Report

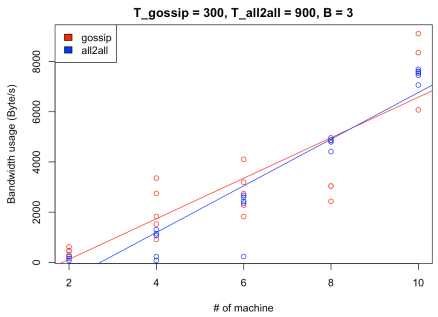
The design principle of our failure detector is gossip style heart beating and all to all heart beating. For gossip style heartbeating, each node has a initial membership list which only contains itself. Then after join the group, the node will send its membership list to introducer node and introducer node will merge the incoming membership list and update the membership with the newer heartbeat. Each node will receive and send full membership list from each other. When the difference of localtime and the heatbeat of a node is greater than 4800ms, the node will first mark the node with as failed and then after 3000ms the node will delete the node from its membership list.Each node will round-robin select b nodes from n-1 nodes and send full membership list to them.

For all to all style heartbeating, each node will only send memebrship for itself for each period of time. The merge principle is the same as gossip style heartbeating but each node will send message to all nodes except itself.

1.

Gossip	2	4	6	8	10
mean	462	2074	2827.2	3648	7741.8
std	108.89	974.09	877.13	1137.46	1125.78

all2all	2	4	6	8	10
mean	185.6	766.4	2057	4769	7467.6
std	68.98	566.6	1026.47	210.32	242.37

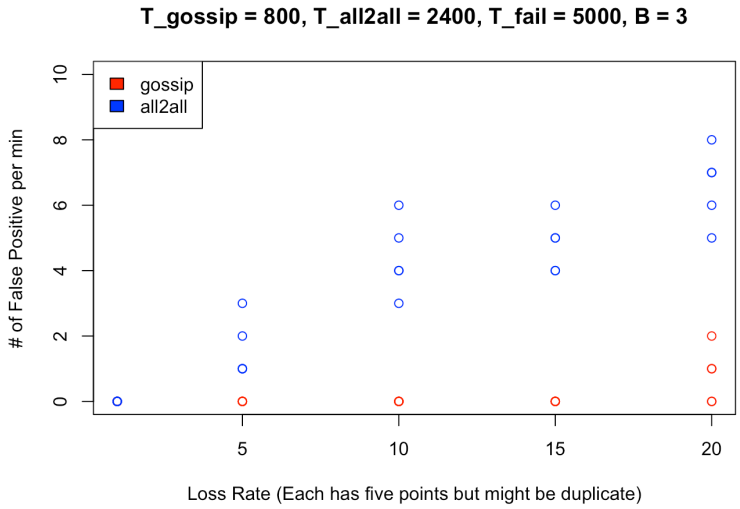


Since every node in a gossip style system sends its full membership list, whereas every node in an all2all style system sends only itself, then gossip style system has some repetitve information. Therefore, gossip needs larger bandwidth than all2all.

2.

all2all	1	5	10	15	20
mean	0	1.6	4.4	4.8	6.6
std	0	0.89	1.14	0.836	1.14

Gossip	1	5	10	15	20
mean	0	0	0	0	0.8
std	0	0	0	0	0.84



Since all to all only send information about itself but gossip can send information about itself and its "friends", which means the information of a node dies out if all the nodes lost the message.