Network coding for MANETs

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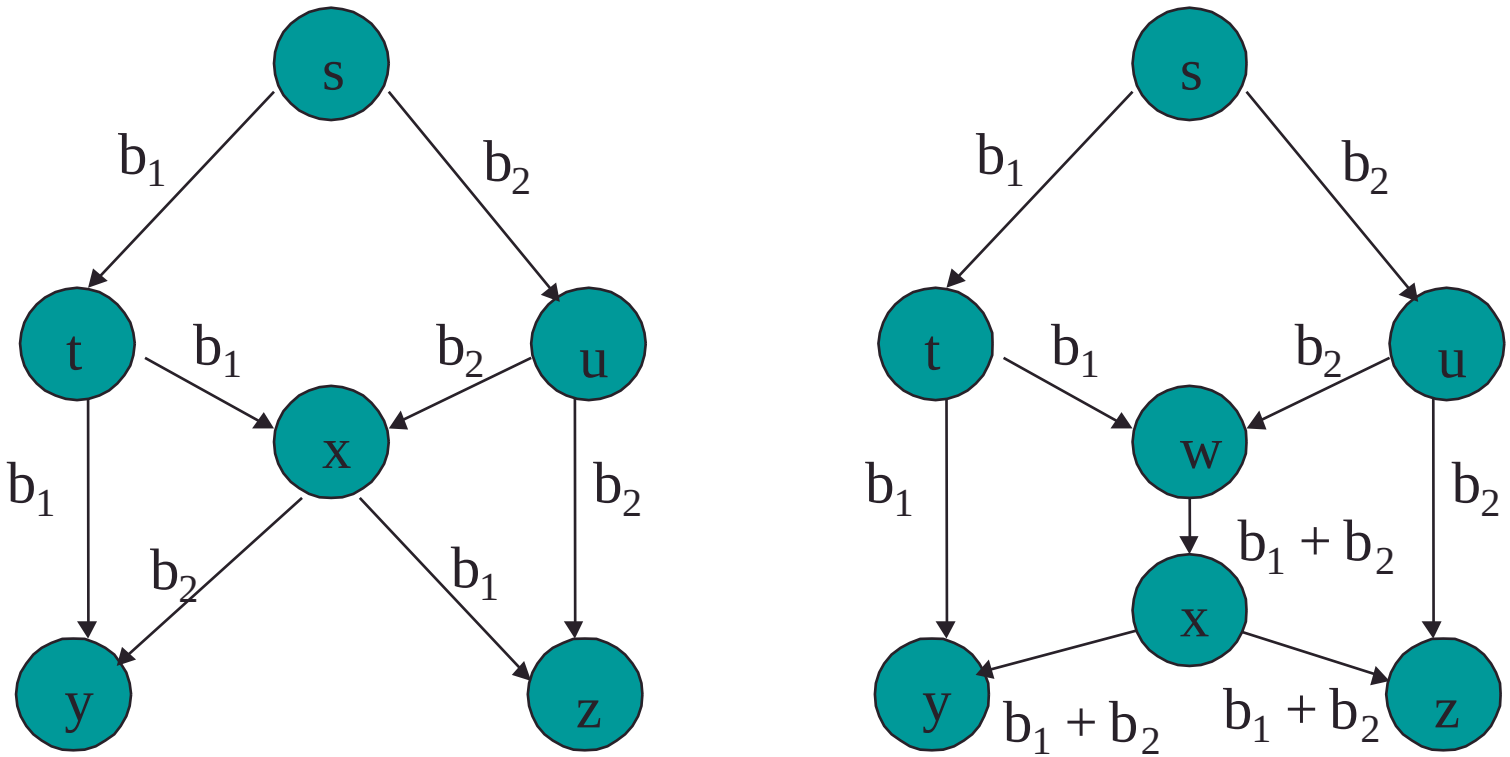
Network Coding

- What it is: the use of the algebraic nature of the data to modify it in the network
- What it does: in effect compresses the data over a network, introducing redundancy when needed to fight against erasure
- How it does it: for multicast applications, nodes in the network can use a distributed approach to coding at all the nodes
- What is gives you:
  - Reduced energy use because of effective compression
  - Distributed operation
  - Ease of optimization because of relaxation of integrality constraints
  - Distributed optimization over a network

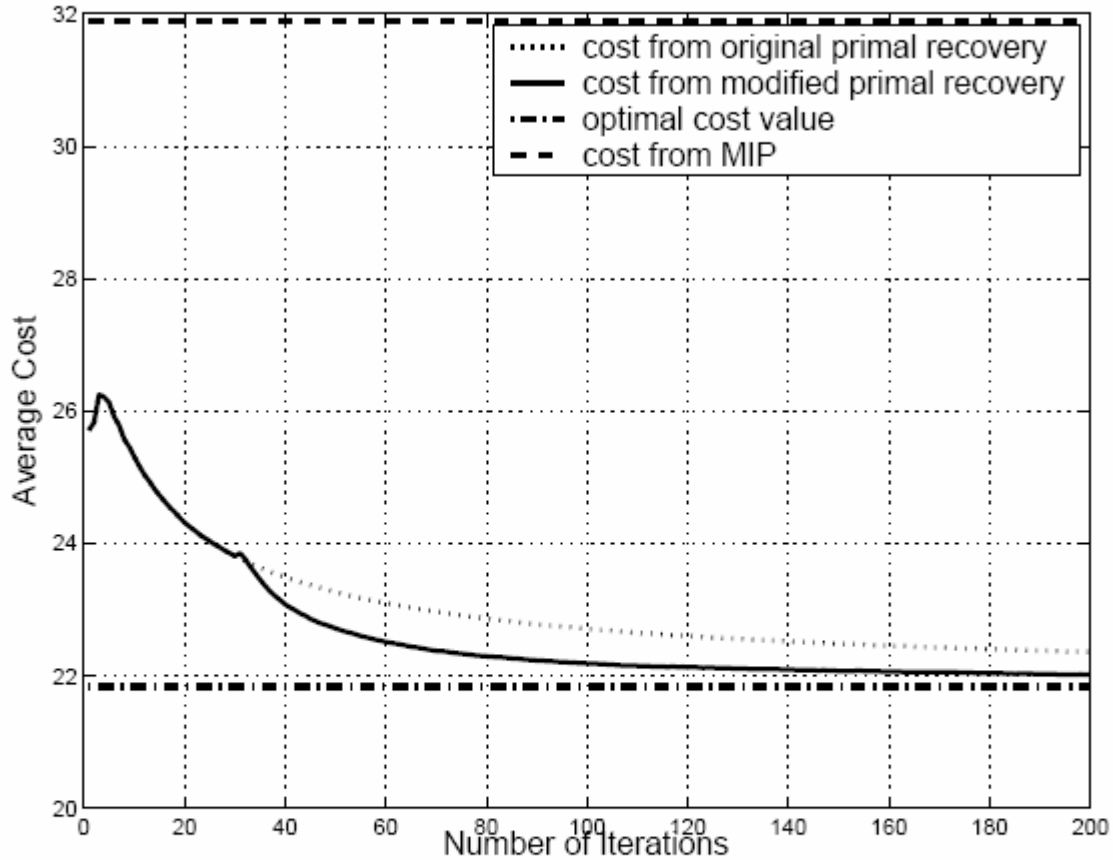
Network coding

- Canonical example [ACLY00]



- No longer flows, but information

Distributed operation



Average cost of random 4-terminal multicasts in 30-node wireless networks, using the decentralized subgraph optimization algorithms and centralized MIP algorithm. For modified primal recovery method, $N_a = 30$.