TCP over SONIC

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SoNIC

Software-defined Network Interface Card

Provides access to the physical and data link layers in software by implementing them in software.
TCP over SoNIC

Design, Implement, Test
Improve performance

Motivation: Reliable data transmission over SoNIC
TCP Throughput Limitation

\[
\text{Throughput} \leq \frac{\text{MSS}}{\text{RTT} \sqrt{P_{\text{loss}}}}
\]

where MSS is the maximum segment size and \( P_{\text{loss}} \) is the probability of packet loss. If packet loss is so rare that the TCP window becomes regularly fully extended, this formula doesn't apply.

Even if there is no packet loss in the network, window size can limit throughput.

\[
\text{Throughput} \leq \frac{\text{RWIN}}{\text{RTT}}
\]

where RWIN is the TCP Receive Window and RTT is the round-trip time for the path.
Evaluation

**Time versus Windows Size for TCP connection over SoNIC**

Configuration:
- Timeout: 0.2 ms
- 100000 pkts
Evaluation
Evaluation

Configuration: [Timeout 0.3 ms; 100000 pkts]
Future Work

Improve performance (Theoretically 10 Gbs)

Measure performance with tcp flows of different characteristics
Question?
Thank You All!