

We investigate the maintenance of overlay networks under massive churn where an adversary may churn a constant fraction of nodes over the course of $O(\log n)$ rounds.

In particular, the adversary has an almost up-to-date information of the network topology as it can observe an only slightly outdated topology that is at least Ω rounds old.

Other than that, we only have the provably minimal restriction that new nodes can only join the network via nodes that have taken part in the network for at least one round.

Our contributions are as follows: First, we show that it is impossible to maintain a connected topology if the adversary has up-to-date information about the nodes' connections.

As our main result, we present an algorithm that constructs a new overlay --- completely independent of all previous overlays --- every Ω rounds.

Furthermore, each node sends and receives only $O(\log^3 n)$ messages in each round.