

## State-centric Programming

State centric programming acts as an intermediary between distributed execution of sensor network applications and application developer's model of physical phenomena. It makes use of collaboration groups in order to retrieve common patterns in communication protocols and resource allocation of a node present in the network. It also takes into account signal processing and control thread wherein developers write algorithms for performing updations and retrieval activities on a state. Besides this it also makes use of other groups like geographically constrained group, N-hop neighborhood group, publish/subscribe group.

### (i) **Geographically Constrained Group(GCG)**

A geographically constrained group is located in a predescribed geographical region. This group generally consists of all the sensor nodes as its members. The scope of the members is limited upto the specified region. The sensor nodes can sense the phenomenon feasibly as the physical signals from the target point propagates only upto a limited geographic extent.

The communication among the members of this group is supported by the protocols namely Geocasting, GEAR, and Mobicast. These protocols allow the communication even in the presence of communication holes within the geographic region. A GCG may led by a leader who is responsible to gather the information from other members of a groups.



## (ii) **N-hop Neighborhood Group (N-HNG)**

N-hop neighborhood group focuses on the communication topology rather than geographical extent. The communication topology is implemented by using hop counts to control the group membership. In this group, the nodes involved in  $n$  communication hops are considered as the group members. The scope of the members of this group is determined by the local broadcasting as it uses hop counts instead of Euclidean distances.

The N-HNG consists of an anchor node which is the leader of all nodes. The N-HNG group forms a tree structure in which the anchor node is at the root. The other members of the group are at the leafy positions of the tree structure. The root is responsible for optimizing the communication. The computation may be distributed by decomposing the operations of root among each node.

## (iii) **Publish/Subscribe Group**

Publish subscribe group consists of producers and consumers. The producers provide the data and services as required by the consumers while the consumers gain the benefit of data and services provided by producers. The producers and consumers communicate with each other by the way of network protocols (eg: directed diffusion) which has rendezvous points or directory servers.