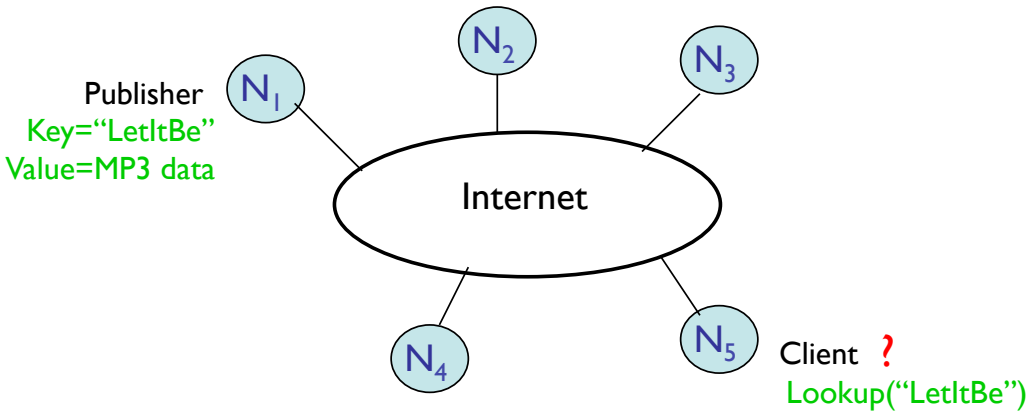
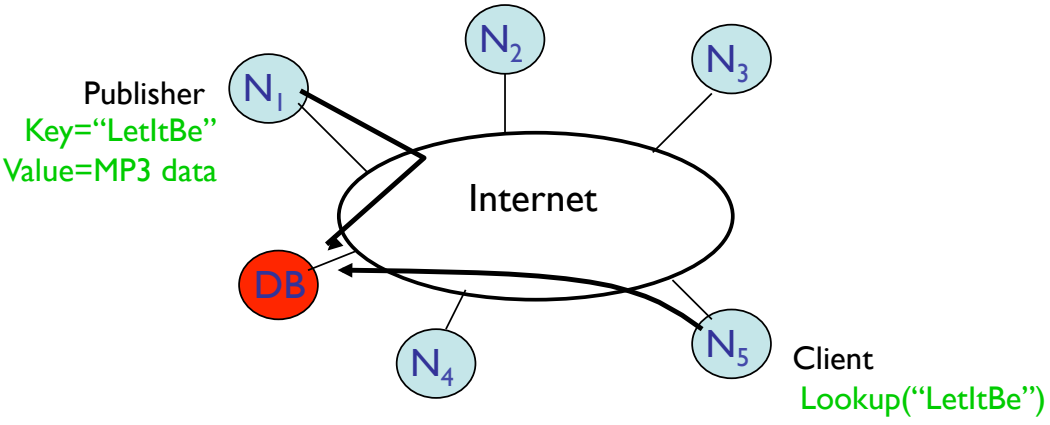
P2P Comparison

	Centralization	Query Model	Scalability	Overhead
Napster	High; central server	Direct server lookup	High	Low
Kazaa	Moderate; SuperNodes	Query flooding	Moderate	Moderate
Gnutella	Low (pre-UltraPeers)	Query flooding	Low	Low
BitTorrent	Moderate; trackers	N/A	High	Moderate
DHT	Low	Direct lookup (exact)	High	High

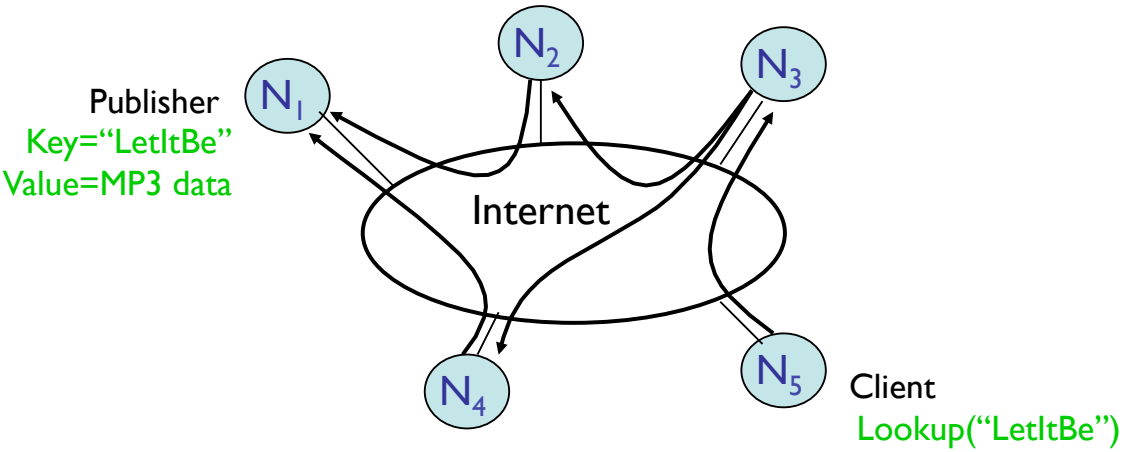
P2P Lookup



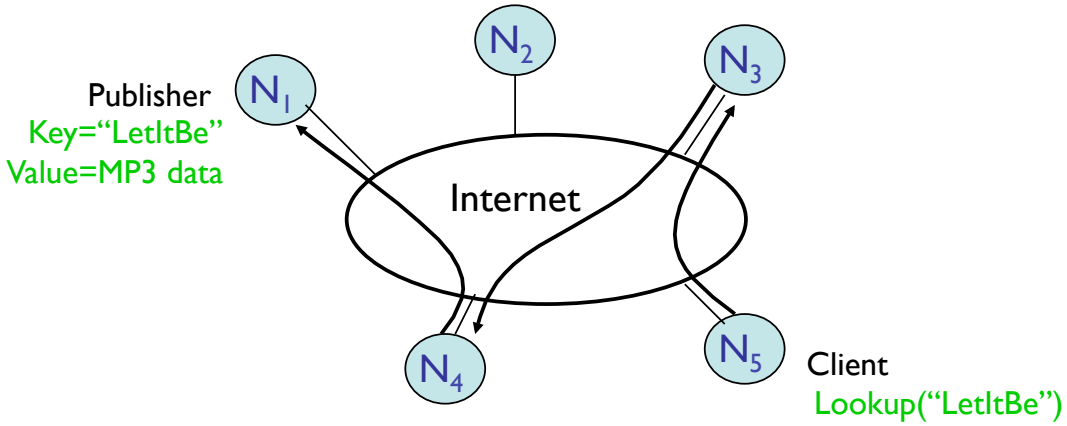
Centralized Lookup



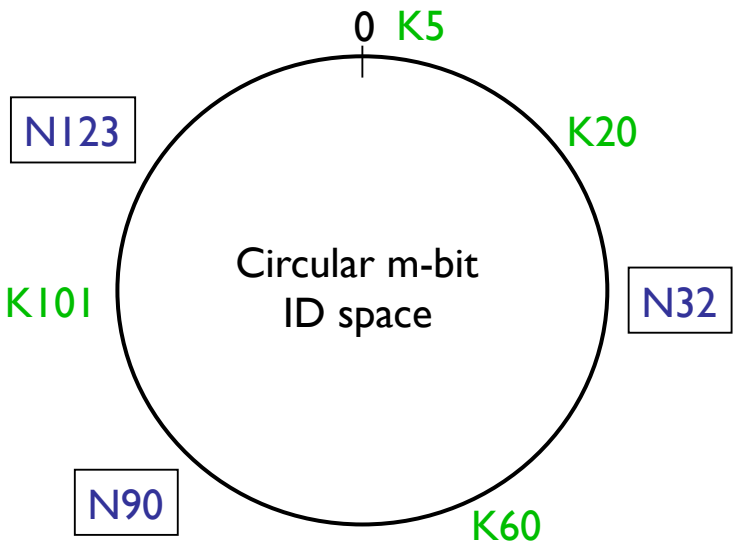
Flooding



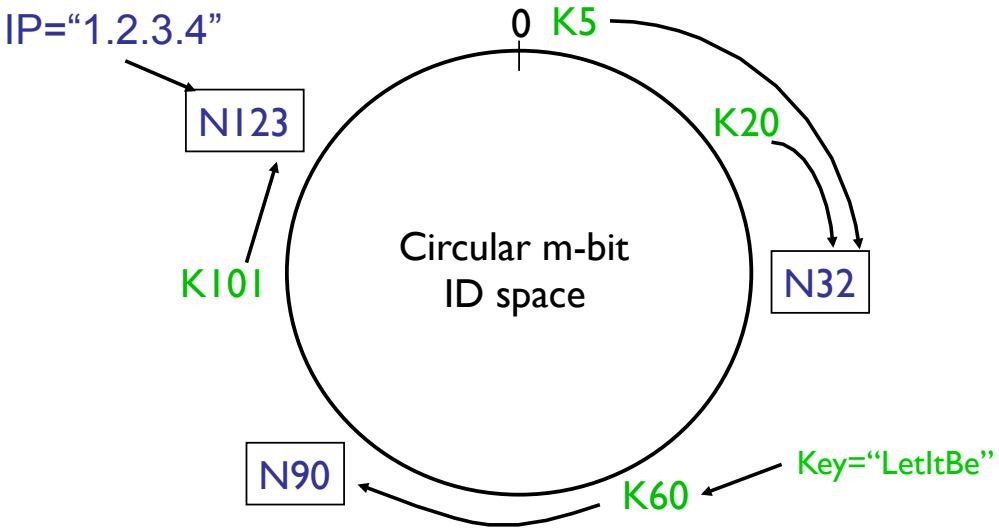
Routed Messages



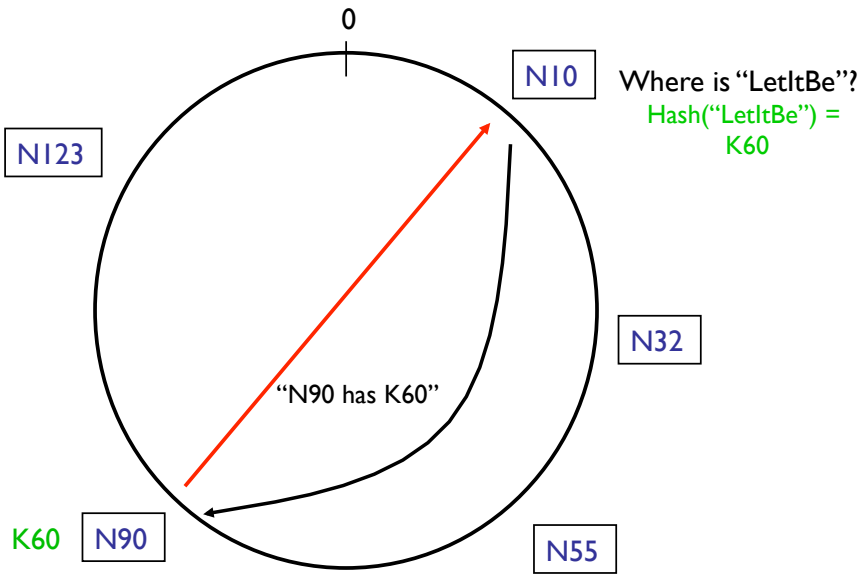
Identifier Circle



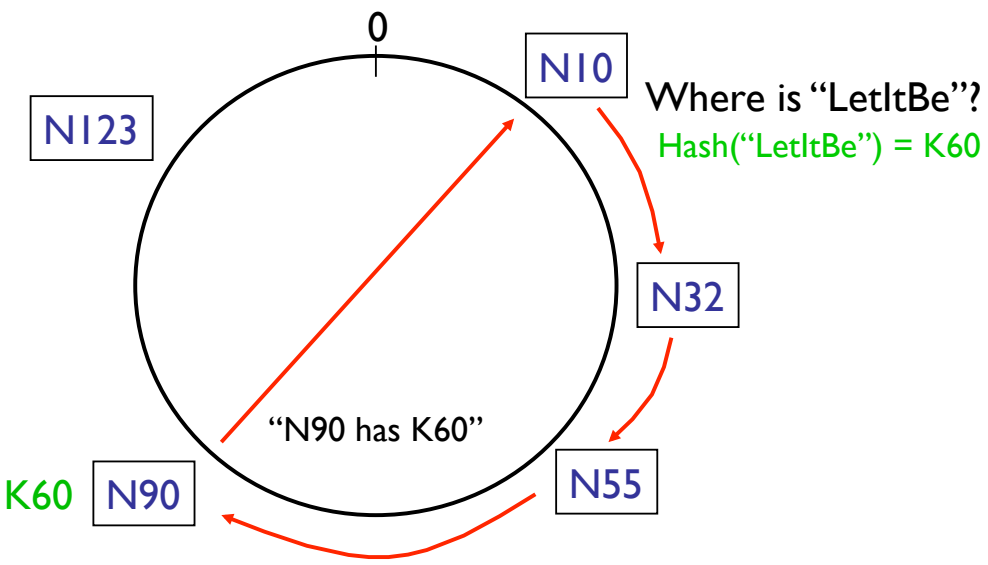
Identifier Successors



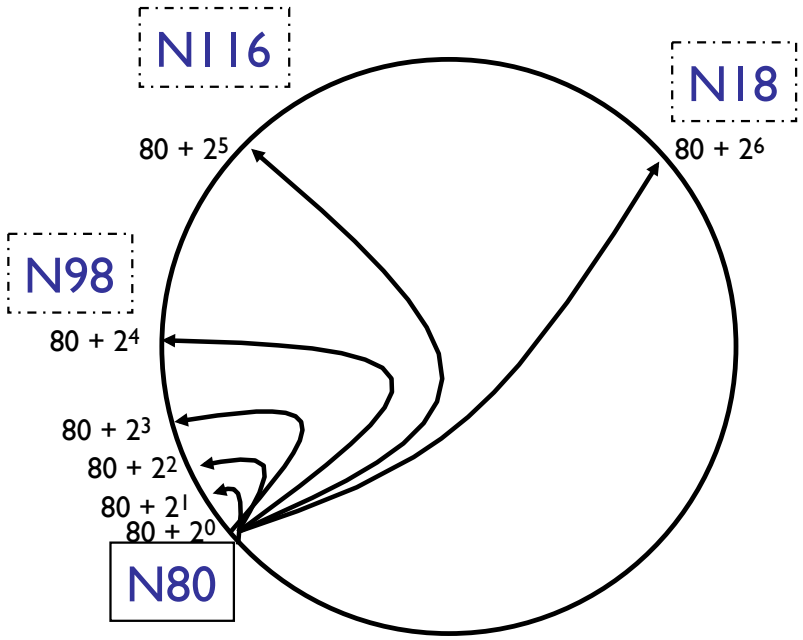
Lookup Example



Simple Lookup

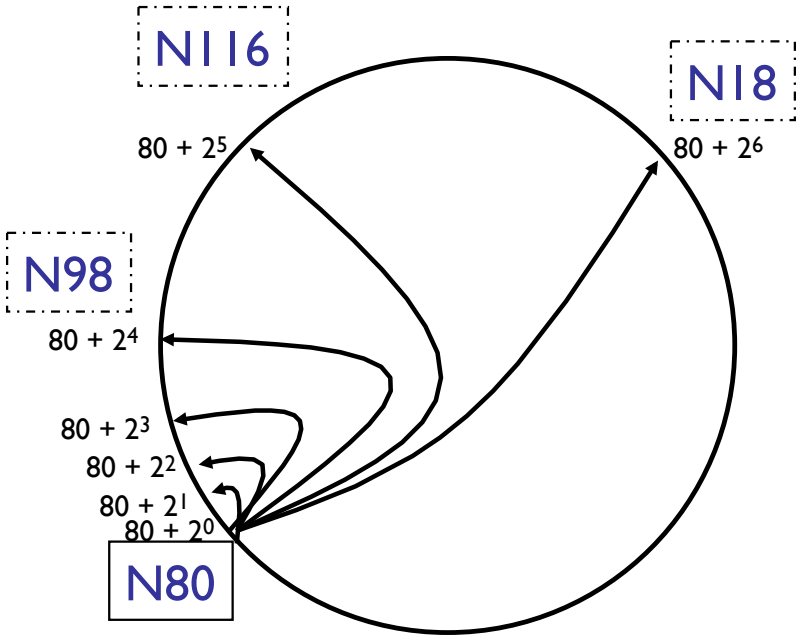


Chord: Finger Tables

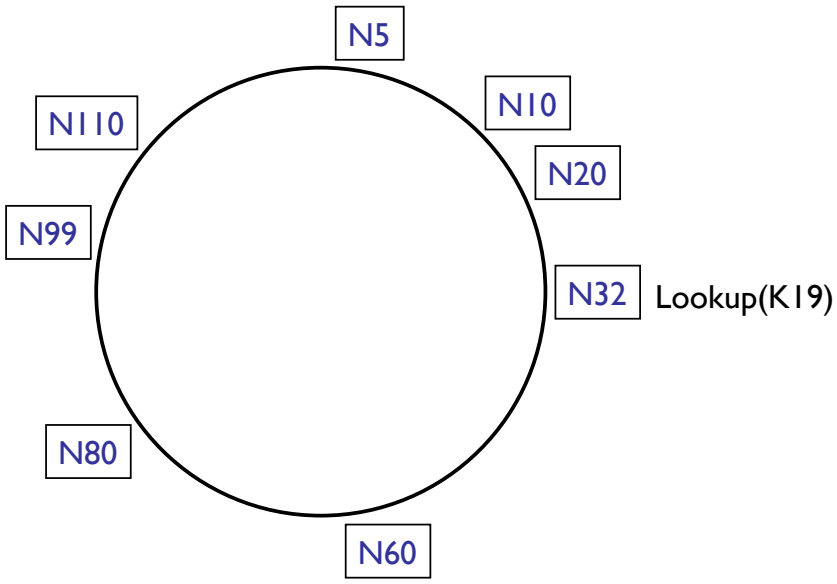


Finger Tables

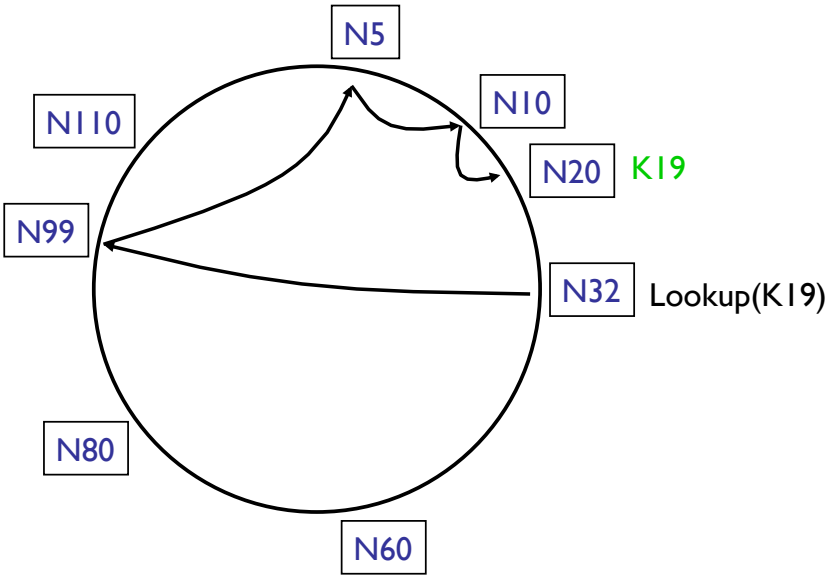
N80+1	N98
N80+2	N98
N80+4	N98
N80+8	N98
N80+16	N98
N80+32	N116
N80+64	N18



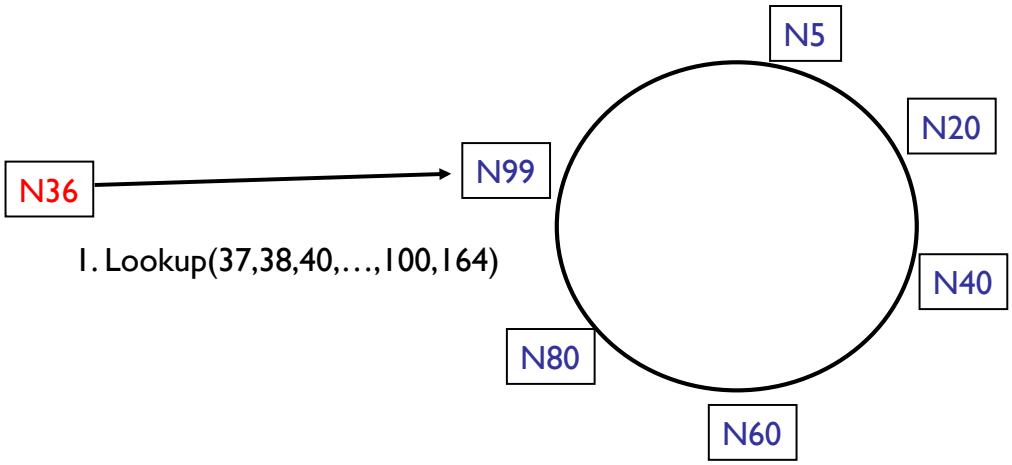
Chord Lookup



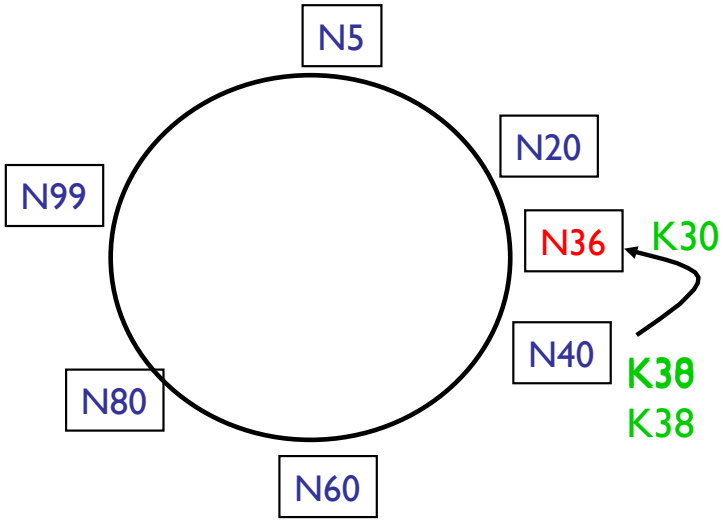
Chord Lookup



Joining the Ring

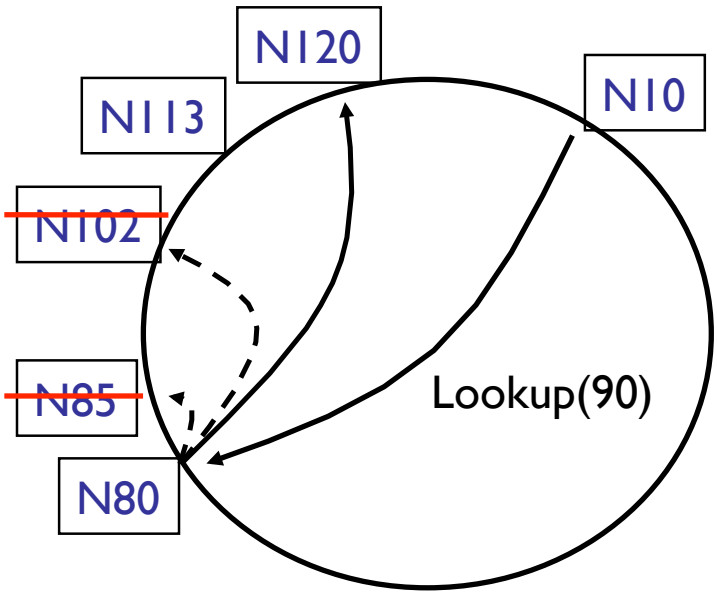


Joining the Ring

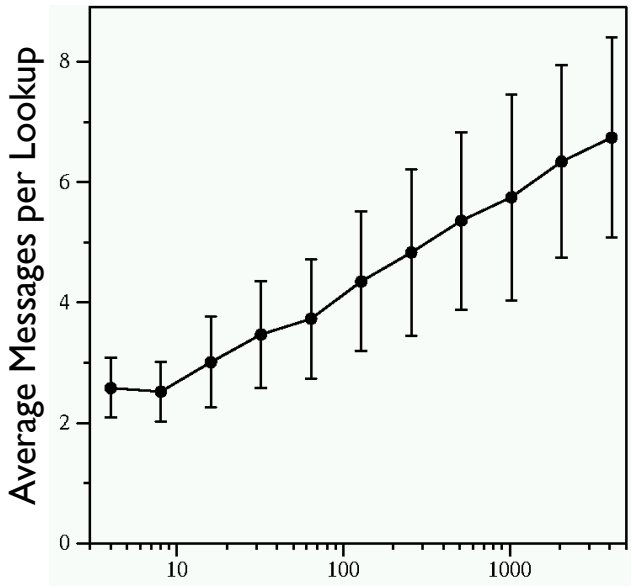
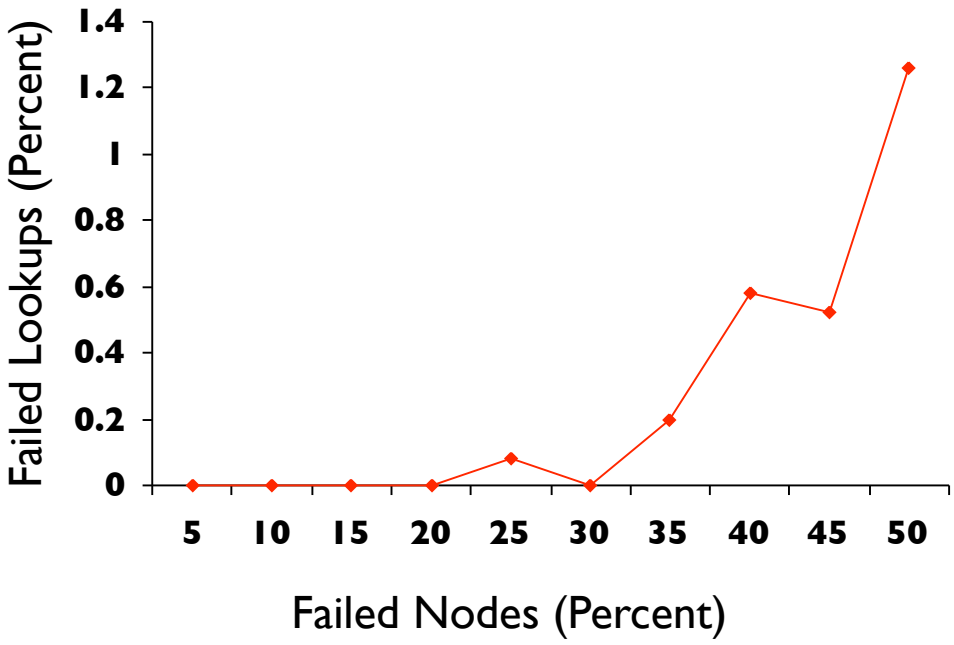


Copy keys 21…36
from N40 to N36

Fault Tolerance



Evaluation: Lookup



Evaluation: Robustness