Wireless Network/Roofnet

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Wireless Network

- Wireless networks use a *broadcast/shared medium*
  - Transmission collisions
  - Carrier Sense Multiple Access (CSMA)
  - Hidden/exposed terminal problems

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- **SampleRate**
  - Goal: Picks the bit-rate that achieves the ***highest throughput***
  - How: Transmitter tries different bit-rates

Routing

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  - From src->dst, you have multiple paths to choose from
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Example:

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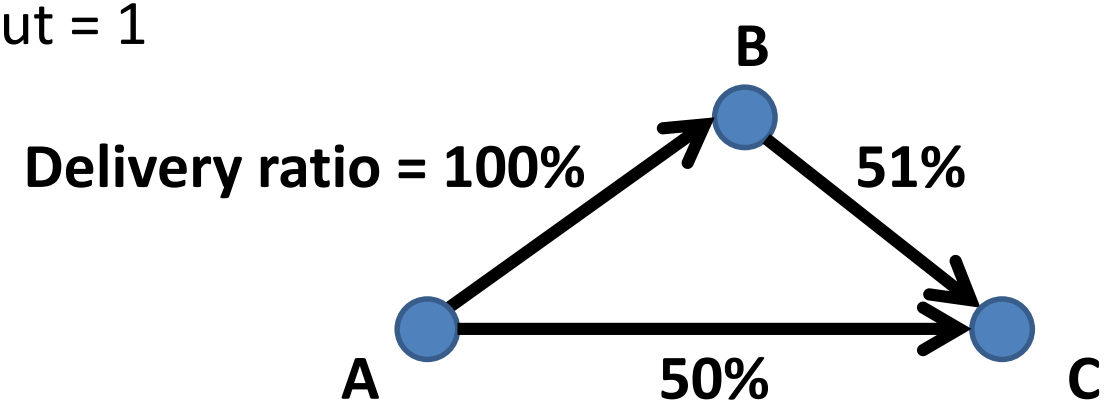
P1: A -> B -> C

P2: A -> C



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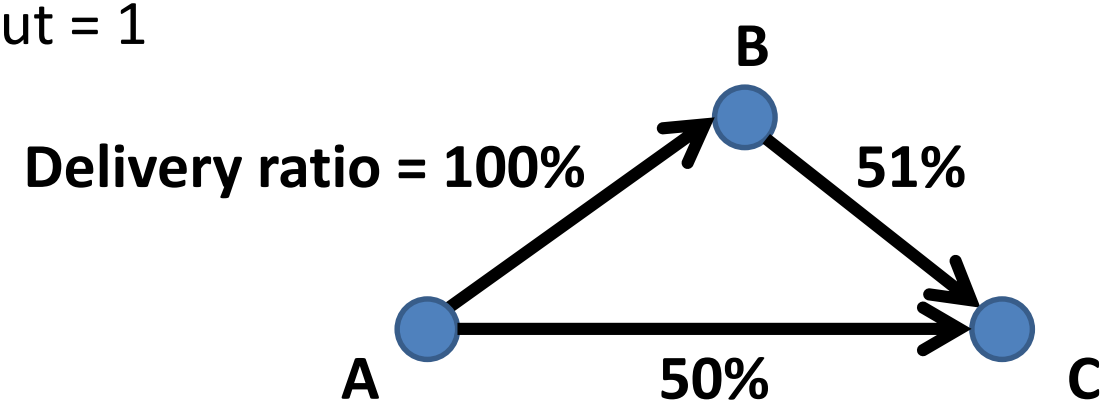
Throughput

P1 : ABB = 1/3

P2: AA = 1/2



Metric 1: Lowest packet loss rate

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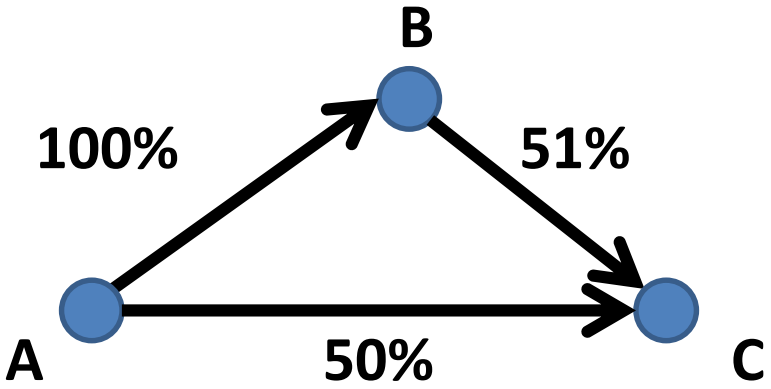

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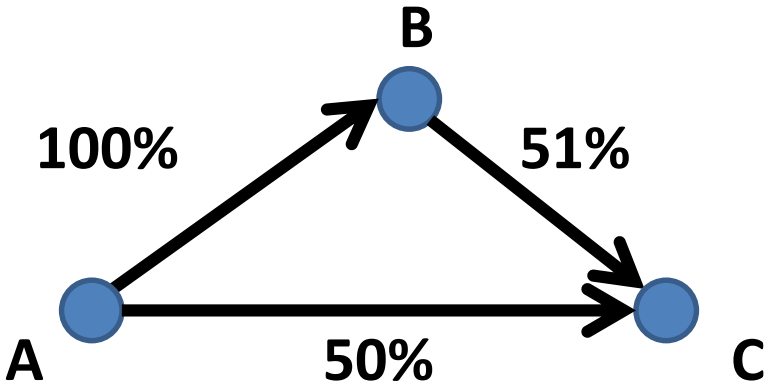


Packet loss rate

P1: 1 – (100% x 51%) = 0.49 ✓

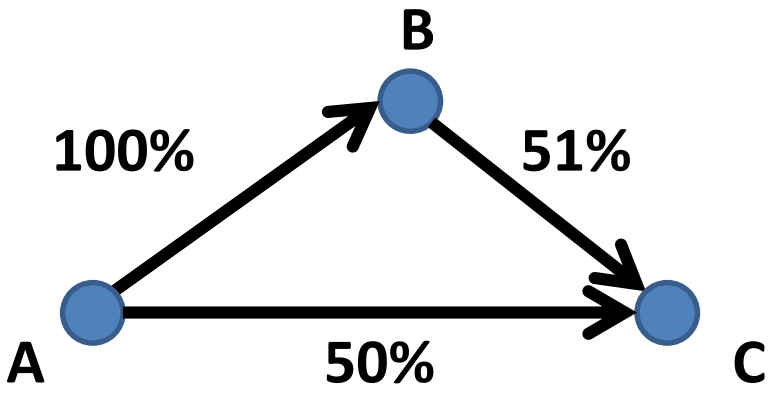
P2: 1 – 50% = 0.5

Lowest packet loss rate != highest throughput

Metric 2:
ETX (expected transmission count)

ETX{link} = 1/P(delivery)

ETX{path} = sum(ETX{link}) over all the links on the path



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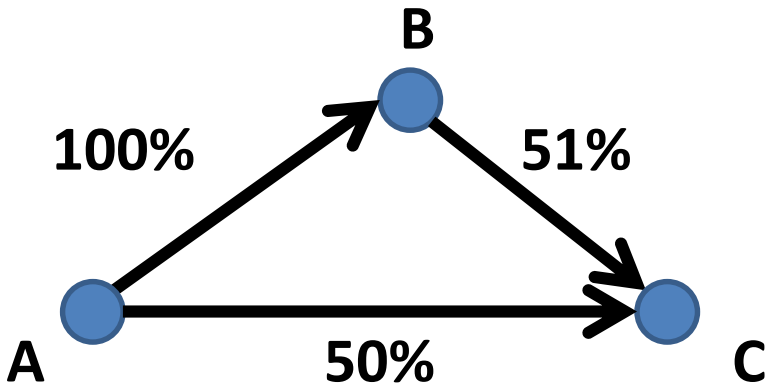
ETX{P1} = 1 + 2 = 3

ETX{P2} = 1 + 1 = 2 ✓



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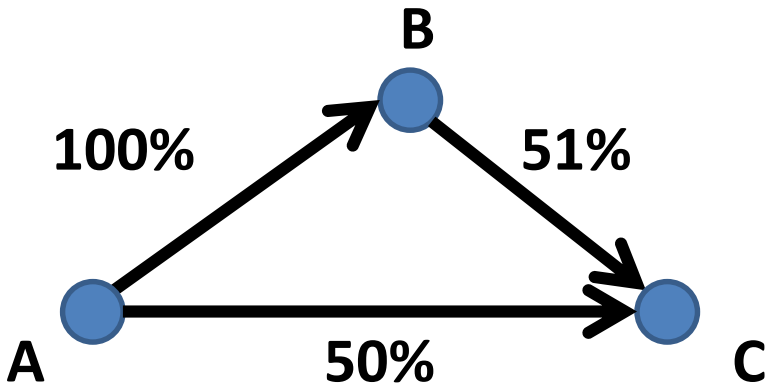

What's bad about ETX?

- Nodes might use different bit-rates, packet size might be different

Metric 3:
ETT (expected transmission time)

ETT{link} = **S/B** * ETX

ETT{path} = sum(ETT{link}) over all the links on the path

S: packet size

B: link bandwidth

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How to find B in Roofnet?

B: Highest throughput bit-rate