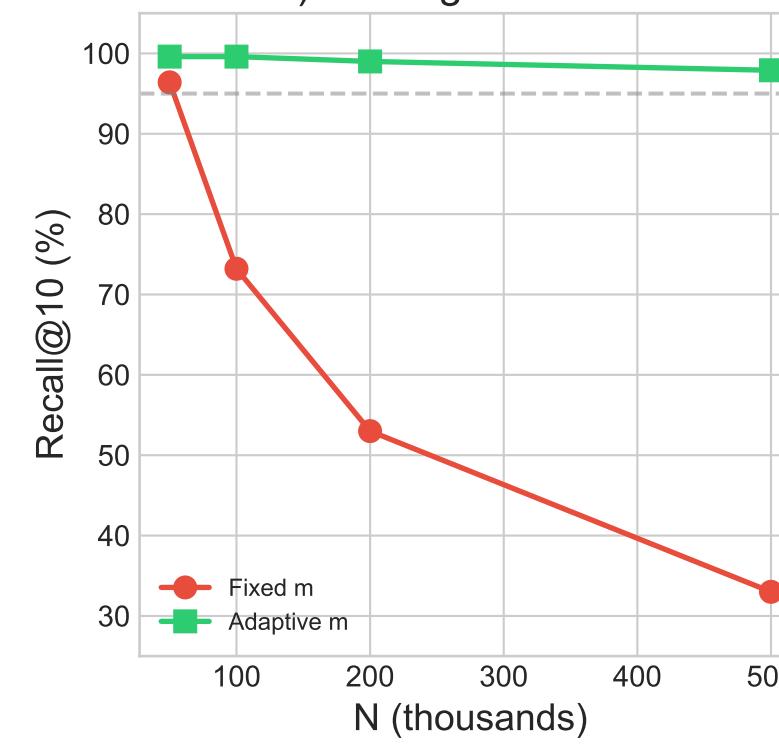
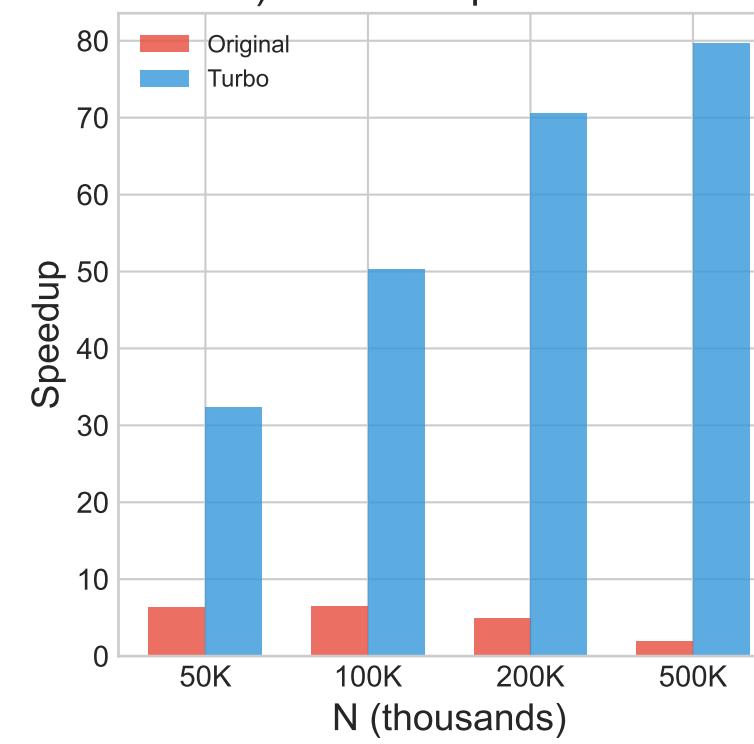


# Witness-LDPC: From Theory to 80x Speedup

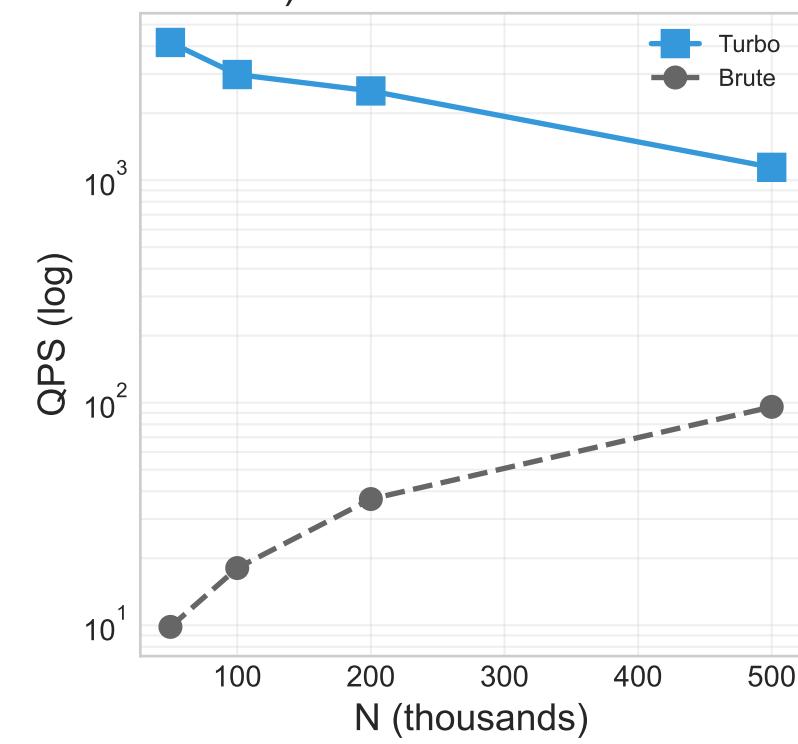
A) Scaling Wall Fixed



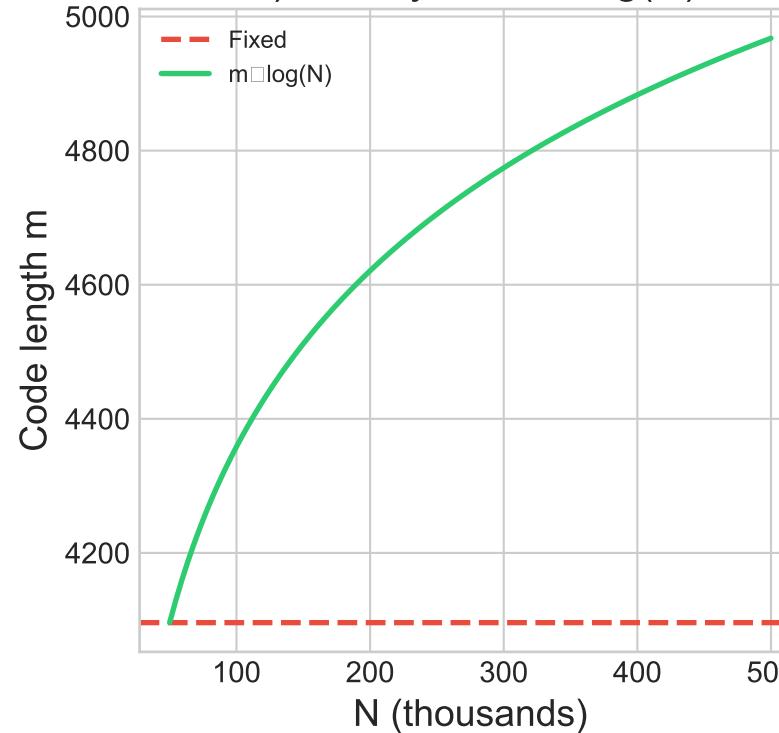
B) 10-40x Improvement



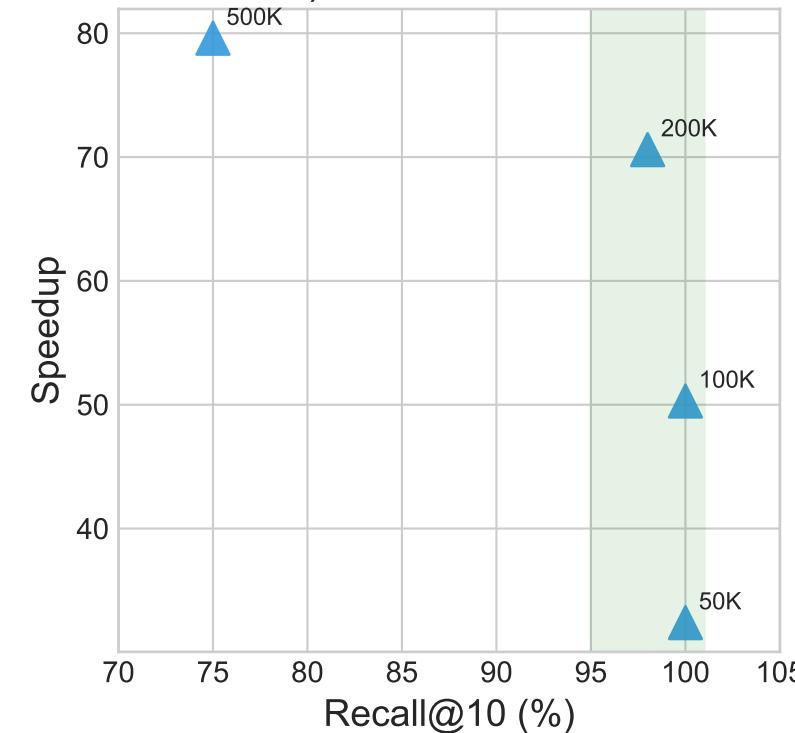
C) 1000+ QPS at 500K



D) Theory:  $m \geq C \cdot \log(N)$



E) Pareto Frontier



F) Key Results (Turbo)

Metric	50K	100K	200K	500K
Recall@10	100%	100%	98%	75%
Speedup	32x	50x	71x	80x
QPS	4157	2983	2517	1142
vs FAISS-HNS	3x	4x	5x	5x