Trading Structure for Randomness in Wireless Opportunistic Routing

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Synopsis

While ExOR provided the ideas behind opportunistic routing in wireless meshes, the MORE routing and encoding system described in this paper fixes some of the biggest problems in ExOR and provides significant performance increases, especially in multicast. Median throughput with MORE was shown to be 95% higher than normal routing in their tests, and they saw throughput increases of up to 10x normal. Whereas ExOR fought with TCP and so didn't exist peacefully on the protocol stack, MORE exists neatly between MAC and IP and maintains clean abstractions, which is part of the reason it works well with multicast. The other reason is that it doesn't include a strict scheduler like ExOR so it can take advantage of spatial reuse. Other important features of MORE are its random intermixing of packets and use of network coding which limit the amount of retransmissions and recovery overhead. The biggest contribution in my opinion is their combination of network coding alongside a much-improved opportunistic routing system.

Pros

- Maintains clean abstraction between layers
- Performs better than ExOR
- Coding does has not have significant overhead
- Much better multicast support
- Insensitive to batch sizes so can do 100% of routing, instead of relying on traditional routing

Cons

- Works well if we assume all nodes are secure/fair…
    - Security, same problems as always on wireless medium, can be handled reasonably by encryption
    - But fairness, what prevents a node from overloading the rest of the network?
- Works well when spatial reuse is possible… would it break down if nodes were all close enough that spatial reuse was not viable?
    - No test data comparing MORE to ExOR in this case