ga•ru•li•ty | gə ˈro͞olitē |

noun

excessive talkativeness, esp. on trivial matters

fluff | fləf |

noun

1 soft fibers from fabrics such as wool or cotton that accumulate in small light clumps: *he brushed his sleeve to remove the fluff.*

Garrulity and Fluff

Carsten Bormann

a decade of sensor network research

- everything has to be done in a different way
  - Internet protocols use too much:
    - energy
    - spectrum
    - gates ...
- greenfield architectures, future internet, etc.

the problems are real

- constrained **nodes**
  - little power (~ μW), lots of sleeping
  - little ROM (code space), RAM (state)
- constrained **networks**
  - high loss
  - not an Ethernet (multicast, reliability, ...)

wait,
we heard this before

- Attempts at redoing everything for some 10x quantitative reason:
  - “lightweight protocols” (XTP and friends)
  - WAP
  - ATM
  - ...

why did WAP&co fail?

- (*insert reason here*) +
- Moore's law
- In the **time** you need to get 10x performance out of a new architecture,

  Moore's law gives you 10x performance with the **old** architecture

in constrained node/networks,

Moore's law barely applies

- In the low-power, low-cost area, gains from Moore's law are used
  - to save **power**
  - to save **cost**
- Performance, ROM, RAM grow **very** slowly

meanwhile...

- people are ***building*** the **Internet of Things**

- focus on what we can do while maintaining much of the Internet architecture
- “Embedded Internet”

what hurts

- architectural issues
- garrulity
- fluff

please re-calibrate your **complexity** meters

- **code** is expensive
  - “class 1” = 100 KiB, “class 2” = 250 KiB
- **state** is expensive
  - “class 1” = 10 KiB, “class 2” = 50 KiB
- **packets** are expensive
- **listening** is even more expensive
  - and multicast doesn’t work

current approaches

- some protocols can be **fixed** = retargeted for less generality, more austerity
  - ND ➳ 6LoWPAN-ND
- some protocols can be re-used after **removing sources of complexity**
  - e.g., DTLS without X.509
- some **architectures** can be re-used with more appropriate protocols
  - e.g., reincarnate HTTP's REST in CoAP

your protocol may be next

- unless it only runs on aircraft carriers and up
- If not, start thinking about ways to:
  - reduce garrulity
  - actively get rid of fluff
- http://www.iab.org/wp-content/IAB-uploads/2011/04/Bormann.pdf