

IEEE Wireless Communications Feature Topic on “Multi-hop Cellular: From Research to Systems, Standards, and Applications”

It has been more than 10 years since the Multi-hop Cellular Networks (MCN) architecture was first proposed in the year 2000. Fundamental researches have demonstrated the benefits of MCN in terms of system capacity, service coverage, and network connectivity. The actual concept behind the MCN architecture could be regarded as “relaying within a cell”, or operating base stations or access points with ad-hoc or mesh networking. This concept also pushed standard bodies to consider their solutions embedded with mesh or ad-hoc architectures, such as IEEE 802.11s, IEEE 802.16j, and IEEE 802.15.5. Now in the recent standards of 3GPP, ProSe (Proximity-based Services) and GCSE_LTE (Group Communication System Enablers for LTE) related working items also cover the device-to-device (D2D) communications with or without infrastructure. After many researches on protocols and architectures for IEEE series specifications have been done for Single-RAT (Radio Access Technology) MCN based on analytical models and simulations, other issues related to implementation, deployment and operations have emerged. From the 3GPP aspect, many research issues are still pending. For Multi-RAT MCN, further researches have to be done in considering the RAT capabilities of devices. This feature topic would serve as a state-of-the-art snapshot in these exciting developments, including but not limited to:

- Design and deployment guidelines for MCN
- Implementation and test bed issues for MCN
- Power saving in MCN
- Cross-layer ID allocation and mapping in MCN
- Path switch between direct/infrastructure links in MCN
- Discovery and self-organization with ad-hoc networking in MCN
- Network management in MCN: privacy, security, routing, and mobility
- Resource management in MCN: single/multi radio access technology (RAT) and power control
- Group communications in MCN
- Multi-hop content sharing in MCN
- Ad-hoc networking at the edge of MCN for disaster relief or military operations
- New application scenarios in MCN: service models, security, charging, billing
- Bandwidth aggregation in multi-RAT MCN
- System capacity modeling and analysis for Multi-RAT MCN
- Cross-layer, cross-RAT collaborative algorithms in Multi-RAT MCN
- Network/RAT selection and multi-homing routing in Multi-RAT MCN

Submission

With regard to both the content and formatting style of the submissions, prospective contributors should follow the IEEE Wireless Communications guidelines for authors that can be found at <http://www.comsoc.org/wirelessmag/paper-submission-guidelines>.

Schedule

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