

We initiate the study of network monitoring algorithms in a class of hybrid networks in which the nodes are connected by an external network and an internal network (as a short form for externally and internally controlled network). While the external network lies outside of the control of the nodes (or in our case, the monitoring protocol running in them), the internal network is under the control of the nodes. An external network can be a physical network while the internal network can be an overlay network. As an example, consider a group of users with mobile devices having access to the cell phone infrastructure. While the network formed by the WiFi connections of the devices is an external network (as its structure is not necessarily under the control of the monitoring protocol), the connections between the devices via the cell phone infrastructure represent an internal network (as it can be controlled by the monitoring protocol). We present scalable distributed algorithms for our new network model that efficiently monitor the number of edges, the average node degree, the clustering coefficient, the bipartiteness, and the weight of a minimum spanning tree. Their performance bounds demonstrate that monitoring the external network state with the help of an internal network can be done much more efficiently than just using the external network, as is usually done in the literature.