CLAIMS

What is claimed is:

1. A method of operating a node, comprising:

under control of circuitry of the node configured to execute the method:

identifying a particular multicast group to join, based on input from an application running on the node;

configuring a multicast report, the multicast report including the particular multicast group indicated by the ~~received request~~input;

periodically refreshing the multicast report to include groups of interest to applications running on the node;

overhearing multicast reports sent by nodes within transmission range of the node; and

periodically transmitting the multicast reports according to a frequency of transmission that is based on a number of the overheard multicast reports that request to join multicast groups indicated by the periodically transmitted multicast report.

2. The method of claim 1, additionally comprising:

receiving multicast reports from downstream nodes; and

periodically refreshing the multicast report to additionally include groups of interest to the downstream nodes as indicated by the received multicast reports.

15. One or more non-transitory computer-readable media storing computer-executable instructions that, when executed, cause one or more processors to perform acts comprising:

receiving information at a node including a leave packet or evidence of a broken link associated with a node downstream of the node;

sending a query to other nodes downstream of the node, the query sent in response to the received information and asking for a report of desired groups associated with multicast data;

transmitting subsequent queries according to a rate based on a density of multicast receivers and multicast forwarders that are downstream from the node; and

expiring the multicast forwarding state in the node if a period of time following the query, or the subsequent queries, exceeds a threshold without receipt of a report, the expiring of the forwarding state indicating that there is no need to forward multicast data for a multicast group.

16. The one or more non-transitory computer-readable media of claim 15, wherein sending the query to the node downstream of the node comprises:

sending the query based on an initial probability that a link to nodes downstream of the node is broken;

counting reports sent in response to the sent query; and

reducing the initial probability for application to queries sent subsequent to the sent query, wherein an amount of a reduction in probability is based on a number of the counted reports.

17. The one or more non-transitory computer-readable media of claim 15, wherein sending the query to the node downstream of the node comprises:

sending the query based on an initial probability;

counting reports sent in response to the sent query; and

reducing the initial probability of queries sent subsequently to the sent query, wherein the reports counted are associated with a factor by which the initial probability is reduced, and wherein the factor does not reduce the initial probability below a minimum level.

18. The one or more non-transitory computer-readable media of claim 15, additionally including instructions to cause one or more processors to perform acts comprising:

configuring a multicast report, the multicast report including at least one group for which data is desired within a multicast data packet;

periodically refreshing the report to include all multicast groups of interest to applications running on the node; and

periodically transmitting the report upstream at a frequency based on a number of overheard reports during a period of time and based on groups included in the overheard reports.

19. The one or more non-transitory computer-readable media of claim 15, additionally including instructions to cause one or more processors to perform acts comprising:

configuring a multicast report, the multicast report including at least one group for which data is desired by an application running on the node and at least one group for which data is desired by at least one downstream node;

overhearing reports sent by other nodes, the overheard reports requesting membership in the group for which data is desired by the application running on the node and requesting membership in the group for which data is desired by the at least one downstream node; and

transmitting the multicast report to a parent node of the node, the transmitting based on a frequency of the overheard reports and based on groups included in the overheard reports.

20. The one or more non-transitory computer-readable media of claim 15, additionally including instructions to cause one or more processors to perform acts comprising:

measuring a number of copies of a multicast data packet that are overheard, the multicast data packet being indicated by the multicast report;

retransmitting the multicast data packet at least once if indicated by a multicast forwarding state of the node, the retransmitting sending the multicast data packet at least to the node downstream of the node;

retransmitting the multicast data packet a number of additional times based on the number of copies of the multicast data packet overheard; and

increasing a number of upstream nodes in forwarding states if the number of copies of the multicast data packet overheard is below a threshold number, the increased number of forwarding states indicating increased numbers of nodes forwarding multicast data groups.