Distributed Monitoring for MANETs

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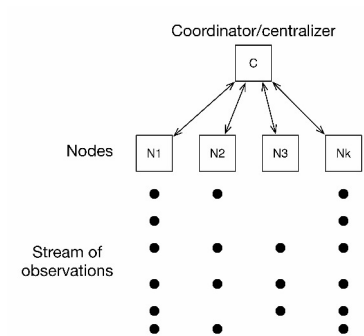[2]LRI-CNRS
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TAROT, 2016

Outline

Monitoring

- A number of observers making observations, and wish to work together to compute a function of the combination of all their observations.[1]

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[1] Graham Cormode. "The continuous distributed monitoring model". In: *ACM SIGMOD Record* (2013).
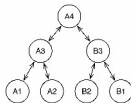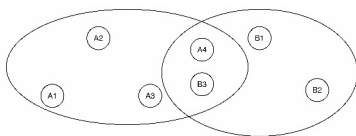
- Centralized[2]

Coordinator/centralizer

[2]Nadia Battat, Hamida Seba, and Hamamache Kheddouci. "Monitoring in mobile ad hoc networks: A survey". In: *Computer Networks* (2014).

Monitoring Types
Decentralized

- Decentralized [3][4]
    - Tree based
    - Gossip based

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[3]Nadia Battat, Hamida Seba, and Hamamache Kheddouci. "Monitoring in mobile ad hoc networks: A survey". In: *Computer Networks* (2014).

[4]Dominik Stingl, Christian Gross, Karsten Saller, et al. "Benchmarking decentralized monitoring mechanisms in peer-to-peer systems". In: *Proceedings of the 3rd ACM/SPEC International Conference on Performance Engineering*. 2012.

Distributed Monitoring
State of the art

- Mobi-G[5]
  - Relies on a gossip approach to communicate, and other mechanism to monitor a property
  - Low performance in large spatial networks regarding node range and node mobility

- BlockTree[6]
  - Relies on a location aware hierarchical approach, two stage mechanism to monitor a property
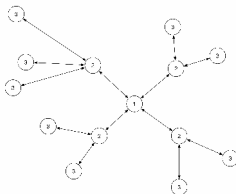 - High power consumption for large networks or high node density

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[5]Dominik Stingl, Reimond Retz, et al. "Mobi-G: Gossip-based monitoring in MANETs". In: *2014 IEEE Network Operations and Management Symposium (NOMS)*. 2014.

[6]Dominik Stingl, Christian Gross, Leonhard Nobach, et al. "BlockTree: Location-aware decentralized monitoring in mobile ad hoc networks". In: *Local Computer Networks (LCN), 2013 IEEE 38th Conference on* 2013.

- The medium can be saturated by the monitor mechanism itself, there is a need of an optimal usage of the medium
- Aggregate efficiently the monitored properties, in a way that the resources are used accordingly
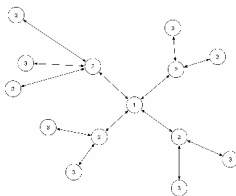- Rely on the mechanism already developed by the opportunistic routing paradigm[7]

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[7]Nessrine Chakchouk. "A Survey on Opportunistic Routing in Wireless Communication Networks". In: *IEEE Communications Surveys & Tutorials* (2015).

- Add appropriate metrics to the inter-exchange of information[8]
- Define new metrics that help directly to the monitoring process
- Propose a hybrid algorithm that combines the best properties of a gossip and hierarchical approach
- Make it scalable for large spatial networks and high node mobility

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[8]Nessrine Chakchouk. "A Survey on Opportunistic Routing in Wireless Communication Networks". In: *IEEE Communications Surveys & Tutorials* (2015).

QA &&/|| Merci :)

📄 Nadia Battat, Hamida Seba, and Hamamache Kheddouci. "Monitoring in mobile ad hoc networks: A survey". In: *Computer Networks* (2014).

📄 Nessrine Chakchouk. "A Survey on Opportunistic Routing in Wireless Communication Networks". In: *IEEE Communications Surveys & Tutorials* (2015).

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Dominik Stingl, Reimond Retz, et al. "Mobi-G: Gossip-based monitoring in MANETs". In: *2014 IEEE Network Operations and Management Symposium (NOMS)*. 2014.