Node-oriented Internet Protocol: A Novel Concept for Enhancement of Mobility and Multi-homing in Future Internet

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Abstract—Mobility and multi-homing are closely related and mainly issues of the used IP addressing scheme. A promising concept to enhance the support of mobility and multi-homing is the application of an addressing scheme that separates node identification and location. However, current approaches that make use of this addressing concept offer, among others, insufficient capabilities to select one or multiple network interfaces for a certain communication process, e.g. to enable load balancing. Therefore, we propose a novel approach called Node-oriented Internet Protocol (NIP). NIP adapts the address separation concept and uses a novel three-tuple addressing scheme that introduces an additional interface ID and enables network nodes to select network interfaces to be used for communication sessions. Our work includes basic concepts for mapping system, schemes for packet forwarding, mechanisms for mobility and multi-homing support and strategies to ensure backwards compatibility. Building on that, the NIP concept enhances multi-homing and mobility capabilities with new functionalities in comparison to known approaches, especially referred to interface selection and bandwidth aggregation.