

# ICN-LoWPAN

draft-irtf-icnrg-icnlowpan-00  
IETF 103, Bangkok

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# Draft Updates

RG adoption:

`draft-gundogan-icnrg-ccnlowpan-02`  $\Rightarrow$  `draft-irtf-icnrg-icnlowpan-00`

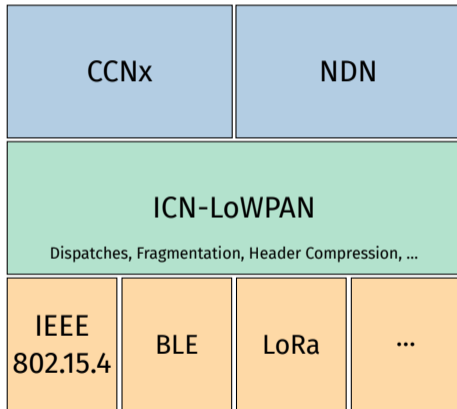
## Update since -02

- ▶ CCNx stateless compression enhancements
- ▶ CCN-LoWPAN  $\Rightarrow$  ICN-LoWPAN
- ▶ Security considerations

# ICN-LoWPAN Recap

## Objectives

- ▶ Make ICN LoWPAN compliant
- ▶ Adapt to LoWPAN link constraints
- ▶ Compress TLVs efficiently for common use cases
- ▶ Provide additional stateful compression



# Stateless Compression Scheme

- ▶ Use space-efficient TLV encoding & omit T where possible
- ▶ Convert TLV booleans to bit vector (2 octets  $\Rightarrow$  1 bit)
- ▶ Reorder header to remove Length fields
- ▶ Remove redundant header fields (e.g., CCNx PacketType == MessageType)

# Stateless Compression for Interest

## NDN

Type	Length	Value
Interest		
Name		...
CanBePref	0	
MustBFresh	0	
FwdHint		...
Parameters		...
Nonce	4	...
Lifetime	2	...
HopLimit	1	...

## Dispatch

0	1	2	3	4	5	6	7
1	0	DIGEST	PREFIX	FRESH	FWD	PARAM	CID

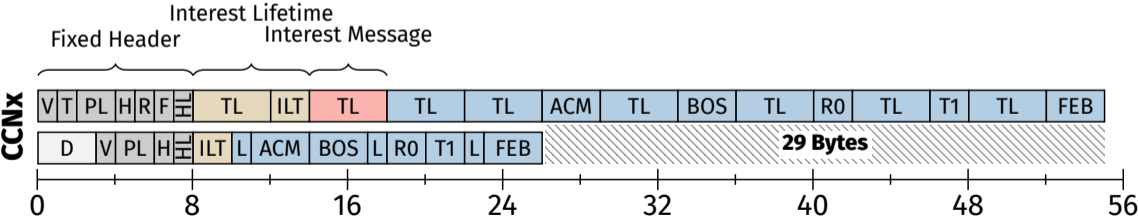
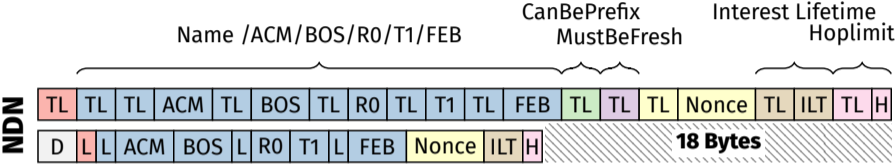
## CCNx

Version	Type	PacketLen	
HopLim	RSVD = 0	Flags = 0	HdrLen
Optional Hop-By-Hop TLVs			
MessageType		MessageLength	
NameType		NameLength	
...			
Optional Interest Message TLVs			
Optional Payload TLV			
Optional Validation TLVs			

## Dispatch

0	1	2	3	4	5	6	7
1	0	FLG	HBH		PTY	HPL	FRS
MSG	PAY	VAL	EXT	RSVD			CID
8	9	10	11	12	13	14	15

# Stateless Compression Performance for Interest



# Stateful Compression

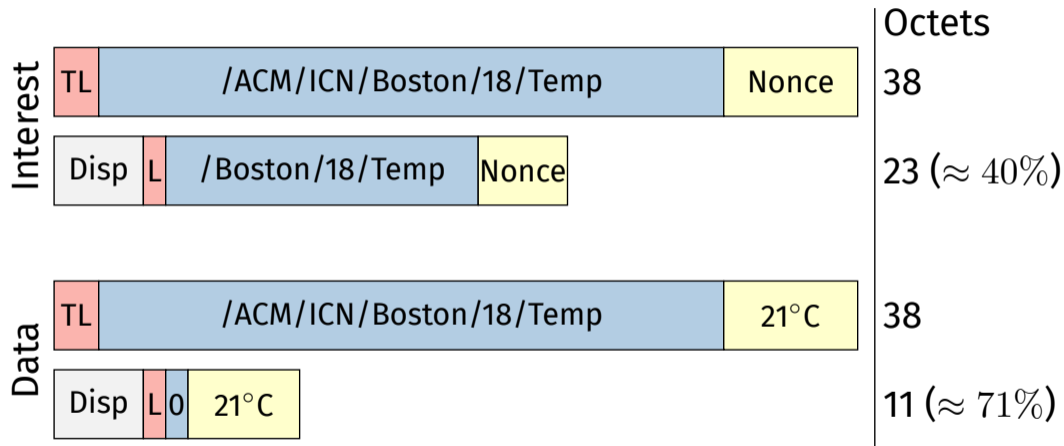
## LoWPAN-local State

- ▶ Context **ID**entifier (**CID**) follows dispatch octet
- ▶ CID lookup table describes **what** to elide (prefix, suffix, options ...)
- ▶ CIDs must be known to all nodes (static/dynamic bootstrap)

## En-Route State

- ▶ Compression state is accumulated during Interest and consumed by Data
- ▶ Returning Data includes **ephemeral HopID** instead of Name TLV

# Stateless + Stateful Compression Performance (NDN)





# Questions to the Community

## **NDN and CCNx Folks:**

- ▶ Does compressed TLV encoding meet your needs?
- ▶ Are type + length restrictions o.k.?
- ▶ Did we catch the common standard packets?

## **Implementers:**

- ▶ NDNofT framework – ready for a joint implementation effort?
- ▶ Others willing to adopt in code?

## **All:**

- ▶ Are we in line with the key use cases?
- ▶ Anything relevant missing?

# Next Steps

## Implementation

- ▶ Ongoing proof-of-concept using CCN-lite (NDN) and RIOT
- ▶ Integrate into NDNoT framework (?)  $\Rightarrow$  Interop. testing
- ▶ Use CCN-lite for CCNx? Other open source implementation available?

## Document

- ▶ Improve compression & adapt to community feedback
- ▶ Restructure and editorial improvements
- ▶ Anything missing?