The 6LoWPAN Wireless Sensor Testbed @ LU-CS

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Topics

- **Motivation**
- RPL 6LoWPANs
- Demo!

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Motivation

Large Scale Research Testbed
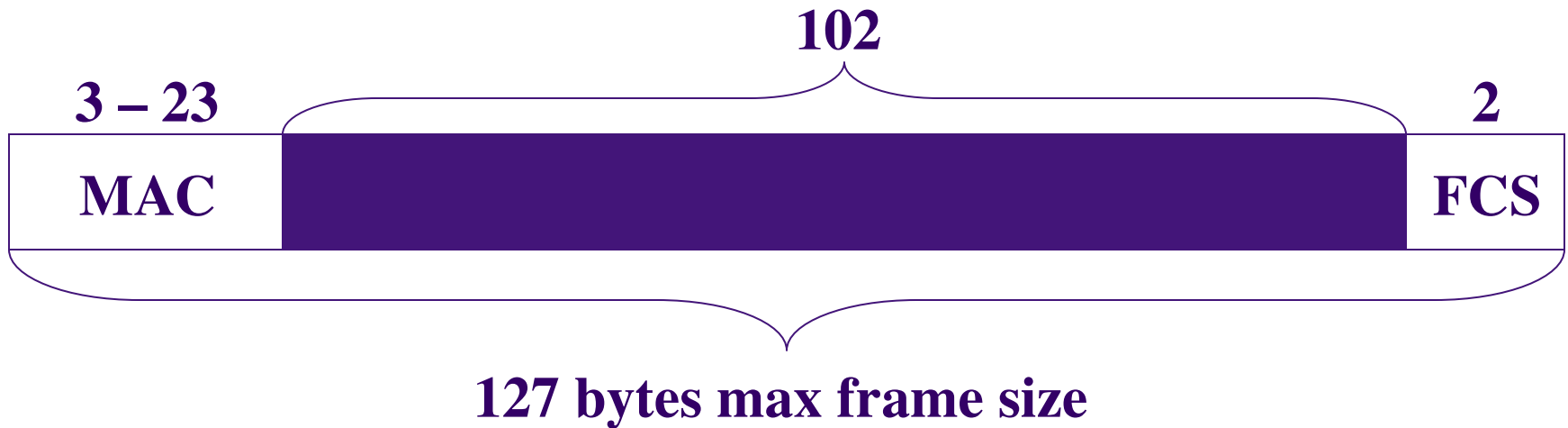
x 450 - n740 NanoSensor

x 50 - n601 NanoRouter USB

Hardware & Software

- TI cc2430 SoC
- MCU: 8051 (8 bit)
- 8 KB volatile RAM
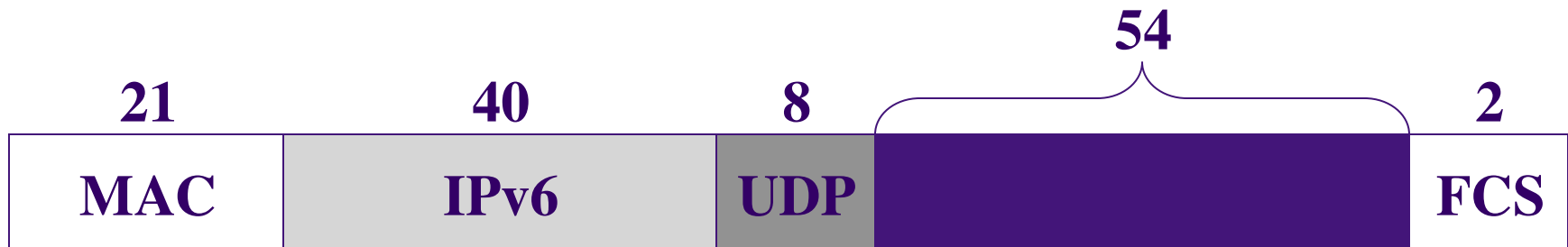- 128 KB Flash (64KB memory space)
- 2.4 GHz RF

- Contiki OS port

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Topics

- Motivation
- **RPL 6LoWPANs**
- Demo!

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IPv6 over 802.15.4

102

3 – 23   2

| MAC | | FCS |

127 bytes max frame size

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IPv6 over 802.15.4

- Simple UDP message

21	40	8	54	2
MAC	**IPv6**	**UDP**		**FCS**

- 56% overhead…

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IPv6 over 802.15.4

- Simple UDP message
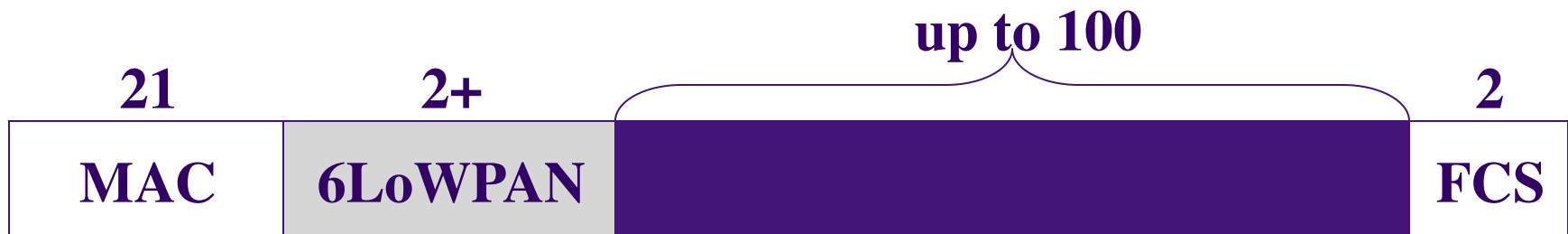
- ~20% best-case overhead…
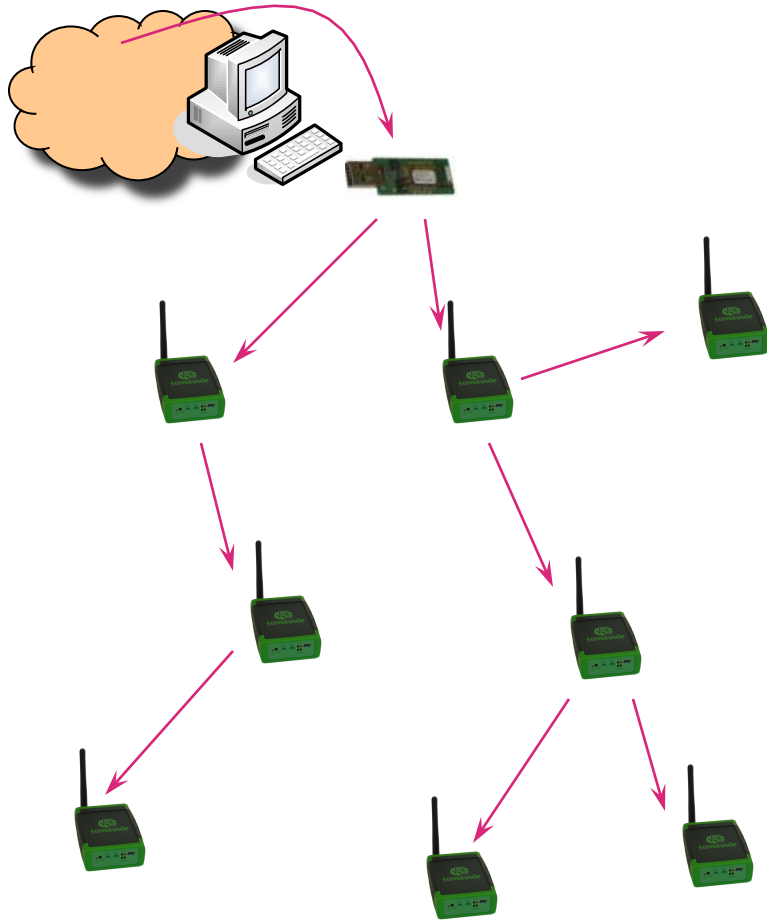- Realistic: 16-20 L3 + 8 L4

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Routing and Scalability

Routing Upwards with RPL
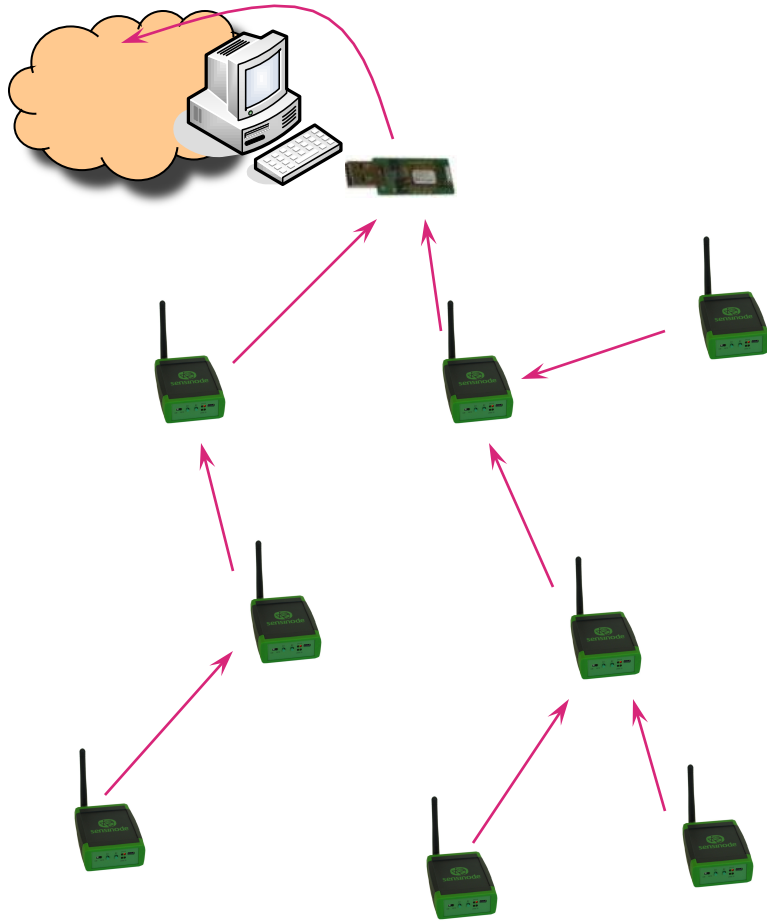
- Easy!
- All traffic: selected parent

- 1 fwd entry
- Think "default gateway"

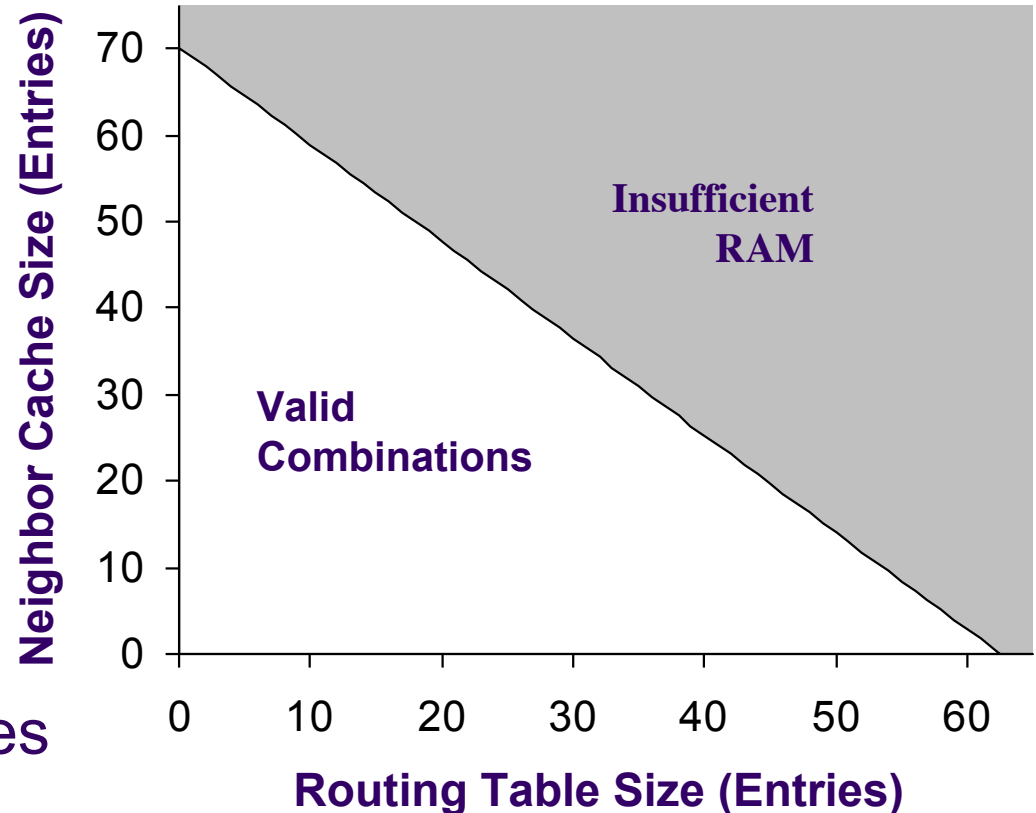Loughborough University

Routing Downwards with RPL

- Not-that-Easy ™

- 1 entry per Child

- Scalability???

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Scalability

- **Neighbor Cache**
  - 46 bytes / entry
- **Routing Table**
  - 47 bytes / entry

- 8 Kbytes RAM
- ~5.2KB used
- ~2.7 KB for the 2 tables

Neighbor Cache Size (Entries)

Routing Table Size (Entries)

Insufficient RAM

Valid Combinations

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Further Research

- Network Management, Monitoring (CoAP)
- Field-Evaluations
    - MAC layers, LoWPAN ND, Routing Protocols
- Code Dissemination (OAP)

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Demo!

Thank You!

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