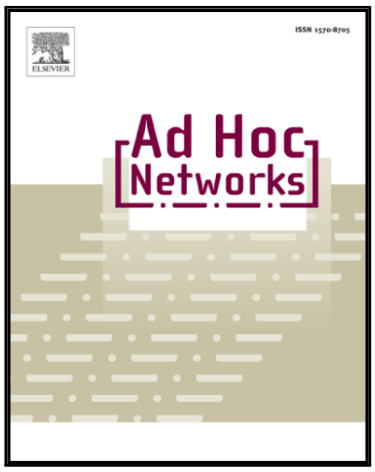

Privacy Enabled Disjoint and Dynamic Address Auto-Configuration Protocol for 6LoWPAN

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Privacy Enabled Disjoint and Dynamic Address Auto-Configuration Protocol for 6LoWPAN

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Abstract

In unsecured 6LoWPANs, the nodes can be easily identified by their IPv6 as well as MAC addresses. An adversary can snoop (and later, spoof) these addresses, thereby posing a major threat against the node's identity and communication integrity. Such threats necessitate enabling privacy by obscuring the node's addresses. This study proposes a protocol for dynamic, auto-configuring and conflict-free IPv6 addressing scheme that attempts to ensure privacy of nodes. In the proposed protocol, each node obtains a three-level hierarchical IPv6 address space which is dynamically generated on basis of congruence classes. Use of congruence classes, along with hierarchical addressing, facilitates generation of inter-leaved (and hence, disjoint) and non-fragmented address space for each node, resulting in conflict free address auto-generation. Nodes auto-configure their address sets independently with congruence seeds shared by routers, potentially reducing router complexity. To ensure the MAC address privacy, MAC address also change when IPv6 address change and it is derived from the interface identification (IID) part of the IPv6 address. The proposed protocol runs on Contiki operating system, simulated in Cooja. Simulated results highlight lower latency and optimal communication costs when compared with existing protocols.

Keywords: Internet of Things, 6LoWPAN, Privacy, IPv6 Address, Congruence Relation