Designing a better routing metric

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ETX – expected transmission count metric.

Minimizing transmission count.

Douglas S. J. De Couto, Daniel Aguayo, John Bicket, Robert Morris:
Latency minimization.

Successful transmission probability maximization.
Hop-counting.

Only latency.
ETX.

Latency, because every transmission takes some time, especially retransmission.

Probability, because less transmissions means less chance that something goes wrong.
ETX.

In wireless networks in practice works quite nicely.
ETX.

It minimizes airtime.

Or does it?
What if?

Mixed wireless and non-wireless.
Diversity / multichannel.
Impact of other nodes making decision.
Its model is quite simplified and not extensible.
When we want to minimize airtime?

When it impacts somebody.
Half-duplex vs. full-duplex.
Same channel vs. multiple channels.
Latency minimization.

Successful transmission probability maximization.
Prediction problem.

From previous performance data predict future.
Shortest path.

Only for latency great.

Hops $\sim$ latency.
Shortest path.

Local.
Blind.
Greedy.
Shortest path.

How to integrate (knowledge of) decisions of others?
Better model?

Probability model.
Better model?

Successful transmission probability maximization.
Better model?

Instead of latency concentrate on successful transmission probability.
Probability that transmission will be successful. First time.
Probability.

Mixed wireless and non-wireless.
Diversity / multichannel.
Impact of other nodes making decision.
Probability.

One-hop.

Multiply $\rightarrow$ logarithm.
Probability.

Link quality.

\[ P(S) = P(LQ) \]
Probability.

Half-duplex, full-duplex.
Probability.

\[ P(S) = \frac{LQ}{\text{number of neighbors}} \]
Probability.

\[ P(S) = \frac{LQ}{\text{number of neighbors who could send at the same time}} \]
Probability.

Number of neighbors who could send at the same time.

\[\downarrow\]

Probability of neighbors sending at the same time.
Probability.

\[ \sum_{\text{half-duplex neighbors}} ILQ \]
Probability.

\[ P(S) = \frac{LQ}{\sum_{\text{half-duplex neighbors}} ILQ} \]

This equation is really buggy, infinite probability?
Discussion.

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