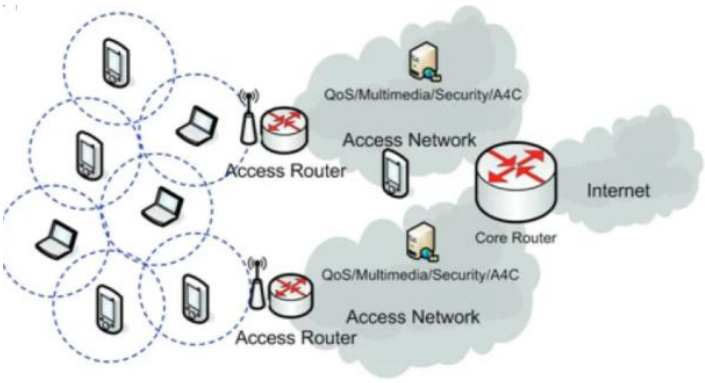
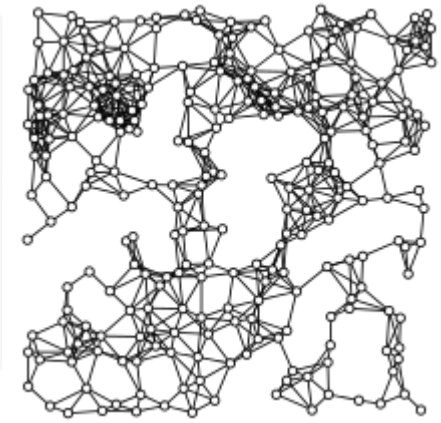
Color-Control Protocol for Mobile Ad-hoc NETwork (MANET) with Half-Duplex Multi-Channel Reception

Abstract:

Mobile Ad hoc NETwork (MANET) is a wireless network of mobile nodes characterized by rapidly changing connectivity and channel conditions. A central control or reliable infrastructure are also absent in this kind of network. The challenging conditions gave rise to many protocols both in the Network layer (such as Destination-Sequenced Distance Vector - DSDV) and the Link layer, Medium Access Control (MAC) in particular. One of the common standard MAC protocols is Carrier Sense Multiple Access / Collision Avoidance (CSMA/CA). Most of the protocols (the ones named before included) were designed for nodes working in a single channel (single frequency) and half-duplex regime – when a node transmits it cannot receive and vice-versa. In This project we will focus on a system where the nodes are still half-duplex, but have Multi-Channel Reception (MCR) i.e. when receiving a node can get several messages, one in each channel. Transmission is done in a single channel.

A new protocol – color control - has been suggested lately to use the advantages of MCR. The goal of this project is to implement the new protocol and conduct a comparative analysis to test its merit.





Goals:

- Learning Stage
  - MANET
  - MANET MAC protocols – CSMA/CA
  - MANET NET protocols – OLSR, DSDV
  - Color-Control protocol
  - A comprehensive analysis of MAC protocols for MANET https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8284553

- Define metrics for analysis and comparison

- Create a sterile simulation:
  - Topology changes
  - Traffic
  - Control plane
  - Scalable

- Analyze performance of the tested protocols
  - Color-Control
  - DSDV over CSMA/CA

Requirements:

Introduction to Networking (Must), Internet Networking (Optional), Algorithms (Optional)

Programming Language:
C++, Python, Matlab

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Collaborate with: