

# Losses in SATCOM systems : impact on QUIC

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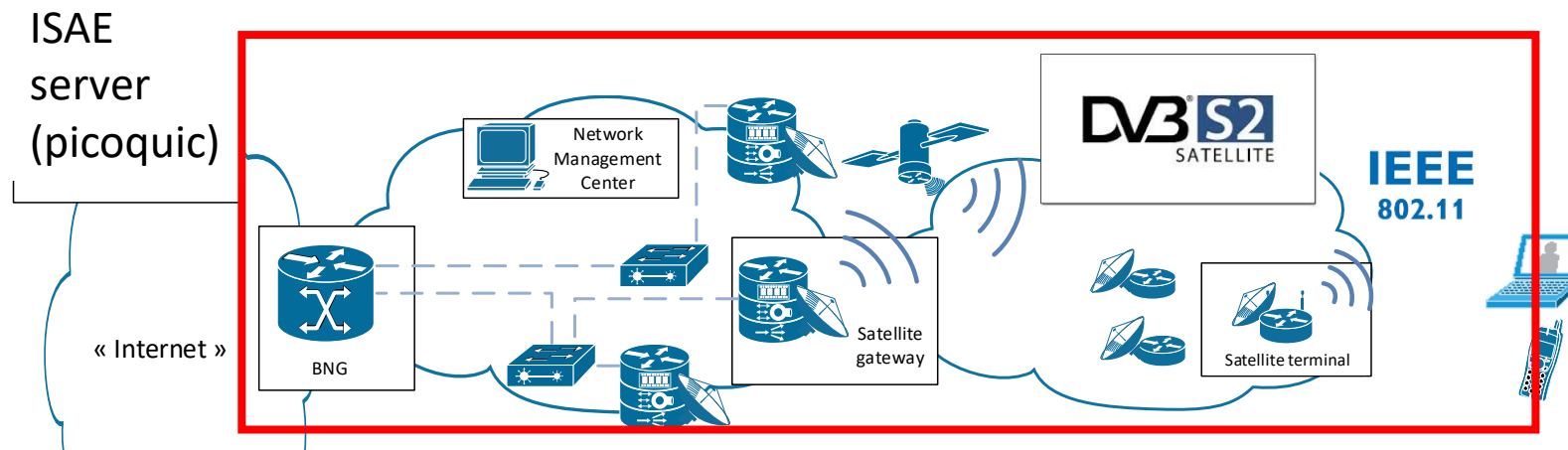
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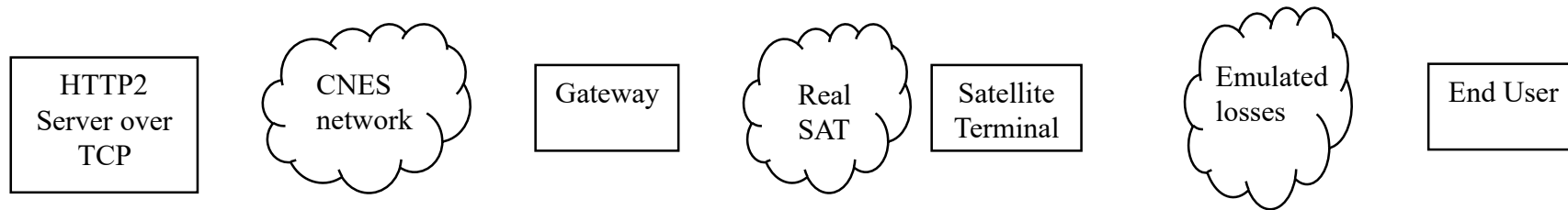
# Are there E2E losses in SATCOM systems ?

- End to end measurements on a real satellite public access



- Loss identified by missing QUIC packets are the receiver
  - Gilbert-Elliott model
  - Probability to go from « good » to « bad » state = 0.018 !

# Impact of E2E losses on a TCP flow



Loss ratio	Time needed to download 1 GB (s)	Goodput (Mbps)	Loss impact (1- Goodput-loss/Goodput-noloss)
0	797	10	0
0.0001	935	8.5	0.15
0.0005	1528	5.2	0.48
0.001	1863	4.2	0.58
0.005	7140	1.1	0.89

- Experimental evaluations of QUIC showed good performance for short flows with public accesses
- For long flows, the E2E losses can have a huge impact

# Results Sample – 1 GB File

- Running through the Hughes terminal and Gateway with 600 millisecond latency
- No Packet Loss
  - TCP HTTP 1.1 with PEP ~211.5 Mbps
  - TCP HTTP 2.0 with PEP ~42 Mbps
  - QUIC HTTP 2.0 ~35.9 Mbps
- 0.1% Packet Loss
  - TCP HTTP 1.1 with PEP ~170.8 Mbps
  - TCP HTTP 2.0 with PEP ~43.4 Mbps
  - QUIC HTTP 2.0 ~23.7 Mbps
- 1% Packet Loss
  - TCP HTTP 1.1 with PEP ~118.3 Mbps
  - TCP HTTP 2.0 with PEP ~41.1 Mbps
  - QUIC HTTP 2.0 ~17.2 Mbps