

VBVA: Vector-based Void Avoidance Protocol for Underwater Sensor Networks

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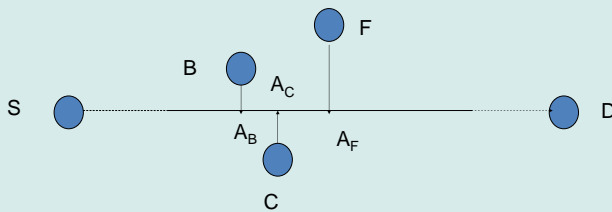
The Problem: void avoidance in underwater sensor networks

- Greedy policy adopted in geo-routing may not work due to routing voids
- Voids in UWSNs: volatile, three-dimensional, and could be mobile
- Our objective: design efficient void avoidance protocol for UWSNs

Proposed Solution : Vector-based Void Avoidance (VBVA)

- The Main Idea and Techniques

- Detecting void on demand
- Two mechanisms to avoid voids: Vector-Shift and Back-Pressure
- Self-center adaptation algorithm to reduce forwarding nodes to save energy



Vector-Shift

Void Detection

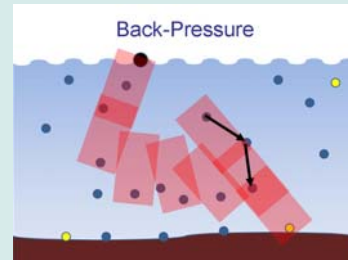
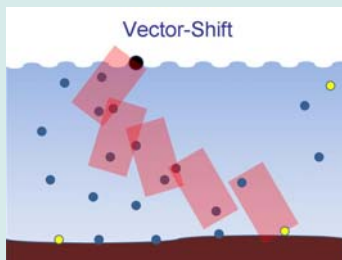
S and D: start point & end point of forwarding vector

$$A_F > A_C > A_B \rightarrow F \text{ is void node}$$

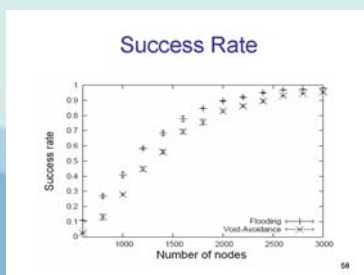
Back-Pressure

- Void node broadcasts a request to change forwarding vector
- Each neighbor outside forwarding pipe forwards packet with a new vector started

- When void node has no next-hop even after shifting vector, it generates a back-pressure packet
- Upon a back-pressure, packet forwarder shifts vector if not yet; otherwise generates a backpressure



Preliminary Results



VBVA can effectively and efficiently handle voids in mobile network as well as mobile voids

