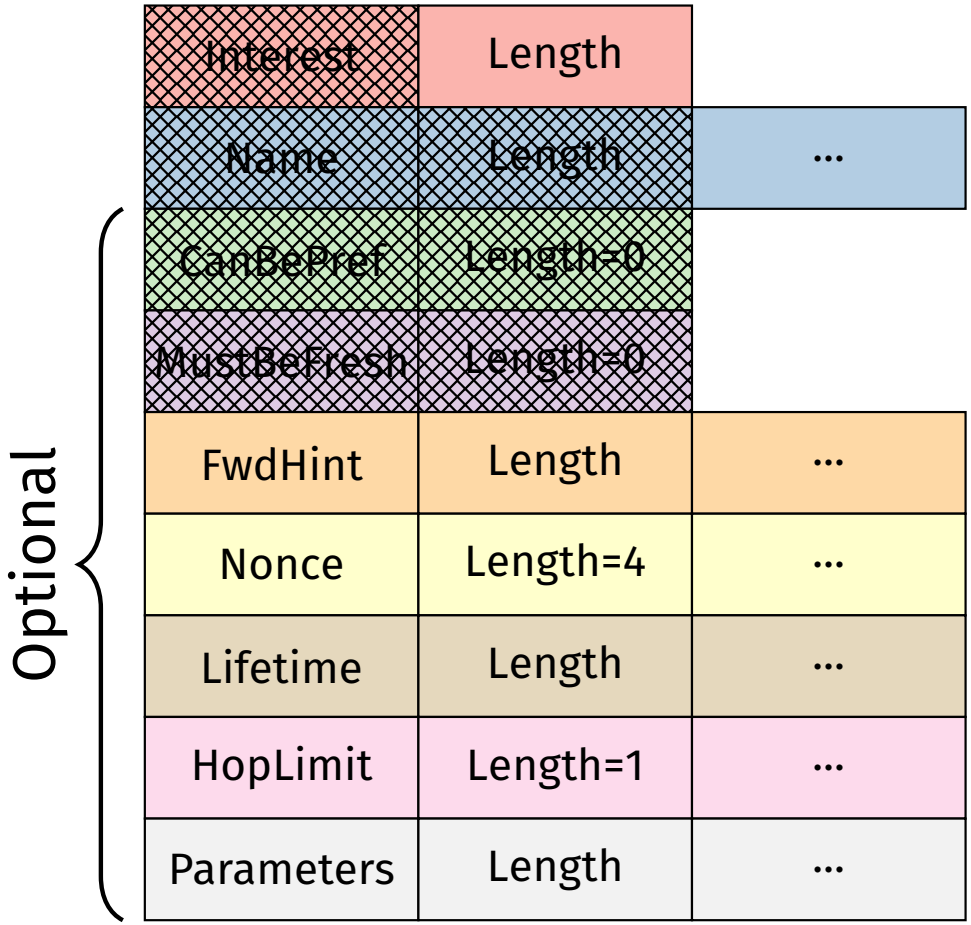


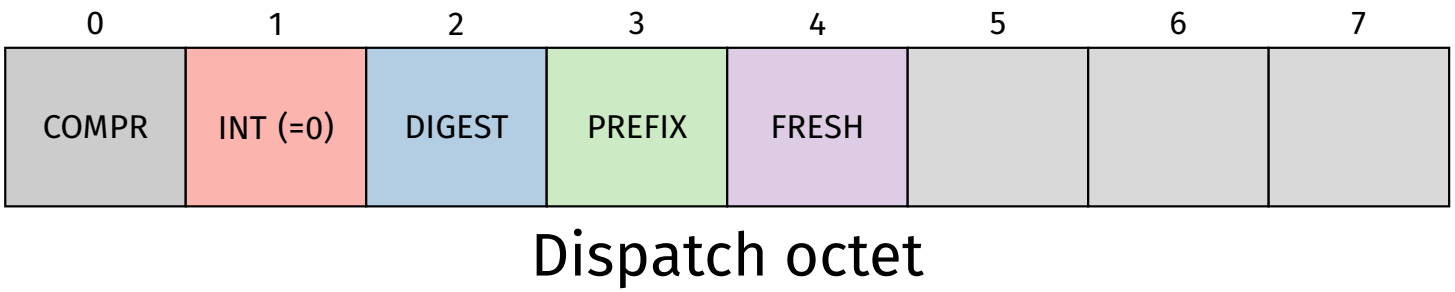
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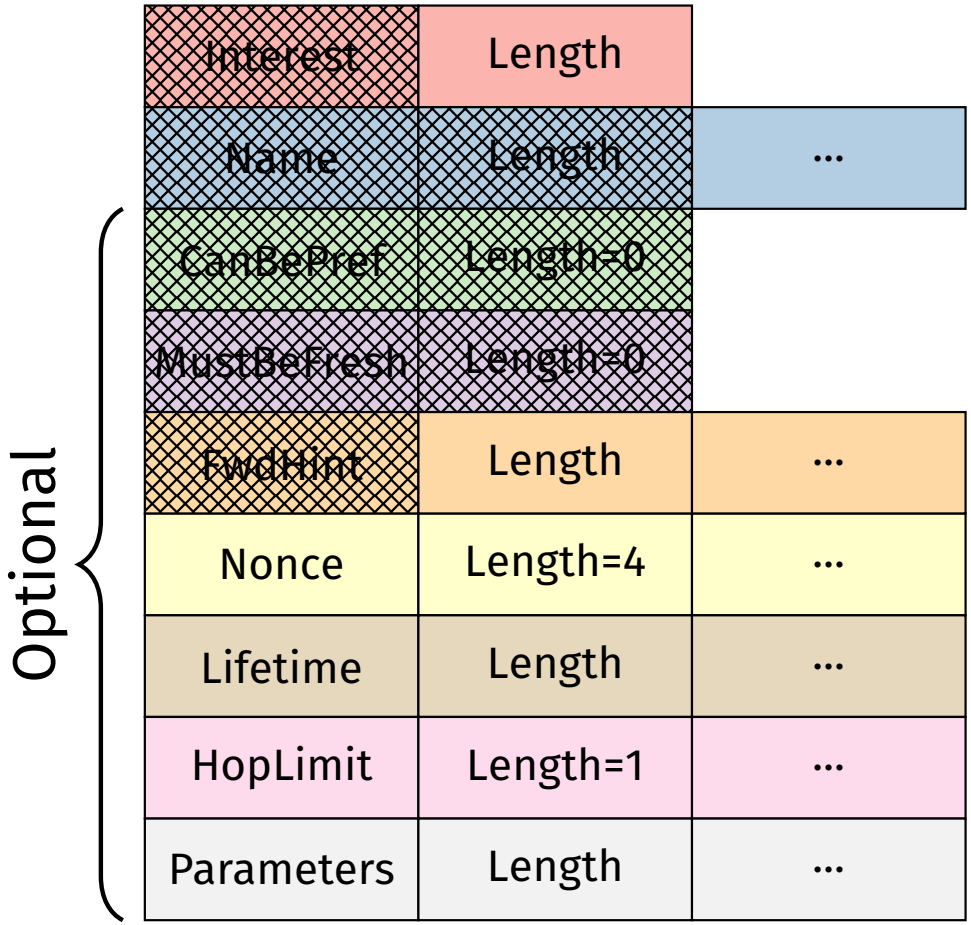


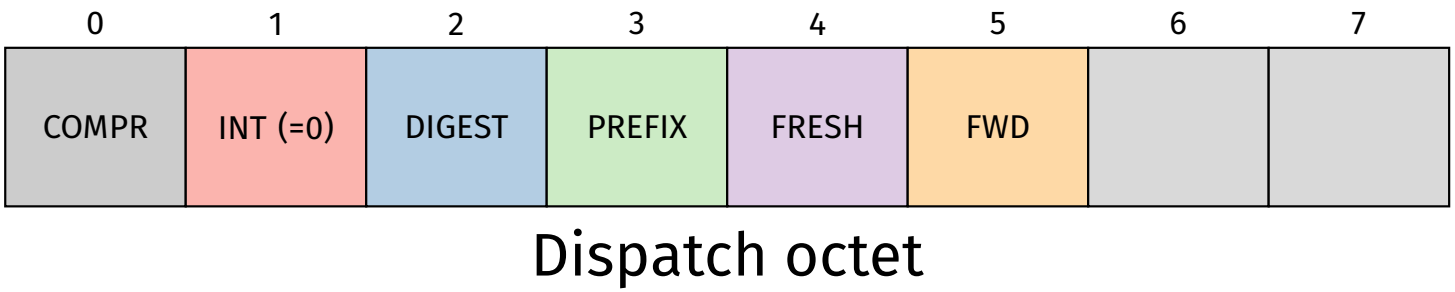
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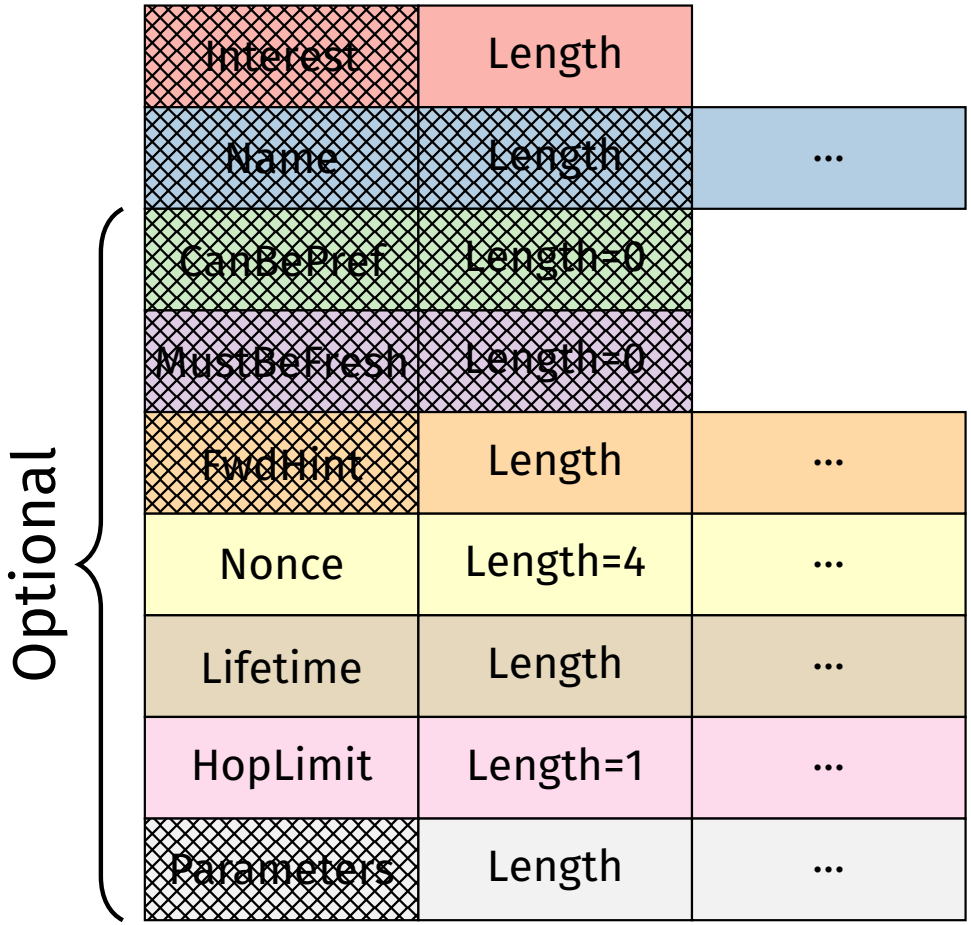


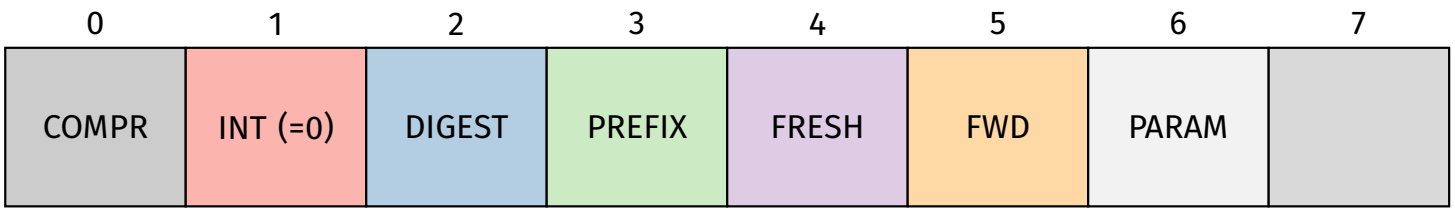
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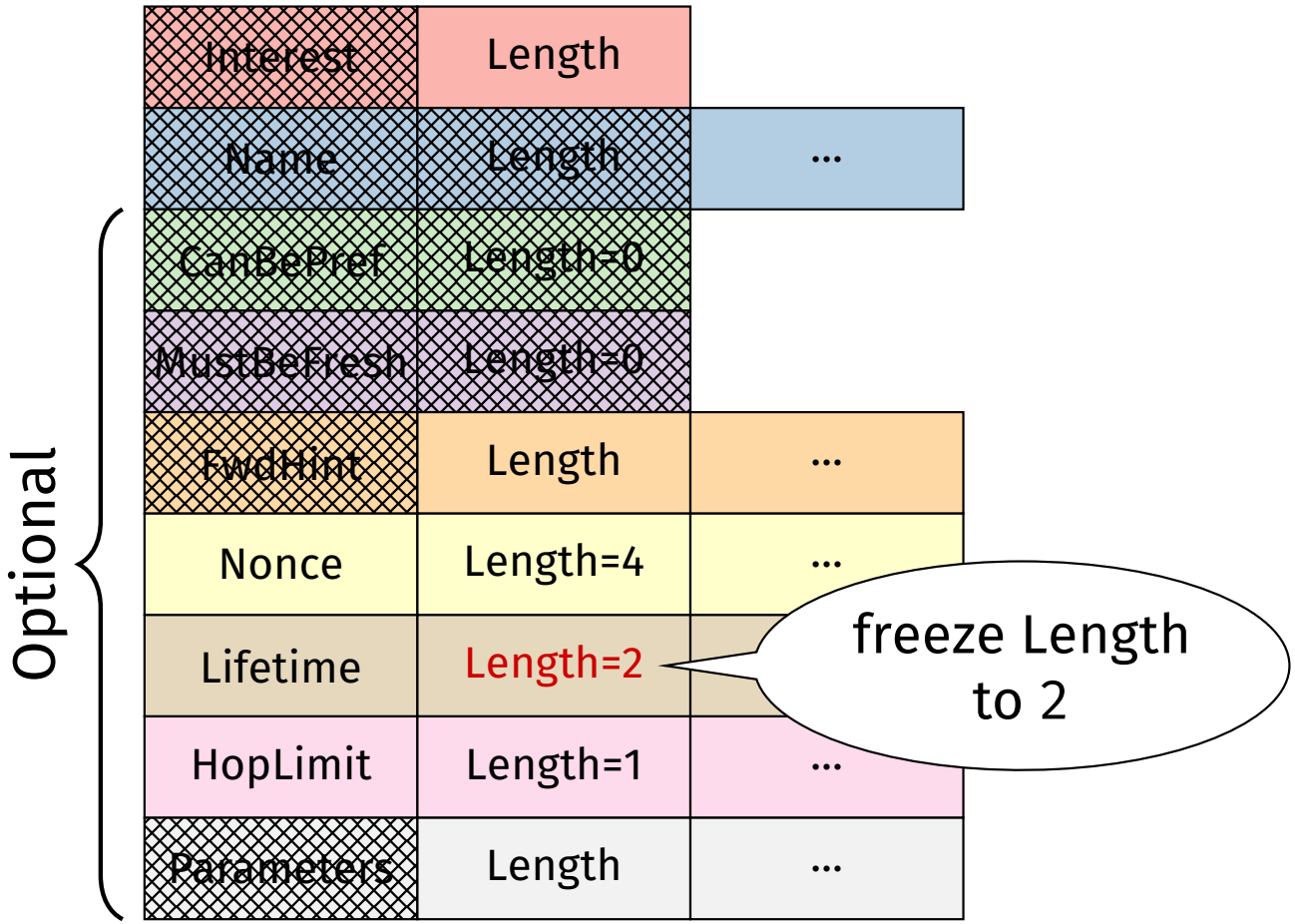
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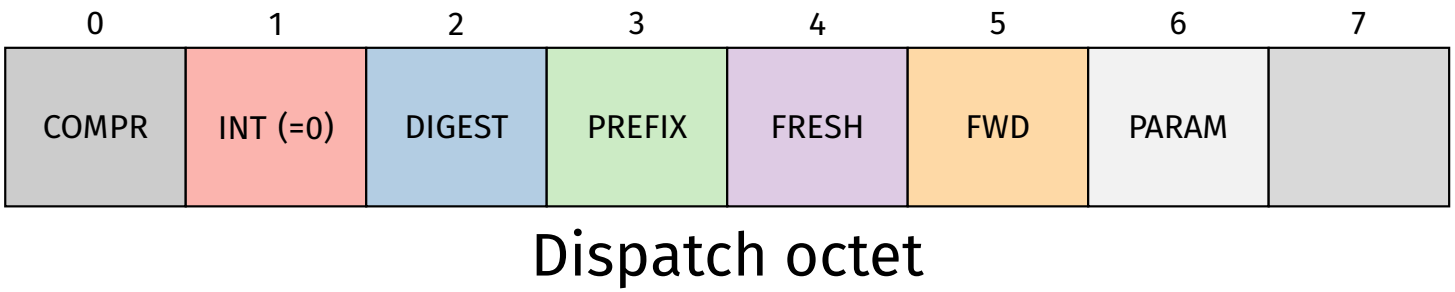




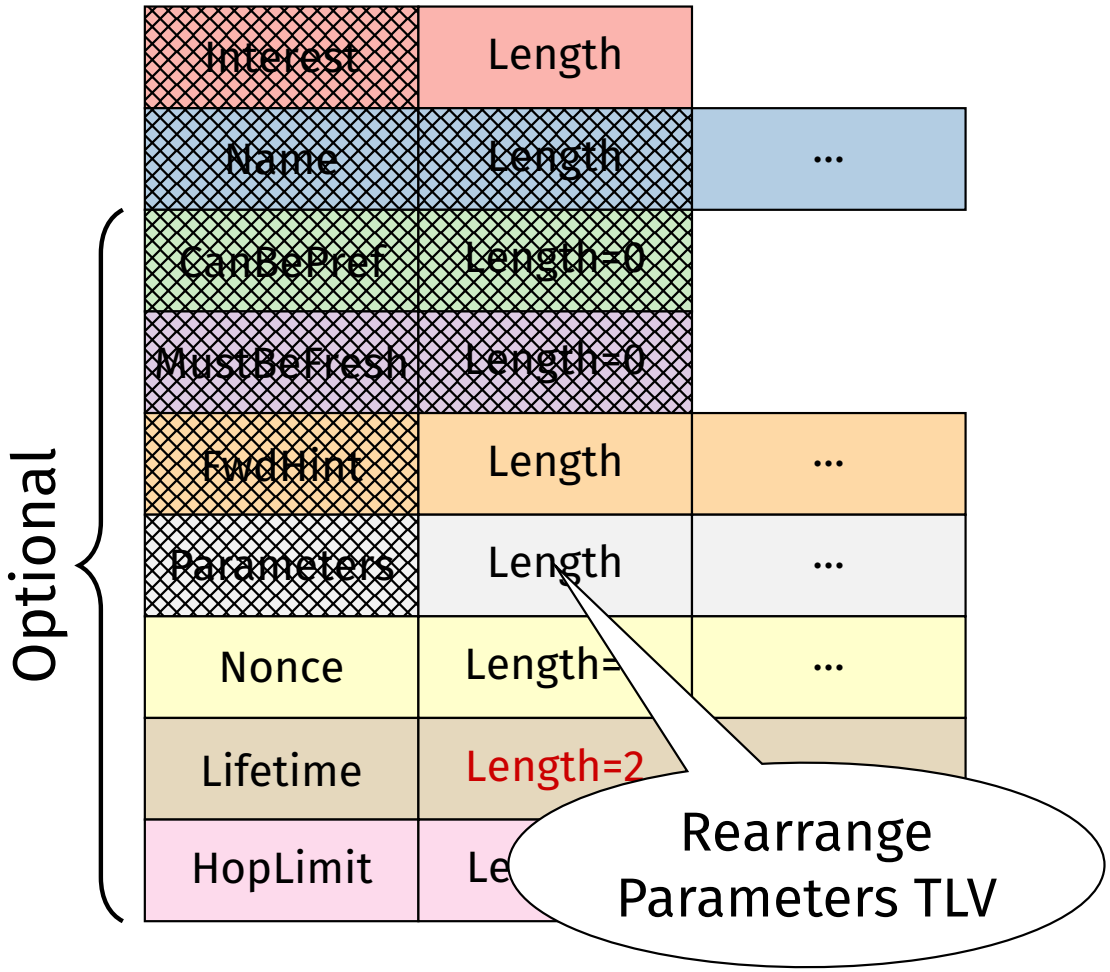
Dispatch octet

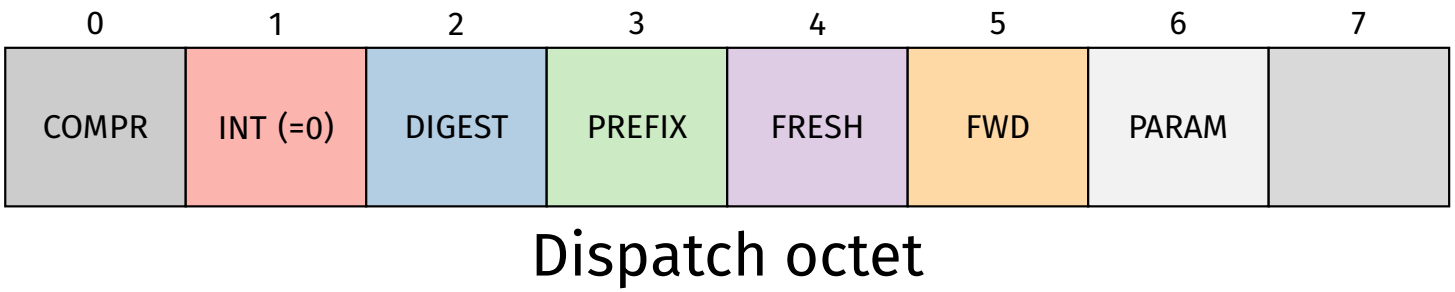
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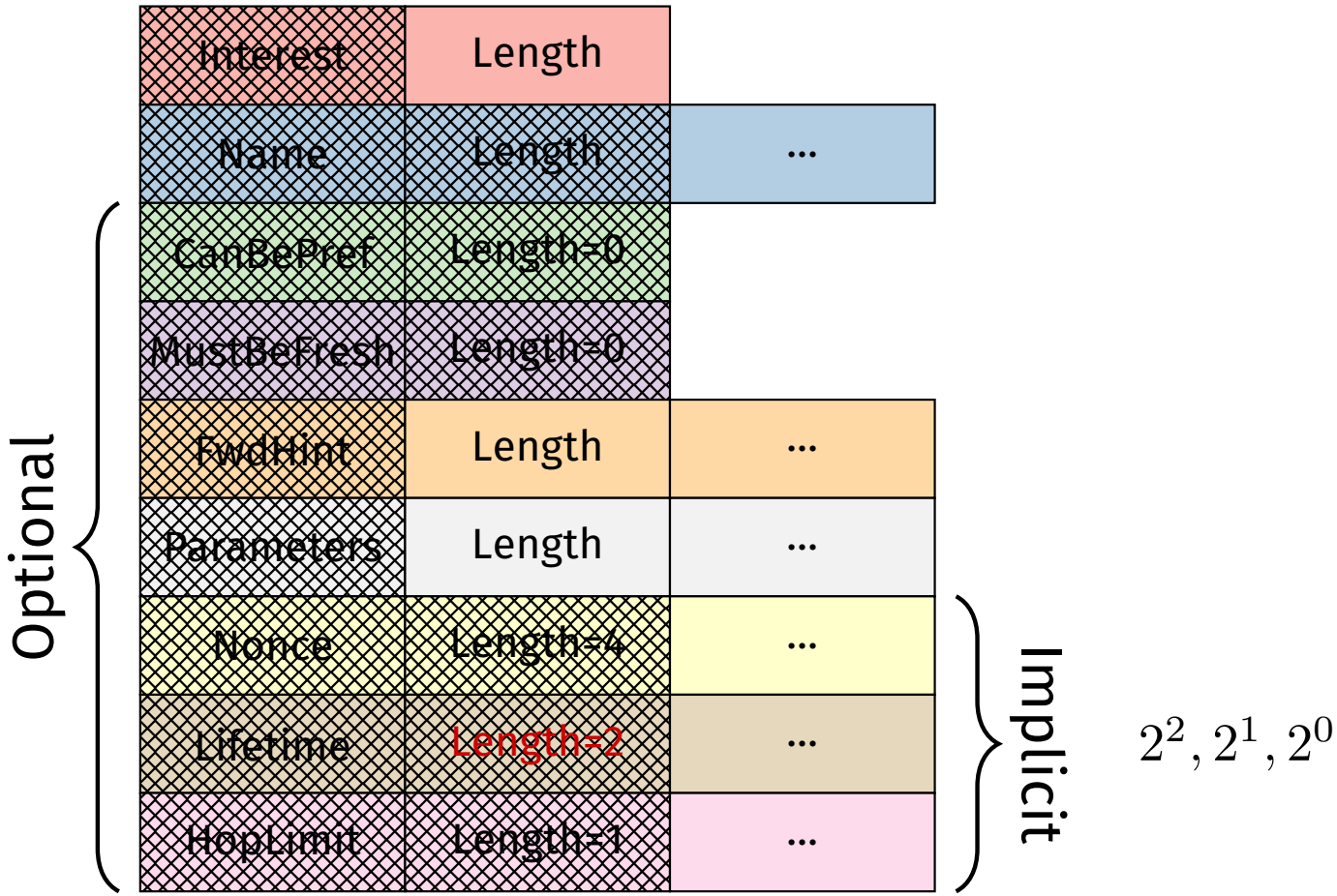


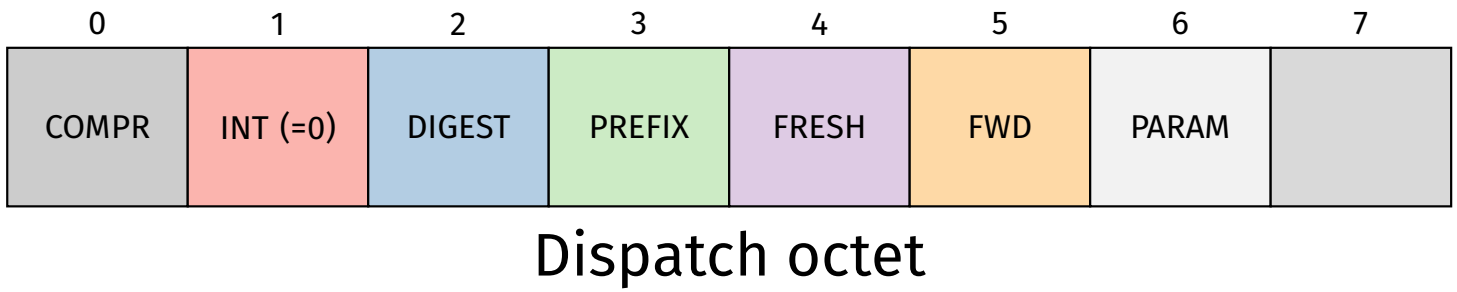
NDN Interest Encoding (v0.3)



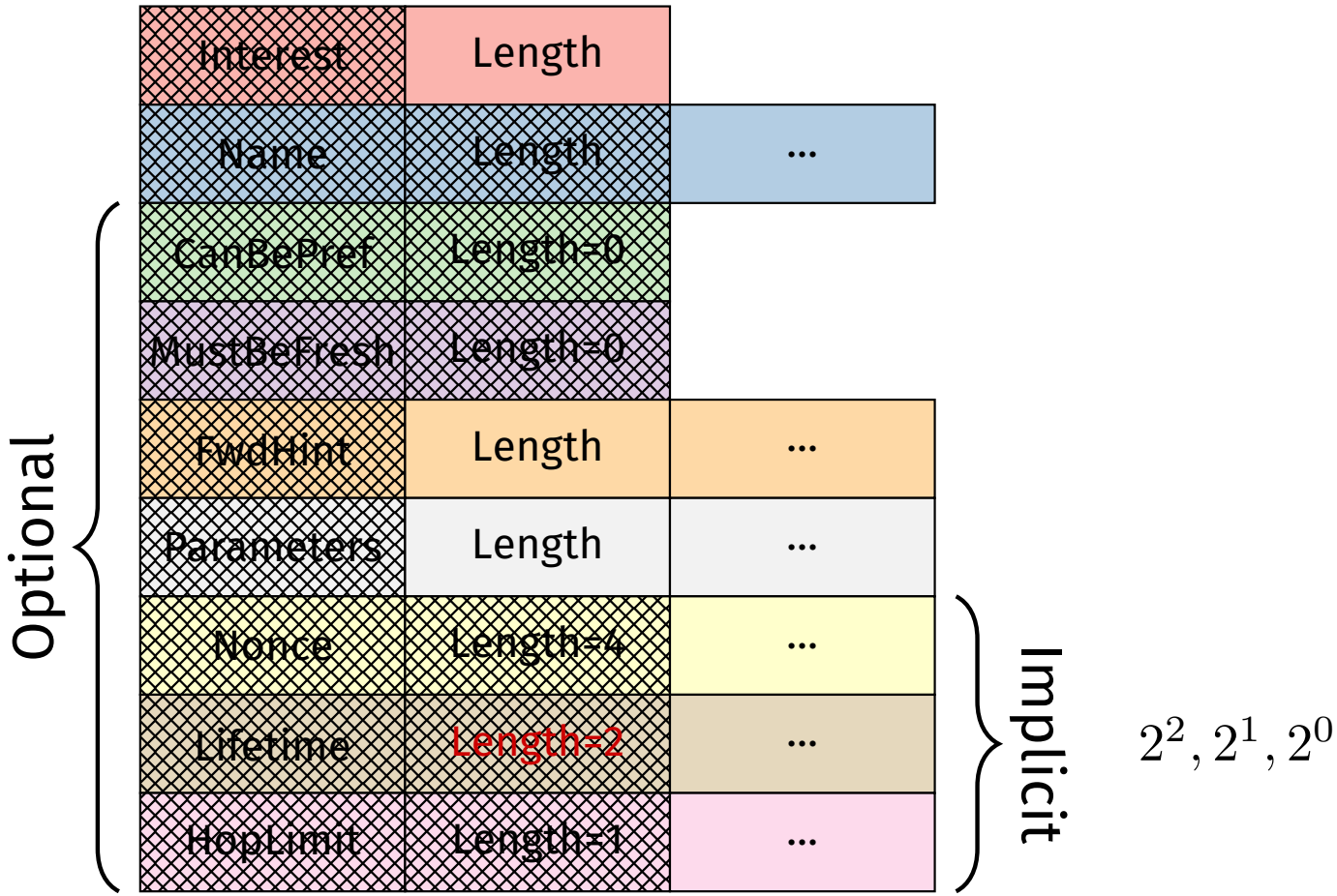


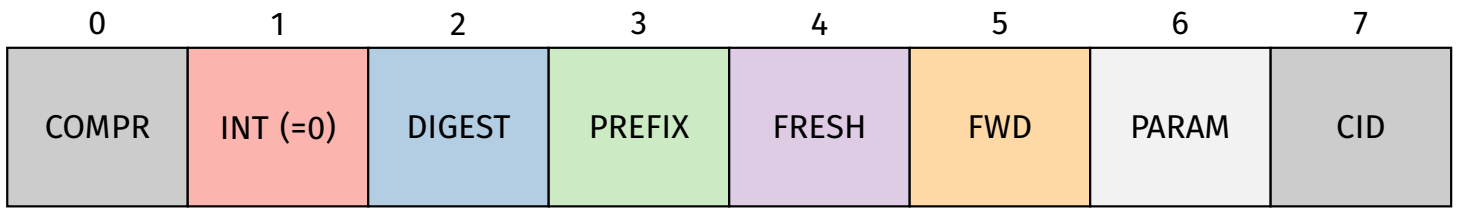
NDN Interest Encoding (v0.3)





NDN Interest Encoding (v0.3)



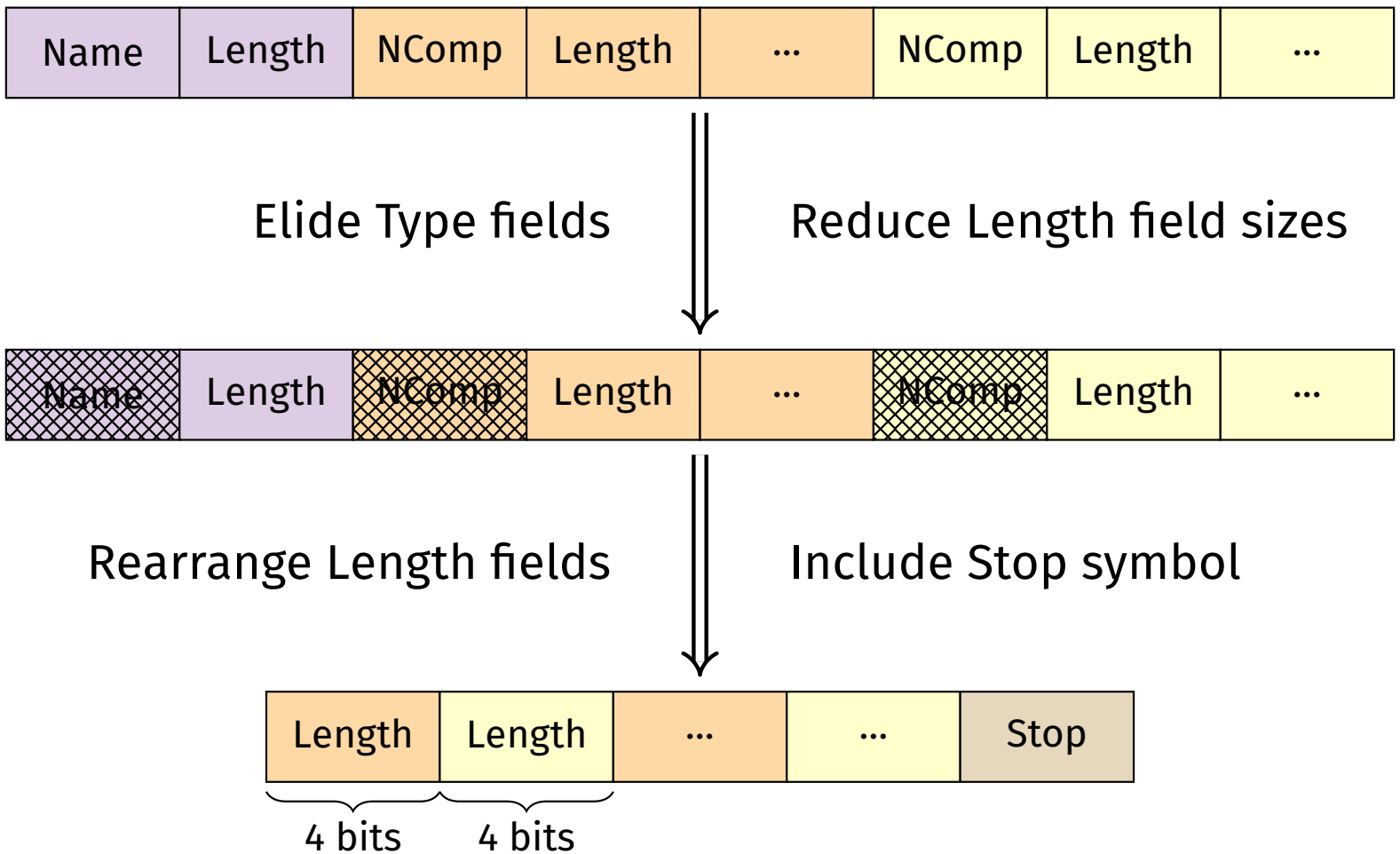


Dispatch octet

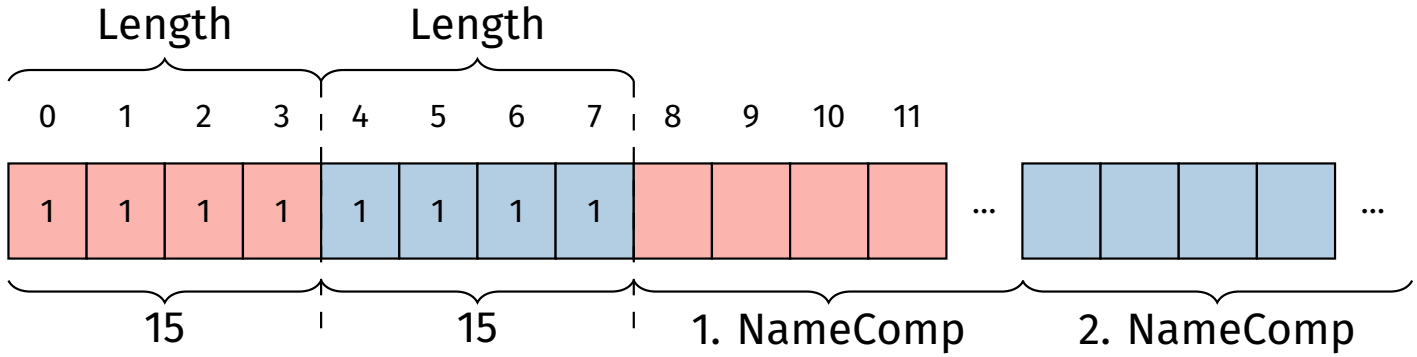
Name Encoding (I)

Premise: Uniform NameComponent Types

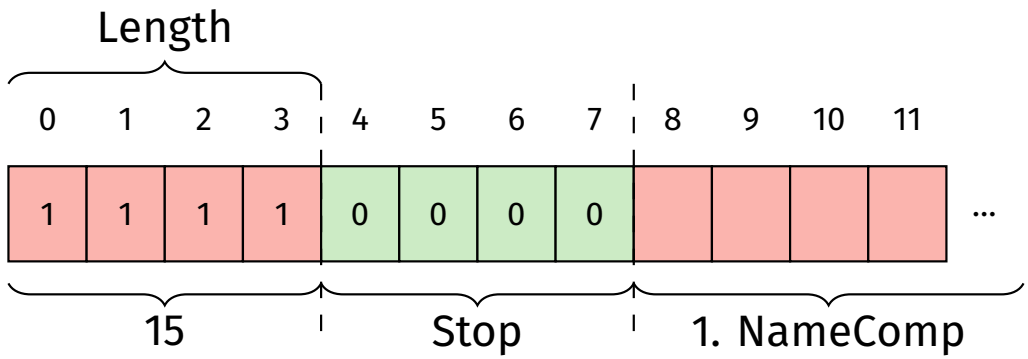
Premise: Short NameComponents (≤ 15 octets each)



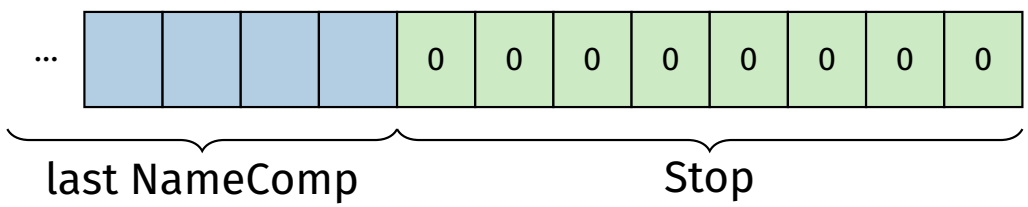
Name Encoding (II)



odd



even



$|c|$ = number of components

Length octets =

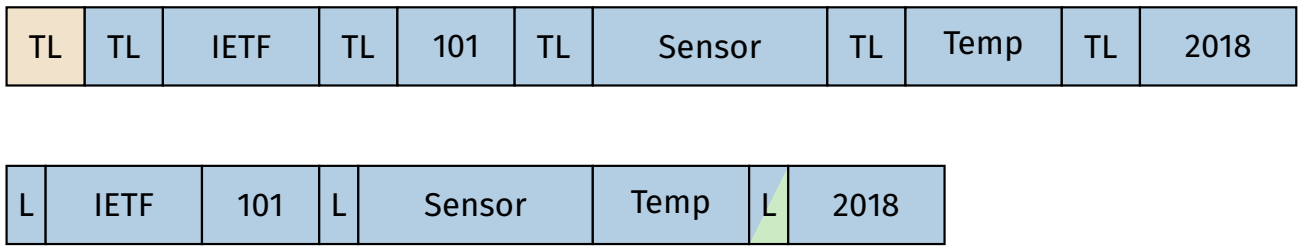
$$\left\lceil \frac{|c|+1}{2} \right\rceil$$

$$\wedge$$

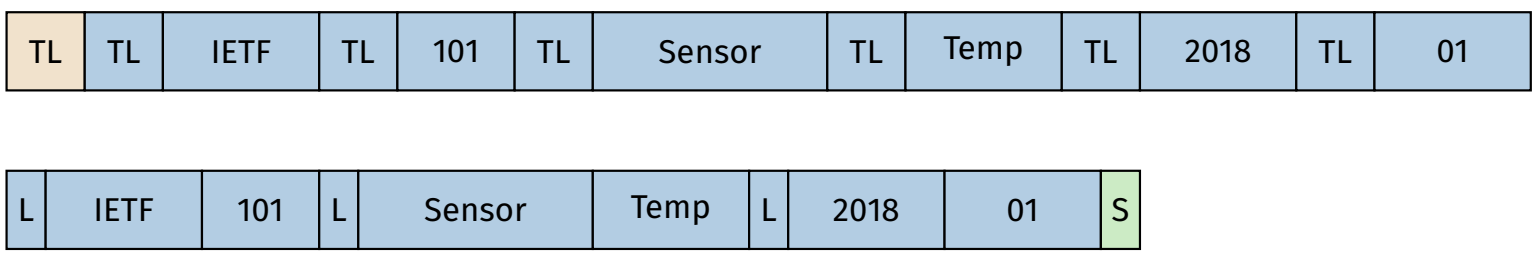
$$2 + 2 \cdot |c|$$

Name Encoding (III)

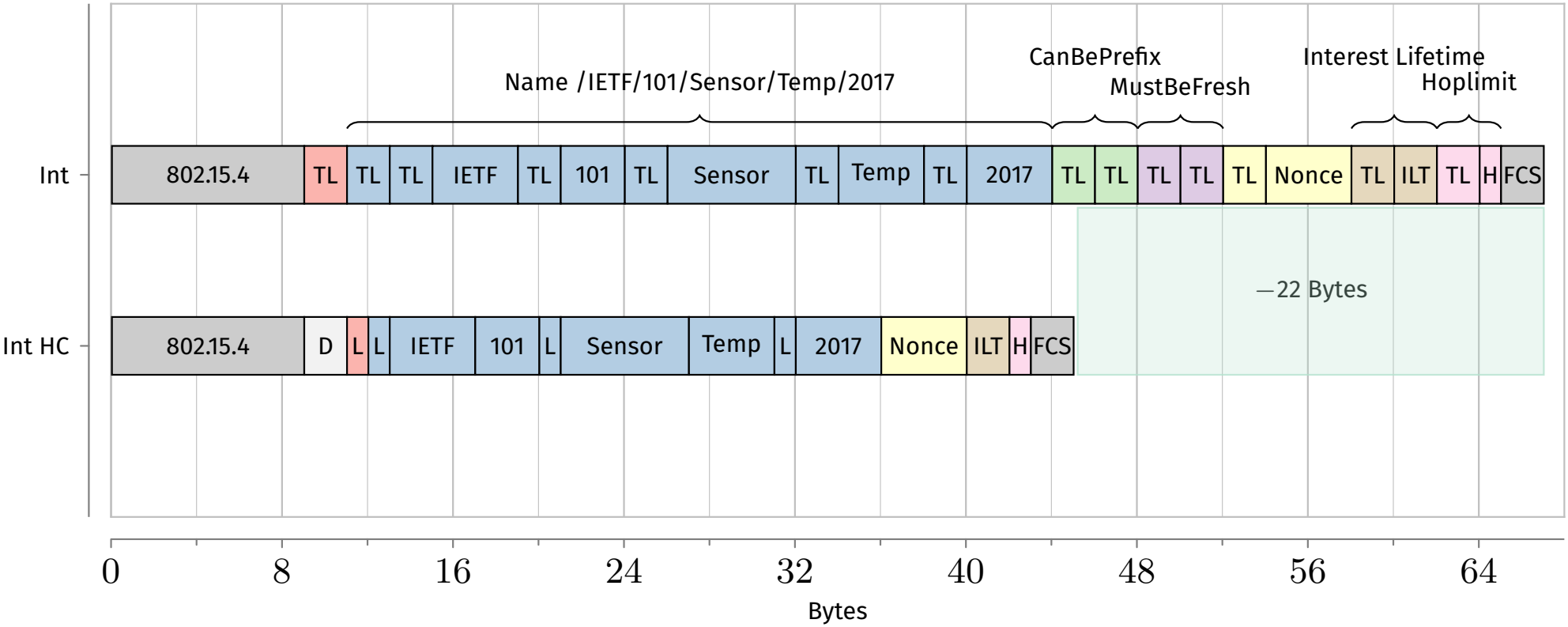
/IETF/101/Sensor/Temp/2018 (odd)



/IETF/101/Sensor/Temp/2018/01 (even)



Example: NDN Interest Encoding



IEEE 802.15.4 Header & FCS: 11 Bytes

	Uncompressed	Compressed	
Payload:	56 Bytes	34 Bytes	≈ 40 % Compression
Meta-Info (T+L):	28 Bytes	6 Bytes	≈ 78 % Compression

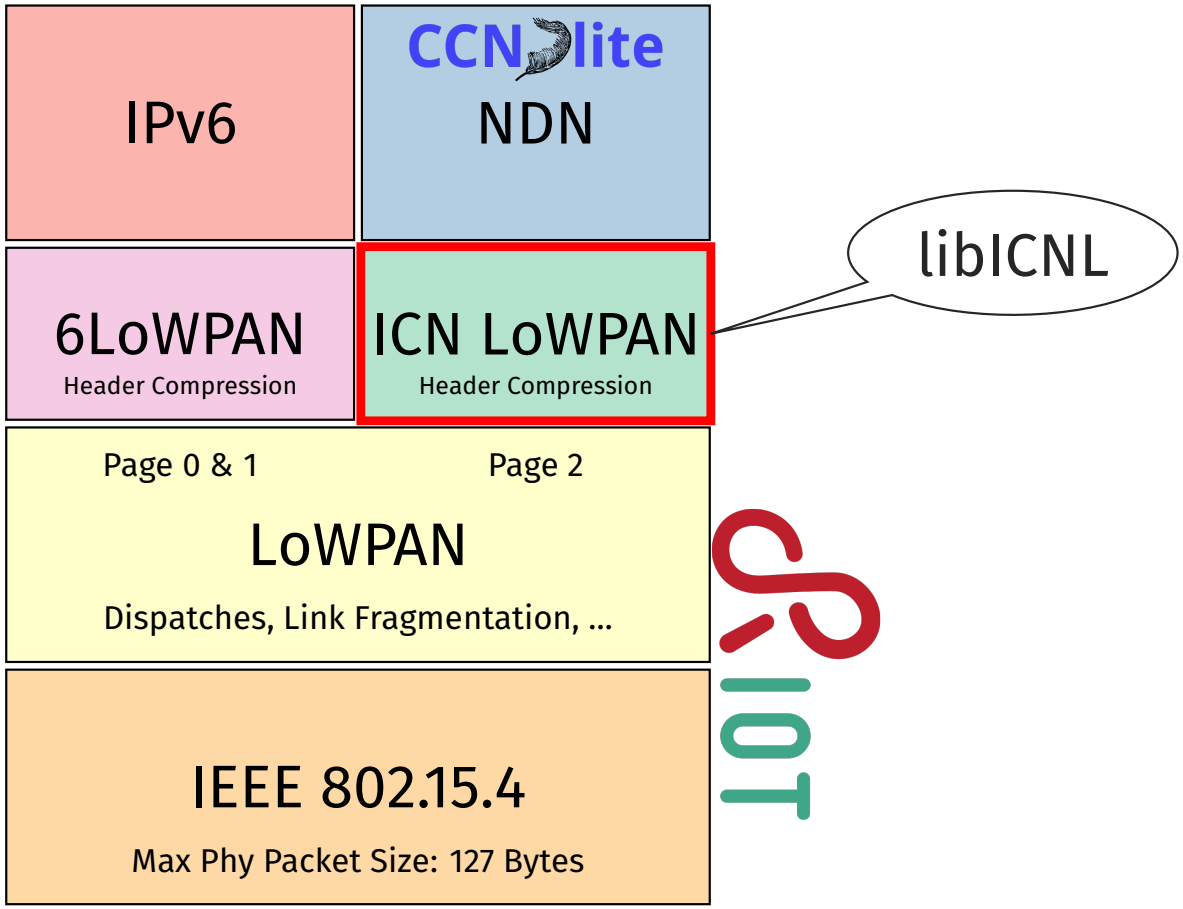
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Draft Updates

Implementation & Next Steps

Implementation



libICNL – https://github.com/inetrg/libICNL.git

– https://riot-os.org

CCN-lite – http://ccn-lite.net

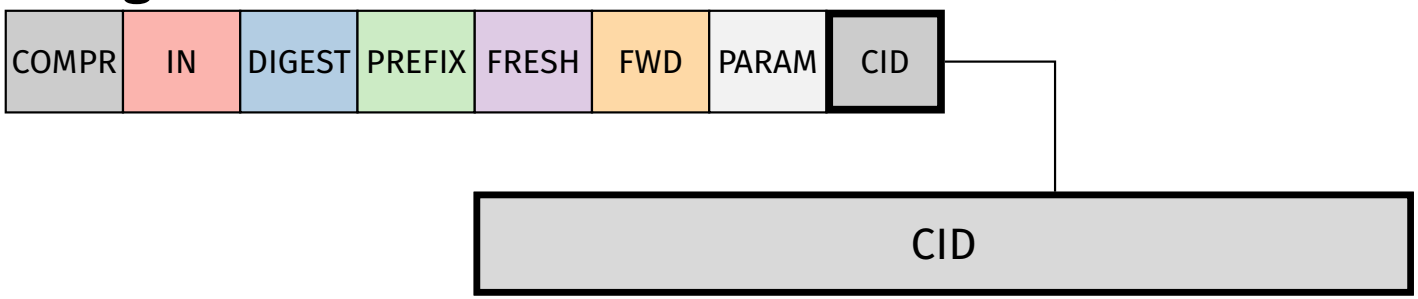
Next Steps

Stateless Compression

- Use LZ77 style compression for nested / custom TLVs

Stateful Compression

- Use global state (with context identifiers)



- Use on-path state (PIT)

BLE & LoRa Adaptation

- Adapt to work of RFC 7668 – IPv6 over BLE
- Adapt to work of LPWAN WG