



# **CENTRE D'INNOVATION EN TELECOMMUNICATION & INTEGRATION DE SERVICES**

## **Evaluation of the BRuIT protocol**

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*Architectures de Réseaux de Services*



# **ARÈS**

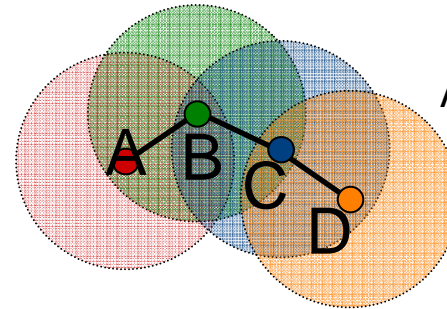




# Context: QoS for ad hoc networks

## ■ Ad hoc networks

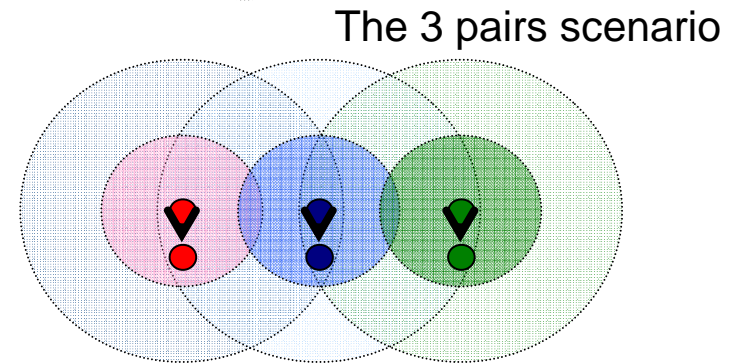
- IEEE 802.11
- Medium overloaded
  - Unpredictable use of the radio medium



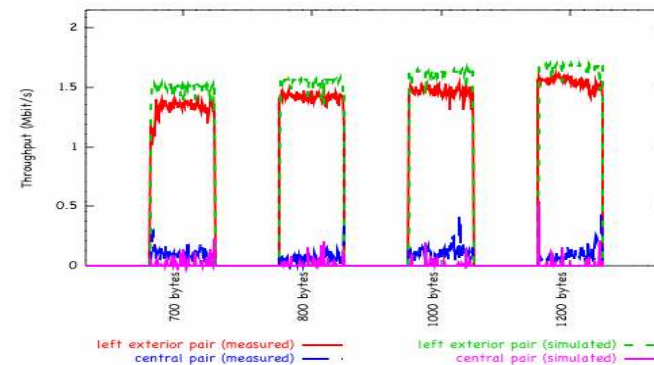
Ad hoc network

## ■ QoS for ad hoc networks

- Mechanisms to provide guarantees
- BRuIT [Chaudet and Guérin Lassous, EW 2002]
  - Bandwidth Reservation under InTerferences



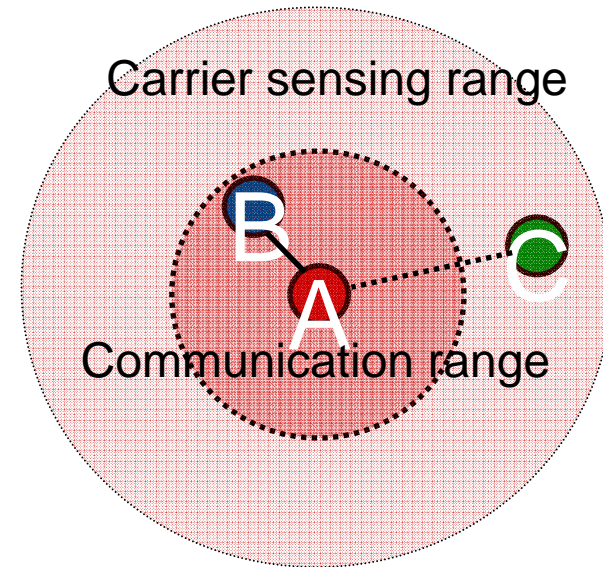
The 3 pairs scenario





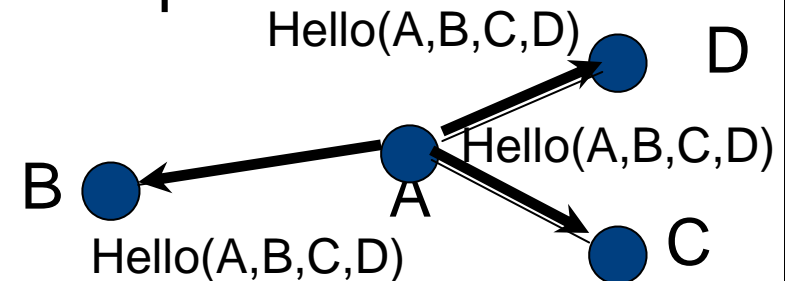
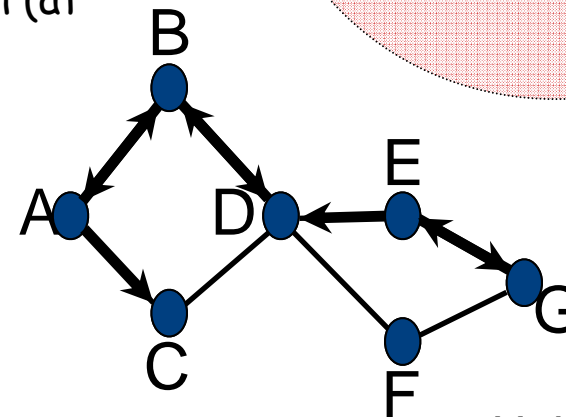
# BRuIT

- Share of the medium with 802.11
  - Carrier sensing range
  - Twice the communication range
    - Simulation / experimentation (at 2Mb/s)



- Principles of BRuIT

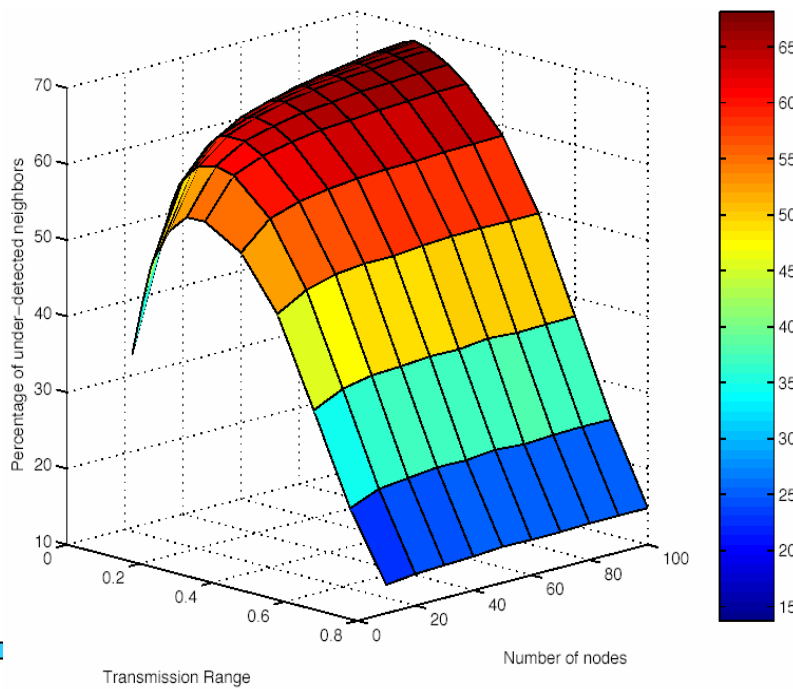
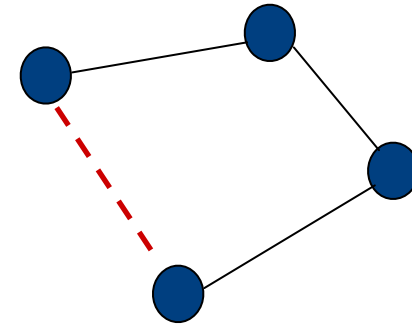
- Routing + reservation
  - On-demand: AODV-like
  - Flooding of a request
  - Admission control
  - Reply on the reverse path + reservation
- Admission control
  - Used bandwidth per node: all the traffic on the 2-hop neighborhood



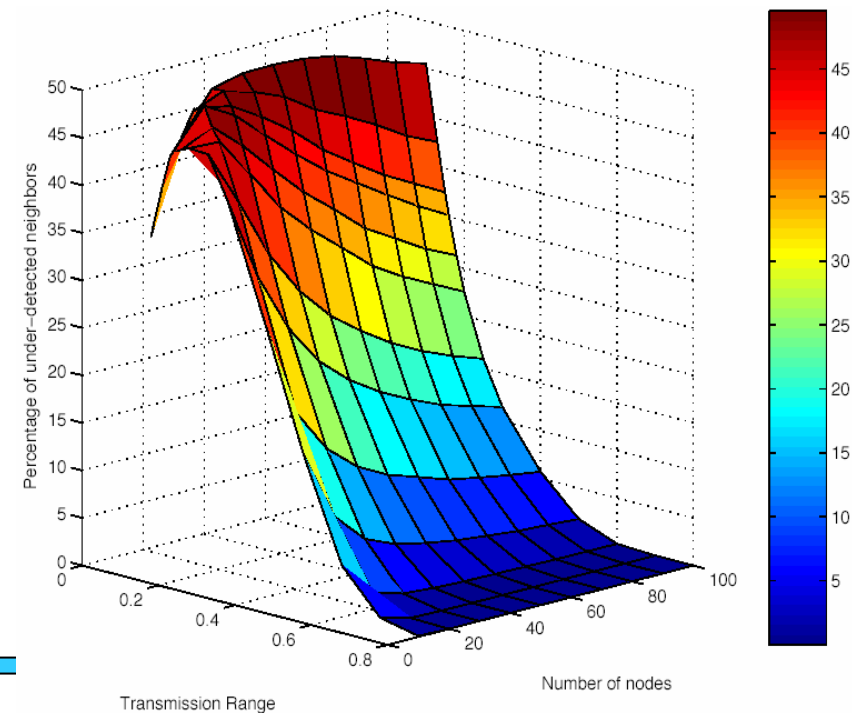


# Why two hops?

- Two hops  $\neq$  twice the communication range
- How many nodes are undetected?
  - Random geometric graphs



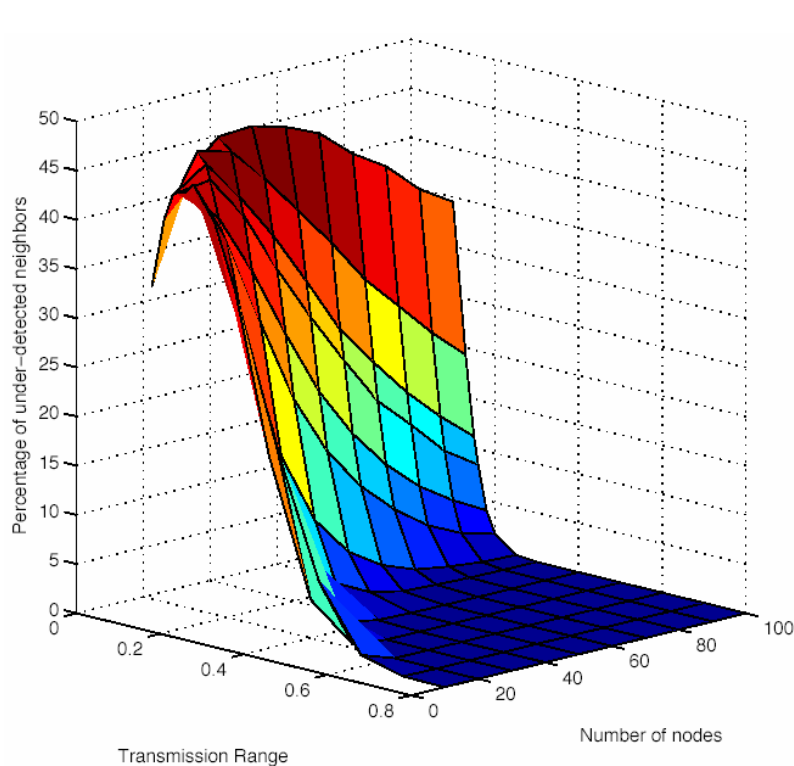
One hop - Max: 70 %



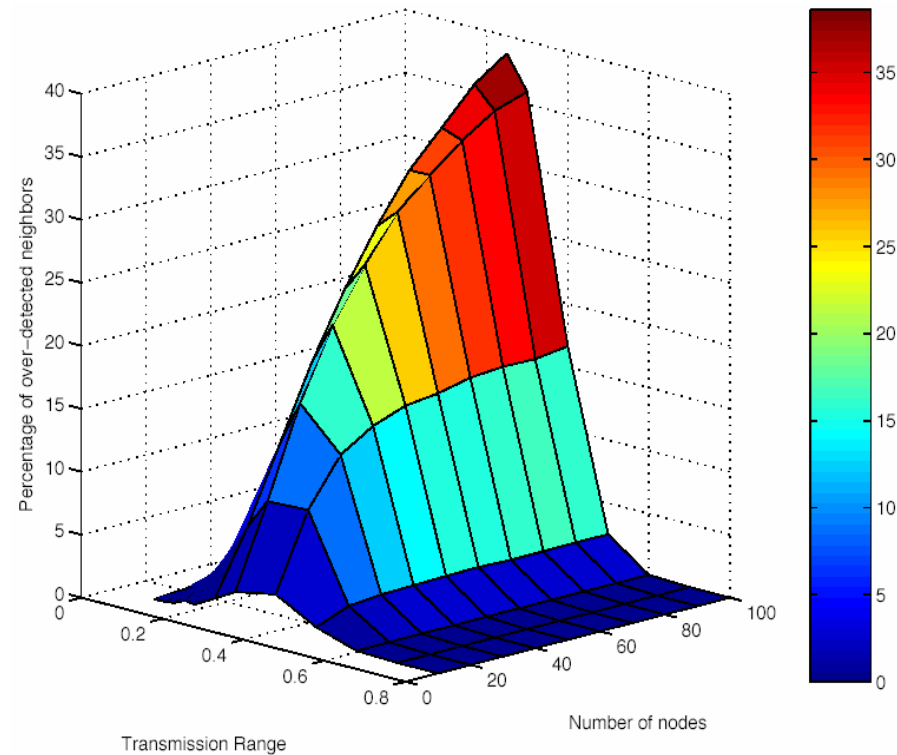
Two hops - Max: 50 %



# Why not three hops?



undetected  
Max: 48 %



“Over-detected”  
Max: 40%



# Evaluation of BRuIT

- Simulation
  - NS-2 version 2.27
  - Random geometric graphs from 10 to 100 nodes
  - 5 to 30 flows of 80kbit/s
  - Average over 100 simulations
  - Comparison with AODV
    - Impact of admission control
    - Impact of guarantees
- Admission rate of BRuIT
  - Between 50% and 60% compared to AODV
  - The difference increases with the network load
- Establishment time
  - Around 100 ms
  - Between 20% and 40% slower than AODV



# Evaluation of BRuIT

- Route length
  - Between 50% and 100% longer than the shortest path (AODV 10% longer than the shortest path)
  - Load balance with BRuIT
  
- Signaling load
  - Comparable
    - BRuIT: Hello packets
    - AODV: Route reconstruction
  - BRuIT more stable
  
- All the curves are available in the paper