BOTM: Basestation-on-the-Move, A Radio Acces Network Mangement Primitive

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UUCS-21-002

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1 April 2021

Abstract

Software-defined Radio Access Networks (SD-RANs) enable unparalleled flexibility and the opportunity to customize and/or optimize network operations. In particular, network function virtualization suggests that network functions are no longer tightly coupled to any specific hardware instance or location. In this thesis, we present our work on BoTM, basestation-on-the-move, where we exploit network function virtualization in an SD-RAN environment to dynamically "move" a mobile base station from one location to another to realize a general RAN management primitive. Specifically, we show how an SD-RAN environment enables orchestration across both the virtual infrastructure layer (i.e., the base station) as well as the mobile network functional layer (i.e., the protocol interactions in a mobile network), allowing a base station and its associated endpoints to be moved, fostering new network management functionality. We present the design and implementation of this network management primitive using Open Air Interface and the FlexRAN framework, with experimental results and efficiency metrics.