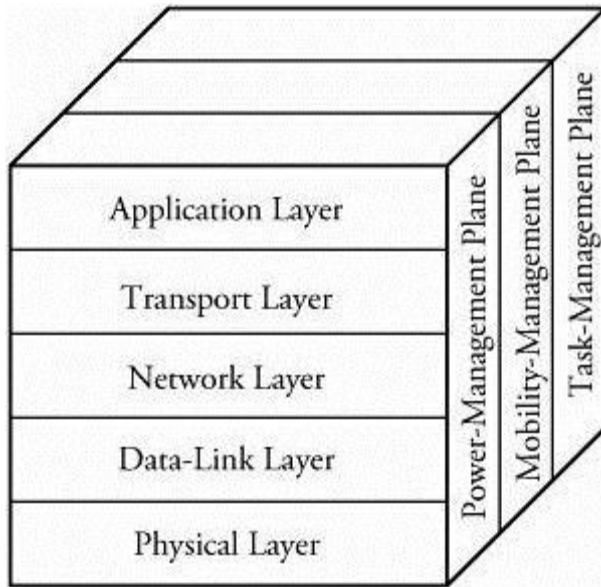


PROTOCOL STACK IN SENSOR NETWORK

The algorithms developed for wireless ad-hoc networks cannot be used for sensor networks, for several reasons. One is that the number of sensor nodes is typically much more than in a typical ad-hoc network, and sensor nodes, unlike ad-hoc nodes, are prone to permanent failure. In addition, sensor nodes normally use broadcast rather than point-to-point communication with its limited power and memory. Unlike computer networks, sensor nodes do not have global ID, since a typical packet overhead can be too large for them.

[Figure 8.2](#) shows protocol architecture for sensor networks. The protocol stack combines power efficiency and least-cost-path routing. This protocol architecture integrates networking protocols and power through the wireless medium and promotes cooperative efforts of sensor nodes. The protocol stack consists of the physical layer, data-link layer, network layer, transport layer, and application layer, backed by a power-management plane, mobility-management plane, and task-management plane. The physical layer is responsible for robust modulation, transmission, and receiving signals. Media access control (MAC) at the data-link layer must minimize packet collision with neighboring nodes, as power is a restricted factor. The network layer routes packets provided by the transport layer. The application layer uses software for preparation of data on an event. The power-management plane monitors the sensor's power level among the sensor nodes and manages the amount of power a sensor node has used.

Figure 8.2. Sensor network protocol stack architecture



Most of the sensor network routing techniques and sensing tasks require an accurate knowledge of location. Thus, a sensor node commonly has a location-finding system. A mobilizer may sometimes be needed to move sensor nodes to carry out assigned tasks. Sensor network routing protocols must be capable of self-organizing. For these purposes, a series of energy-aware MAC, routing, and clustering protocols have been developed for wireless sensor networks. Most of the energy-aware MAC protocols aim to either adjust the transmission power or keep transceivers off as long as possible.