Networking for Sensor Nets (I)

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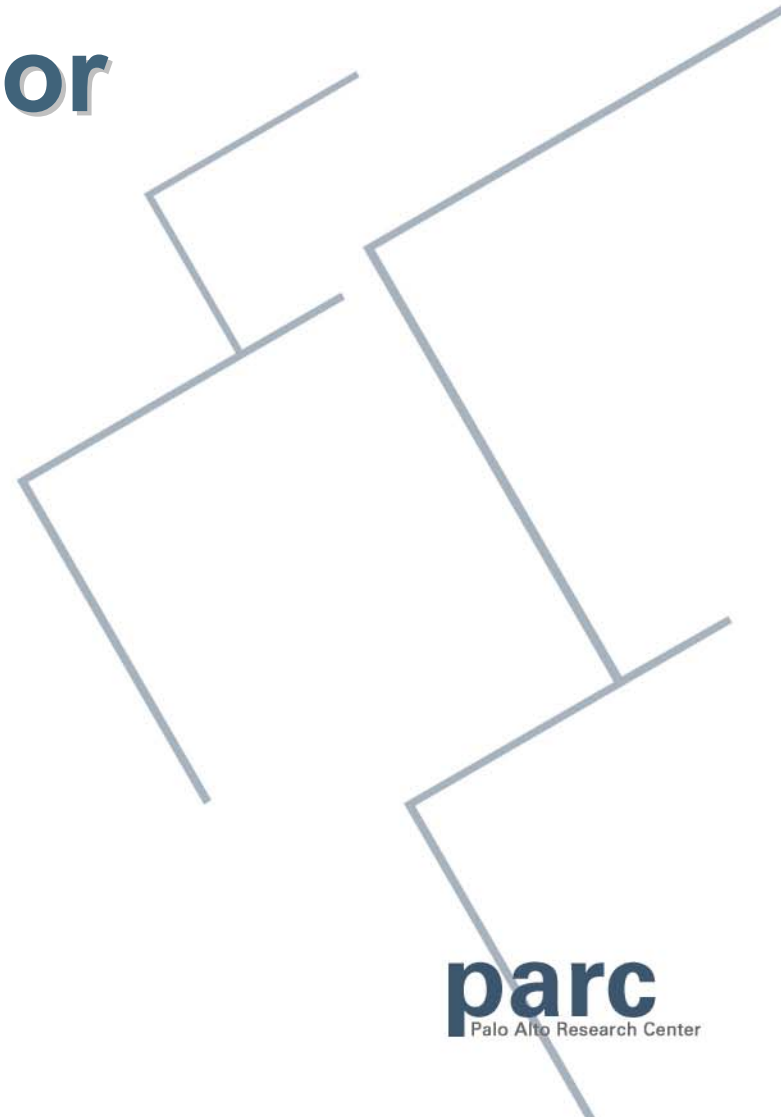

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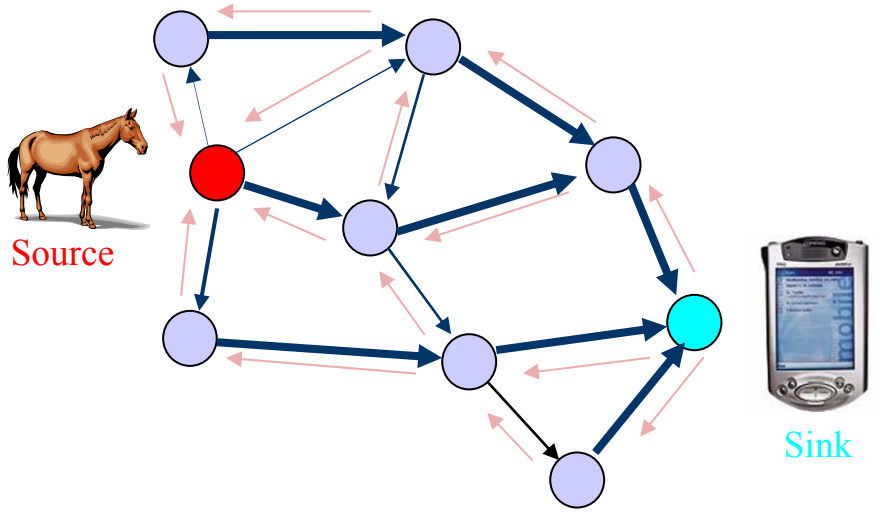
Where is the data and how to move it to where it will be needed?



Key questions:

- How should the information obtained by the sensor net be named and routed to where it is needed?
- How should sensors collaborate in a way that scales gracefully to large sensor nets?
- How can the system conserve resources, adapt to changing conditions in the environment, and tolerate node failures?

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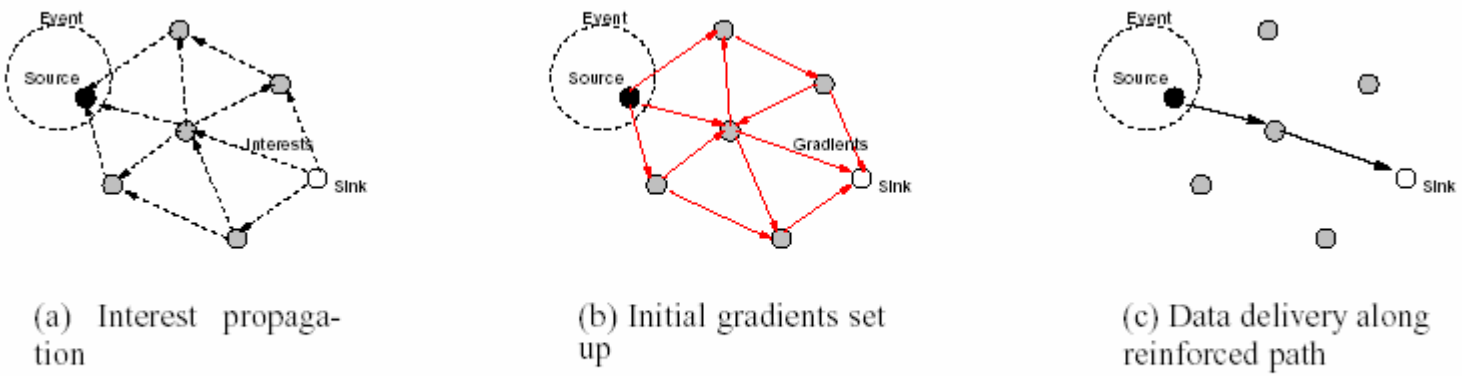
Directed diffusion: data centric routing [Intanagonwiwat00, heidemann01]

- Name data (not nodes) with physical attributes
  - data type, time, location of node, SNR, etc
- Sources publish data, sinks subscribe to data
  - diffuse requests and responses across network using application driven routing (e.g., geo sensitive or not)
  - optimize path with reinforcement



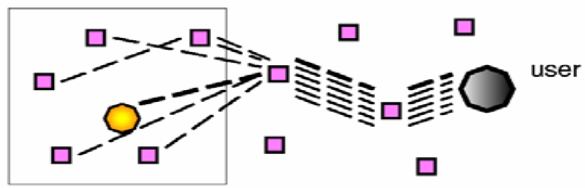
(a) Interest propagation

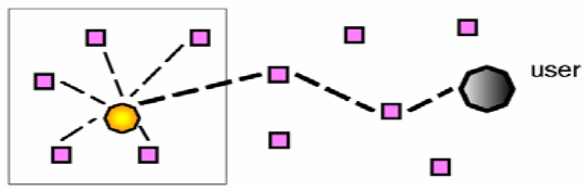
(b) Initial gradients set up

(c) Data delivery along reinforced path

Figure 1: A simplified schematic for directed diffusi

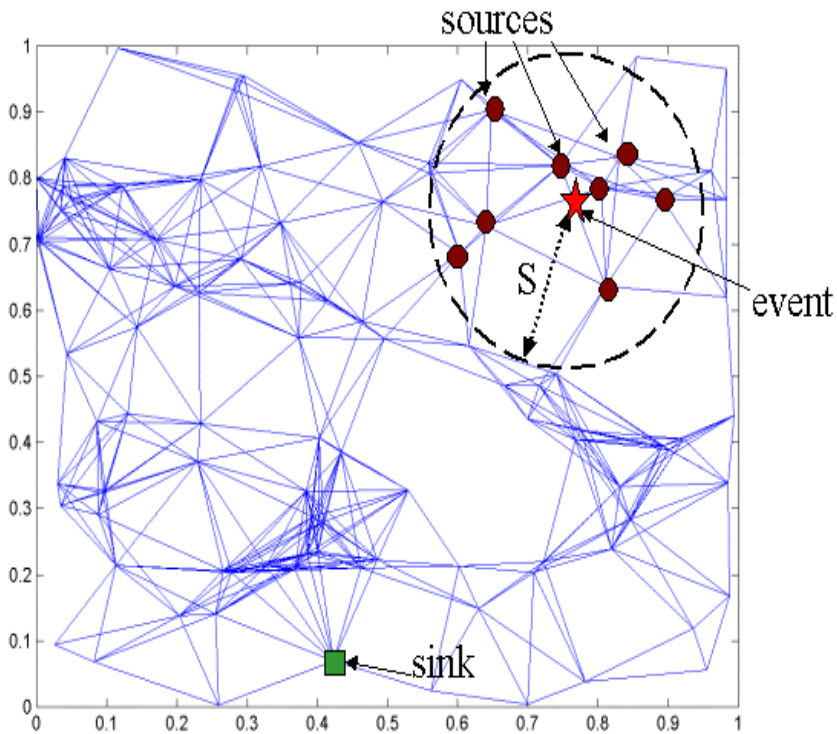
- Support in-network aggregation and processing
  - nested queries reduce network overhead





Building efficient trees for data centric routing [krishnamachari02a]

- Aggregation tree: On a *general* graph if k nodes are sources and one is a sink, the aggregation tree that minimizes the number of transmissions is the minimum Steiner tree. NP-complete….Approximations:
  - Center at Nearest Source (CNSDC): All sources send through source nearest to the sink.
  - Shortest Path Tree (SPTDC): Merge paths.
  - Greedy Incremental Tree (GITDC): Start with path from sink to nearest source. Successively add next nearest source to the existing tree.



Event-radius model

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