

We consider the problem of transforming any weakly connected overlay network of polylogarithmic degree into a topology of logarithmic diameter.

The overlay network is modeled as a directed graph, in which messages are sent in synchronous rounds, and new edges can be established by sending node identifiers.

However, every node can only send and receive a polylogarithmic number of bits in each round, which makes the naive approach of introducing all neighbors to each other until the network forms a clique infeasible.

We present an algorithm that takes time $O(\log^3/2(n))$, w.h.p.

At the heart of our algorithm lies a deterministic strategy to group and merge large components of nodes, but we make use of randomized load-balancing techniques to keep the communication load of each node low.