A module for Data Centric Storage in ns-3

Michele Albano, Tiago Cerqueira, Stefano Chessa
Data Centric Storage

- Storage of data on the sensors can contribute to saving sensors' communication energy.
- Each datum is identified by a key.
- Position of datum is a hash function of key: \( <x,y> = H(k) \).
- Data is routed using GPSR: greedy steps, and perimeter mode when no neighbour is closer to destination.
- Producer (P) sends data to point \( <x,y> \).
- Data are replicated on all nodes in the perimeter around \( <x,y> \).
- To retrieve data regarding \( k \), a consumer (C) sends a request to \( <x,y> = H(k) \).
- When datum is found it is returned to C.
Geographical Hash Tables (GHT):
• Data is stored on the whole perimeter around \( <x,y> = H(k) \)
• No control on the number of sensors saving the data

Q-NiGHT:
• Data is stored on the \( v \) sensors closest to \( <x,y> = H(k) \)
• Direct control on the QoS (number of sensors storing data)
• Proven to save energy w.r.t. GHT
Features of the DCS module

- Routing using the Enhanced GPSR protocol:
  - Greedy steps as long as it steps forward
  - Perimeter mode to get around holes/store data in GHT
    - Heuristics to decide to go clockwise / counter-clockwise

- Data Centric Storage using
  - GHT
  - Q-NiGHT

- Implemented as an Application layer
  - Since it is the port of a ns-2 Agent

- Basic visualizer
  - Written in c#, not part of ns-3