A Hierarchical P2P Overlay for Hierarchical Mobile Ad hoc Networks (MANETs)

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Abstract	P2P applications deployment on MANETs is motivated by the popularity of these applications, coupled with the widespread use of mobile devices. P2P applications and MANETs have common features such as decentralization, self organization, and the absence of dedicated servers or infrastructure. The deployment often faces specific performance challenges resulting from topological overlay and underlay mismatch, limited bandwidth constraint and dynamic topology changes. Hierarchical MANETs are a special type of MANETs where some nodes have specific routing roles to allow inter- cluster communications. Such topologies (typical for tactical networks) render a successful P2P deployment more challenging. We developed a novel approach for P2P deployment in such networks by bringing topology-awareness into the overlay, mapping the underlay topology (structure) to the logical overlay and building a hierarchically-structured logical overlay on top of the hierarchical underlay. Simulation results demonstrated a significant performance advantage of our proposed deployment solution vs. a flat logical overlay using different configurations and mobility scenarios.
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telecommunication security Resiliency pubcrawl p2p Peer-to-peer computing Metrics telecommunication network routing MANET mobile ad hoc networks telecommunication network topology Scalability Human Factors mobile devices DHT dedicated servers deployment deployment solution dynamic topology changes flat logical overlay hierarchical MANETs hierarchical mobile ad hoc networks Hierarchical Networks hierarchical underlay mobility scenarios OMNET++ specific performance challenges specific routing roles Structured Overlay tactical networks topology-awareness underlay mismatch underlay topology wireless networks peer to peer security