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Modeling and Evaluation of Mobility Management in mmWave Cellular Networks

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Abstract

5G cellular networks will enable new differentiated services and applications to support industry like healthcare, energy, automobile and security. These services will massively increase the number of attached devices like mobiles, sensors, and actuators, resulting in sharp increase in mobile traffic volume. To cater high traffic volume and to fulfill strict quality of service requirements, 5G networks are expected to handle complex scenarios to provide seamless mobility and better resource utilization. In this paper, we propose mobility management algorithm for target cell selection and provide a methodology to evaluate its performance under varying conditions in mmWave framework. We use discrete time Markov chain (DTMC) and Markov decision process (MDP) to model radio access network controller and user equipment respectively. Probabilistic model checking (PMC) is used to do performance evaluation of the algorithm. The results show that our proposed algorithms adapts to network changes and responds successfully to mobility management process execution. With the help of PMC, we also gain useful insights regarding critical network parameters which can be used to achieve optimal resource utilization and to enhance user perceived quality of service (QoS). © 2018 IEEE.

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