Project 2 Report

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1   Implementation without the failure model

1.1   Gossip Algorithm

From the plots in Figure 1, it is clear that full network gives the best convergence time. Then comes the imperfect grid, grid and line respectively. All the convergence times are O(log(N)).

1.2   Push-Sum Algorithm

From the plots in Figure 2, it is clear that full network and imperfect grid give the best and almost similar convergence time. Then comes the grid and line respectively. All the convergence times are again O(log(N)).

2   Implementation with failure model

In a real network, nodes are likely to fail due to various reasons like long running time, heavy workload, network congestion, or even temperature. To emulate this, we implement a failure model in our network. Every after a short time period, say τ, we shut down a node, but keep the rest of our system running. Clearly this is only an approximation but we feel that it suffices for our experiment. In our model, τ is a parameter that reflects how likely machines are down. We set it to 250ms, but it can be easily adjusted according to different simulation purposes. Figures 3 & 4 show the plots for Gossip and Push-Sum algorithm respectively.
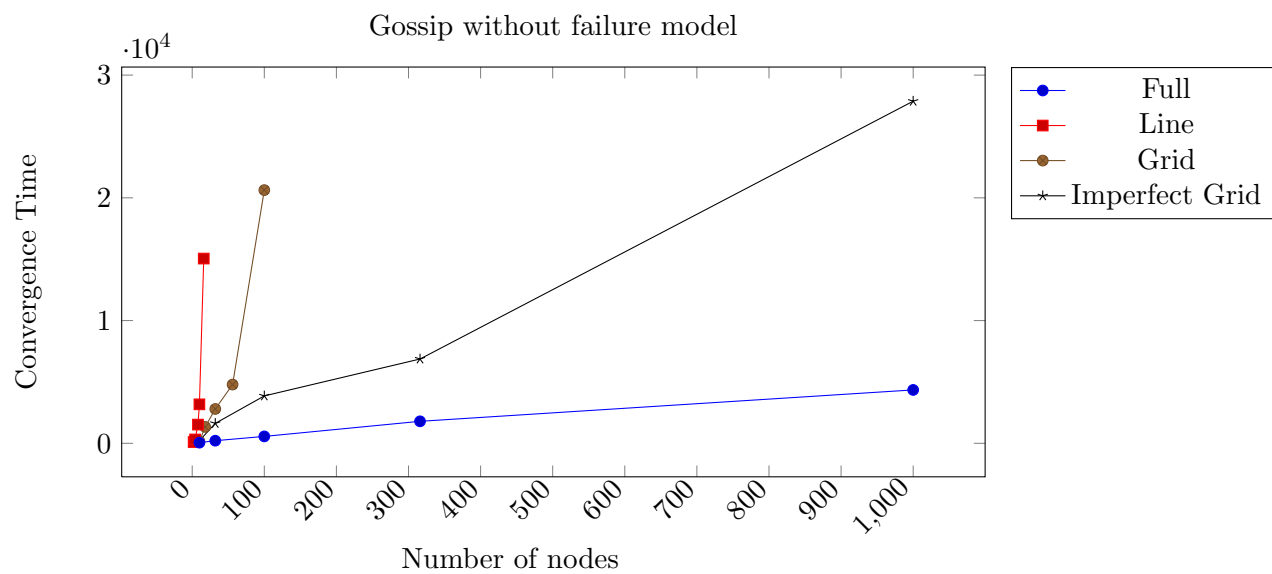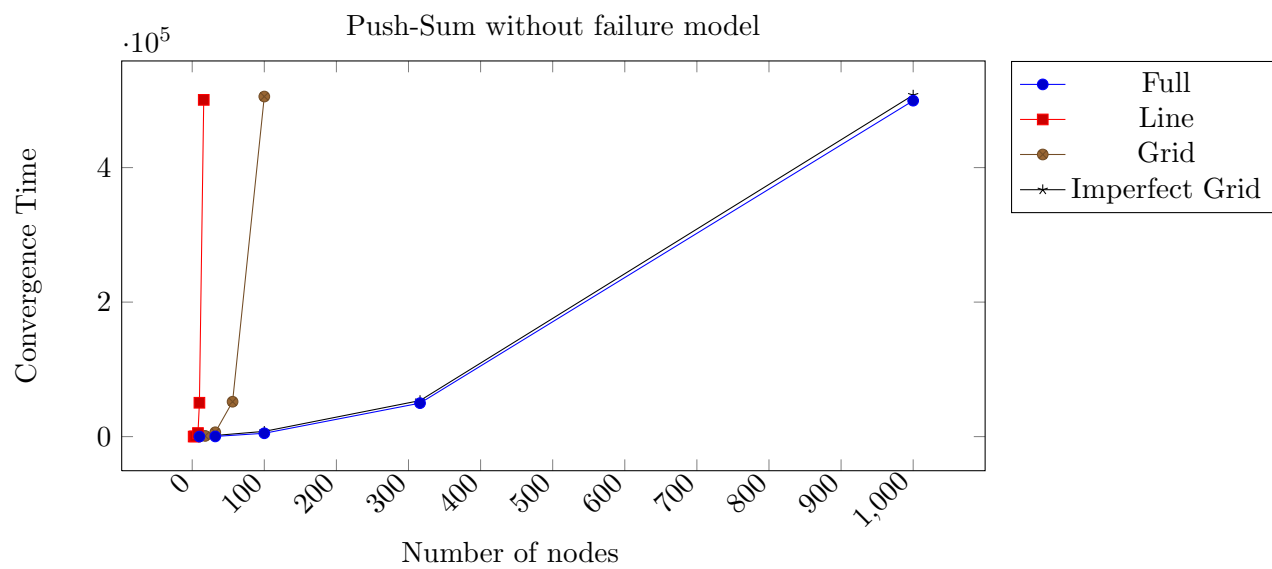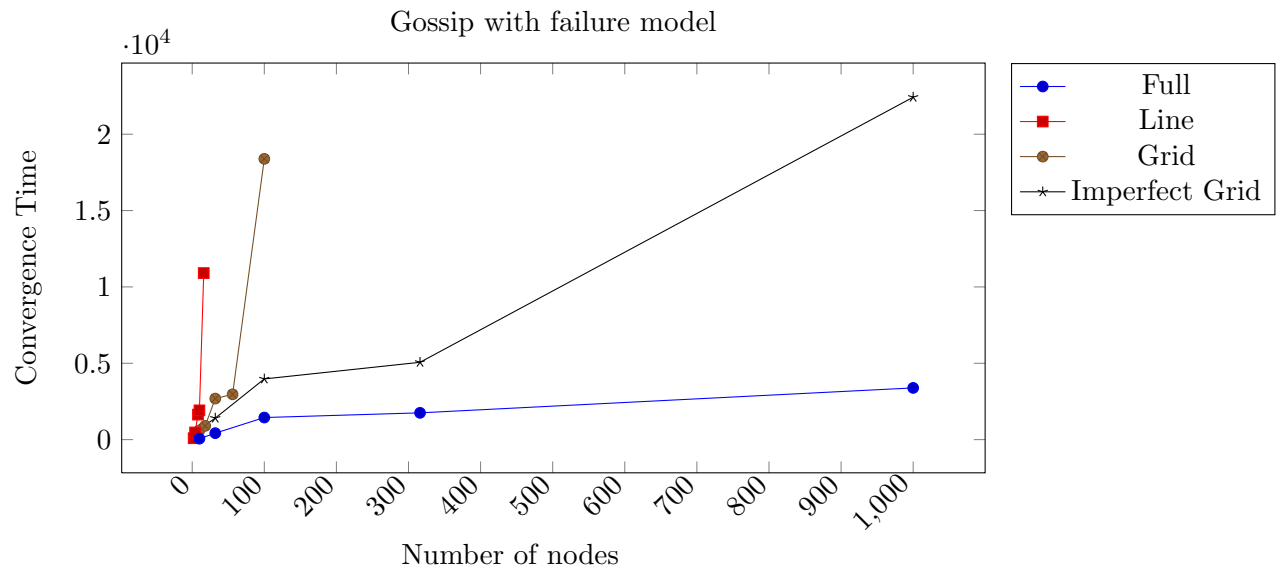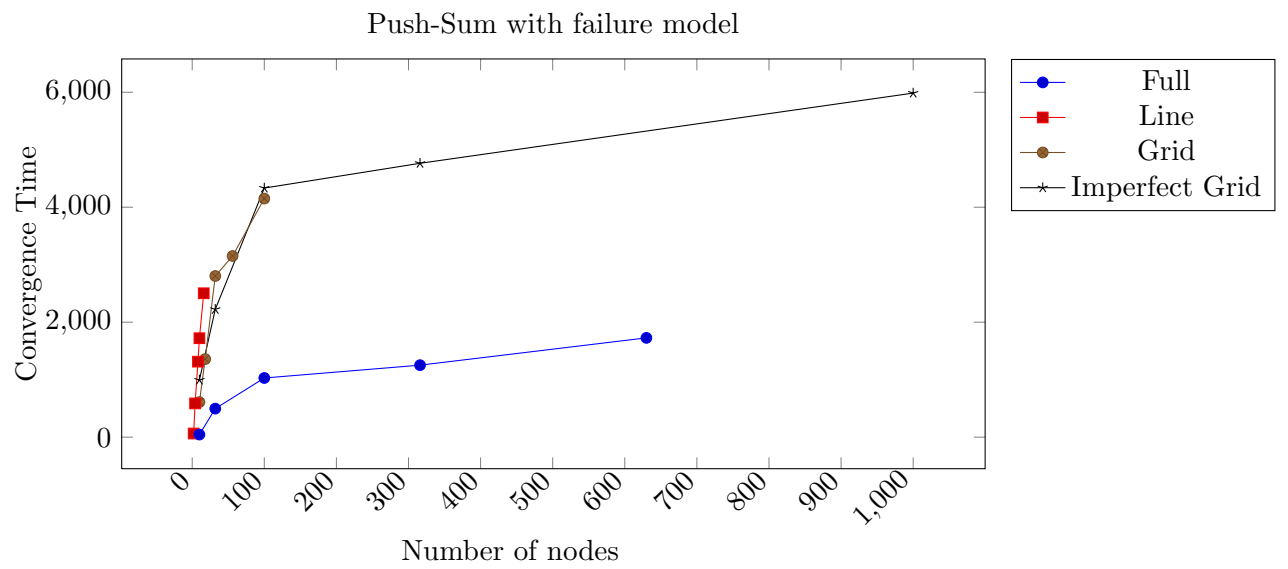
Figure 1

Figure 2

Figure 3

Figure 4

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