ABSTRACT

The unabated flurry of research activities to augment various mobile devices in terms of compute-intensive task execution by leveraging heterogeneous resources of available devices in the local vicinity has created a new research domain called mobile ad hoc cloud (MAC) or mobile cloud. It is a new type of mobile cloud computing (MCC). MAC is deemed to be a candidate blueprint for future compute-intensive applications with the aim of delivering high functionalities and rich impressive experience to mobile users. However, MAC is yet in its infancy, and a comprehensive survey of the domain is still lacking. In this paper, we survey the state-of-the-art research efforts carried out in the MAC domain. We analyze several problems inhibiting the adoption of MAC and review corresponding solutions by devising a taxonomy. Moreover, MAC roots are analyzed and taxonomized as architectural components, applications, objectives, characteristics, execution model, scheduling type, formation technologies, and node types. The similarities and differences among existing proposed solutions by highlighting the advantages and disadvantages are also investigated. We also compare the literature based on objectives. Furthermore, our study advocates that the problems stem from the intrinsic characteristics of MAC by identifying several new principles. Lastly, several open research challenges such as incentives, heterogeneity-ware task allocation, mobility, minimal data exchange, and security and privacy are presented as future research directions.

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