Introduction

- Wide-spread sensor networks cater to different types of data
  - All data not equally important
    - Data Prioritization for service differentiation

- Congestion exists
- Congestion is a larger problem with flood of data
- Routing dynamics leads to congestion in an area - conzone

Solution Overview

- Presence of congestion in tree based routing
- Presence of low priority data aggravates congestion
- Congestion drawbacks
  - Service degrades, some nodes may die sooner, only sub-optimal paths may be available, network partitioning

- Primary solution – Priority Queues
  - Problem - High priority data in one node still competes with low priority data in another

Congestion Aware Routing (CAR)

- Data prioritization
- Dynamic conzone discovery and destruction
  - From critical area to sink
  - From sink to critical area
- Differentiated routing

Differentiated Routing

- High priority packets are generated inside conzone and routed inside
- Low priority packets generated inside conzone are routed out
- Low priority packets generated outside conzone stay outside

Improvements

- CAR+ : Eliminates low priority data inside conzone
- CAR++ : Eliminates low priority data inside conzone and around critical area

Routing Views

- AODV
- CAR
- CAR+
- CAR++

Results

- Higher high priority packet delivery ratio
- Lower average delivery delay for high priority packets
- Lower jitter for high priority packets (supports multimedia applications)

- Lower maximum energy consumed
- Fewer average hops traveled for high priority packets

Varying Communication Range

(a) Varying Communication Range

(b) Varying Low Priority Data Rate

(c) Varying High Priority Data Rate

90th percentile Delivery Delays (Inter-Arrival Delay) [s]