



## Ad Hoc Networks

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# Mobile Matrix: Routing under mobility in IoT, IoMT, and Social IoT

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## Abstract

The explosive growth of “things” connected to the Internet (Internet of Things, IoT) raises the question of whether existing ready-to-go networking protocols are enough to cover social mobile IoT’s demands. IoT aims to interconnect static devices attached to some physical infrastructure. However, mobility is a major factor present in everyday life, and naturally “things” can move around (Internet of Mobile Things, IoMT) and create social ties (Social IoT, SIoT) in the cyber-physical space. In that context, we present Mobile Matrix ( $\mu$ Matrix), a routing protocol that uses hierarchical IPv6 address allocation to perform any-to-any routing and mobility management without changing a node’s address. In this way, device mobility is transparent to the application level favoring IoMT and SIoT implementation and broader adoption. The protocol has low memory footprint, adjustable control message overhead, and it achieves optimal routing path distortion. Moreover, it does not rely on any particular hardware for mobility detection (a key open issue), such as an accelerometer. Instead, it uses a passive mechanism to detect that a device has moved. We present analytic proofs for the computational complexity and efficiency of  $\mu$ Matrix, as well as an evaluation of the protocol through simulations. We evaluate the protocol performance under human and

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