

Network Coding meets Compressed Sensing

5G challenge: 7 billion devices (2014) → 500 billion devices (2022)



- Meshed networks, IoT/M2M/D2D, Smart Grids, Car-to-Car, Augmented Reality, Free Viewpoint Video, ...
- Massive throughput, reduced delay, resilience, energy saving, ...

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Massive sensing:



How many „sensors“ do we need:

- one: bad
- some: better (good)
- many: perfect
- even more: ???

How to read thousands of sensors?

Does it make sense (to read more data than the over-all information content (\rightarrow entropy))?

Network Coding meets Compressed Sensing

- combine NC with CS to exploit spatio-temporal data correlation and decrease the amount of data transferred through the network
- „agnostic“:
 - independent source and channel coding
 - only individual gain per sensor (spatial correlation not exploited)
 - reconstruction at the sink resulting in high complexity
- joint design of CS and NC:
 - in-network processing → compressed compute-and-forward
 - distributed partial decoding/denoising at intermediate nodes
 - adapted protocol design with active sensing capabilities
 - improved delay, resilience and complexity

