Converged Wireless Access: The New Normal

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Abstract:

Wireless access networks have traditionally operated in two different domains using disparate technologies -- WLANs (802.11x, WiFi family technologies) target small indoor environments, and employ distributed, asynchronous access mechanisms in unlicensed spectrum for scalability, easier deployment and coexistence among different operators; WWANs (cellular LTE) target outdoor deployments, and employ centralized, synchronous access in licensed spectrum for higher spectral efficiencies and quality of service. However, the demand for increased capacities from next generation 5G services, is driving both these wireless networks to a common "converged wireless access" paradigm -- WiFi is incorporating advanced wireless PHY technologies (eg. multi-user/network MIMO), while LTE is moving to dense, asynchronous deployments (eg. small cells), and the use of unlicensed spectrum (eg. LTE un-licensed). In this talk, I will explore the evolution of both these wireless technologies and the need for a converged wireless access paradigm which we refer to as "Access Asynchronously, Transmit Synchronously" (A2TS) for the future. As an illustration of this paradigm, I will present some of our recent experimental work in operating LTE in un-licensed spectrum and its coexistence with WiFi.

Bio:

Karthikeyan (Karthik) Sundaresan is a senior researcher in the Mobile Communications and Networking research department at NEC Laboratories America. His research interests span both algorithmic and experimental aspects of wireless networking and mobile computing, with recent efforts targeting various connectivity and computing paradigms for 5G networks and services. Dr. Sundaresan currently serves as an Associate Editor for the IEEE Transactions of Mobile Computing. He was the recipient of four Best Paper Awards at prestigious ACM and IEEE conferences, and recently received the 2016 ACM SIGMOBILE RockStar Award (Early Career Award) for contributions to the field of mobile computing. He is a senior member of IEEE.

Group's Background:

Mobile Communications and Networking (MCN) research group at NEC Labs America conducts research in various aspects of wireless networking and mobile computing, with a particular emphasis on technologies targeting 4G and 5G wireless networks. The group focuses on designing theoretically-sound solutions as well as building experimental systems for 4G/5G technologies to validate these solutions. The research topics range from network/massive MIMO and full-duplex, to LTE small-cell interference/resource management, LTE-unlicensed, cloud-RAN, virtualized RAN and mobile core networks, and mobile edge computing, to name a few.