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odprto brezžično omrežje Ljubljane

Designing a better routing metric

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wlan ljubljana/slovenia – March 16, 2011

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ETX – expected transmission count metric.

Minimizing transmission count.

Douglas S. J. De Couto, Daniel Aguayo, John Bicket, Robert Morris:
A High-Throughput Path Metric for Multi-Hop Wireless Routing, 2003

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Latency minimization.

Successful transmission probability maximization.

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Hop-counting.

Only latency.

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ETX.

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

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

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ETX.

In wireless networks in practice works quite nicely.

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ETX.

It minimizes airtime.

Or does it?

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What if?

Mixed wireless and non-wireless.

Diversity / multichannel.

Impact of other nodes making decision.

Its model is quite simplified and not extensible.

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When we want to minimize airtime?

When it impacts somebody.

Half-duplex vs. full-duplex.

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Same channel vs. multiple channels.

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Latency minimization.

Successful transmission probability maximization.

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Prediction problem.

From previous performance data predict future.

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Shortest path.

Only for latency great.

Hops ~ latency.

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Shortest path.

Local.
Blind.
Greedy.

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Shortest path.

How to integrate (knowledge of) decisions of others?

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Better model?

Probability model.

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Better model?

Successful transmission probability maximization.

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Better model?

Instead of latency concentrate on
successful transmission probability.

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Probability that transmission will be successful. First time.

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Probability.

Mixed wireless and non-wireless.

Diversity / multichannel.

~~Impact of other nodes making decision.~~

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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.

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

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Probability.

Number of neighbors who could send at the same time.

↓

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?

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Discussion.

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