

Modelling the EpiChord P2P Overlay in an XCAST enabled Network

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Abstract

Structured Peer to Peer (P2P) overlay networks are becoming increasingly popular. Multi-hop systems achieve a successful lookup in $O(\log N)$ hops, whereas one-hop systems approach $O(1)$ hops. Both approaches, but especially one-hop overlays suffer from a high number of identical messages being sent to a number of nodes on the overlay.

Previous work showed that P2P networks benefit from the integration of the overlay network with the underlay network in which multi-destination multicast routing is available. This allows combining identical messages from the same source into joint multi-destination multicast messages to significantly reduce the number of messages. Our experimentation has centred around the one-hop EpiChord overlay. Here the problem is described using DTMC and Pepa models for more advanced analysis. The models are novel in two aspects: they are the first to investigate one-hop overlays and they are the first to study the performance of multi-destination multicast including the consideration of retransmissions of requests.

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