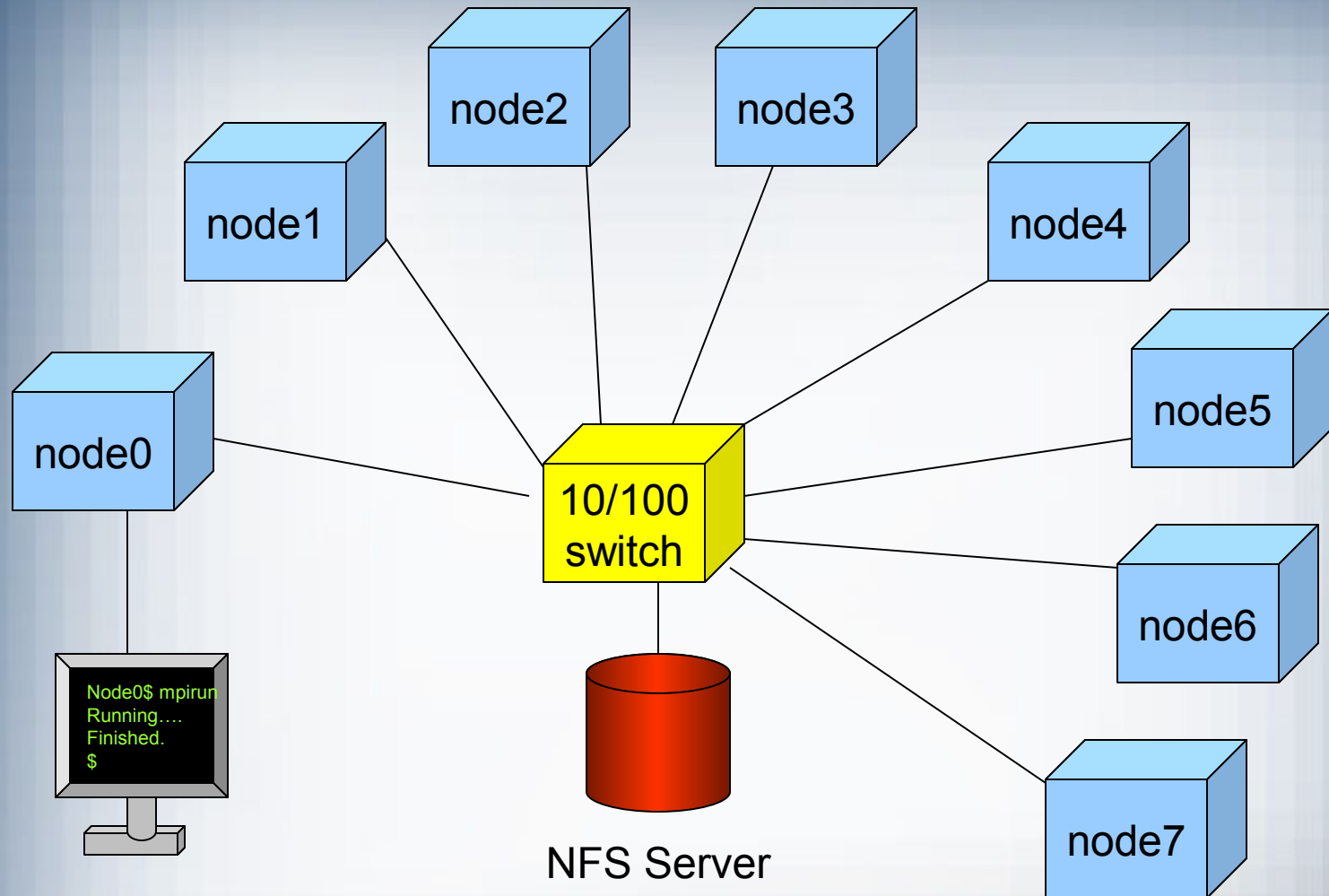


MPI Cluster Benchmark

Using Conway's
“Game of Life”

Setup



Algorithm

Initialize()

Start_Timer_1()

Read_file()

Start_Timer_2()

Loop from 1 to k

 Exchange_borders()

 Cellular_Automata()

EndLoop

Stop_Timer_2()

Write_file()

Stop_Timer_1()

Algorithm

```
CellularAutomata() {  
  for X := 1 to MaxX  
    for Y := 1 to MaxY  
      foreach neighbor(X,Y)  
        count += neighbor  
      endfor  
      Decision(count)  
    endfor  
  endfor  
}
```

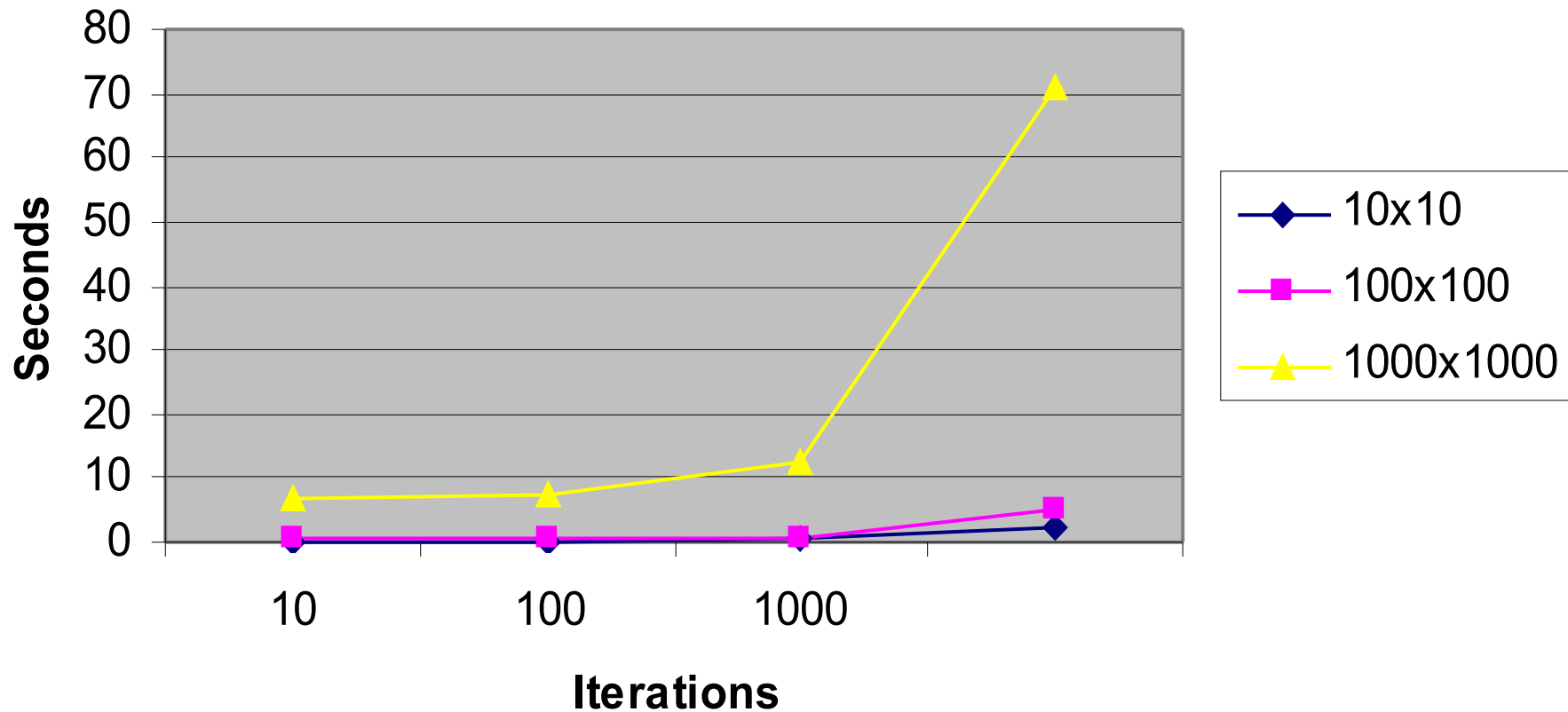
Runtime – More Data = More Crunch

1-processor



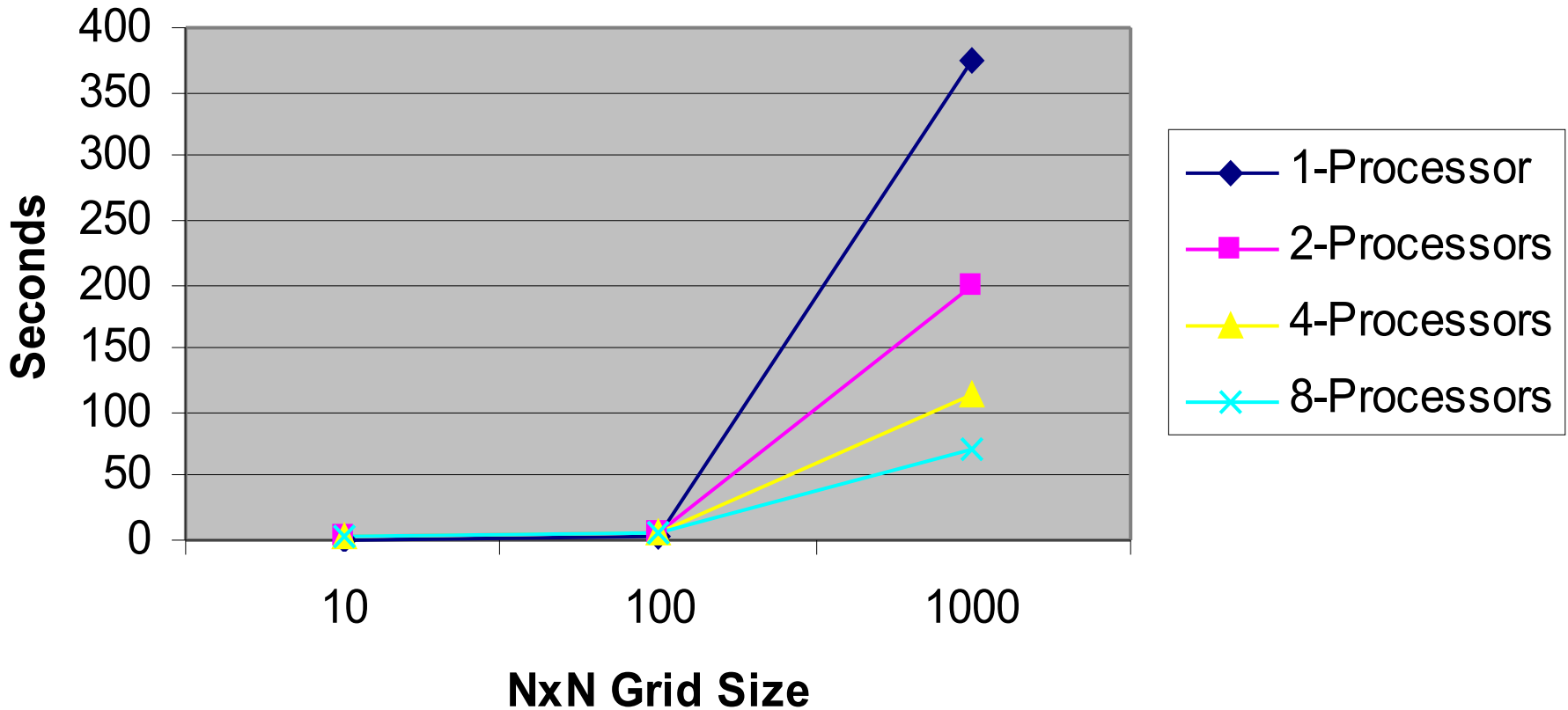
Runtime – Same Principle

8-Processors



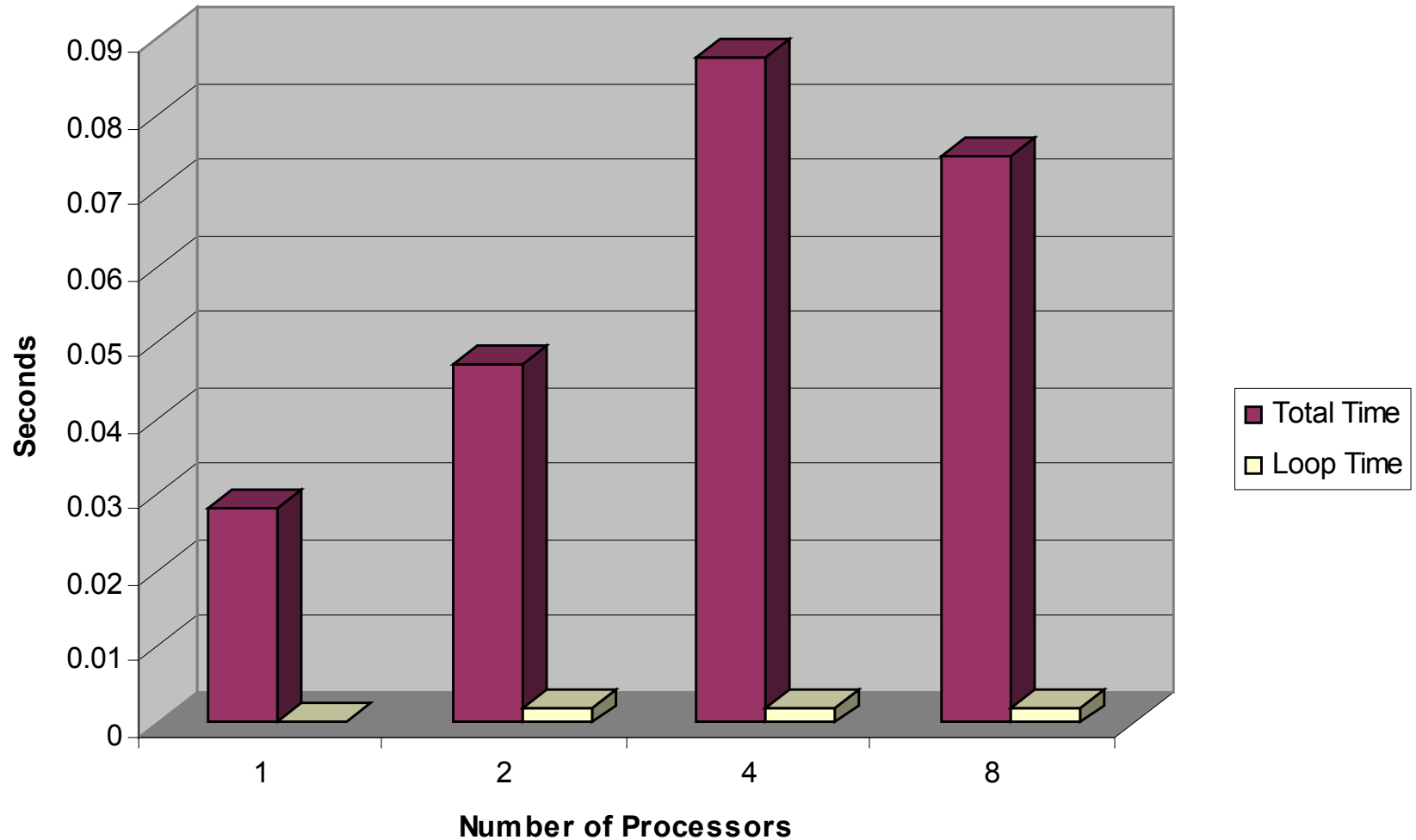
Runtime – More CPUs = Less Time

1k Iterations for increasing size grid



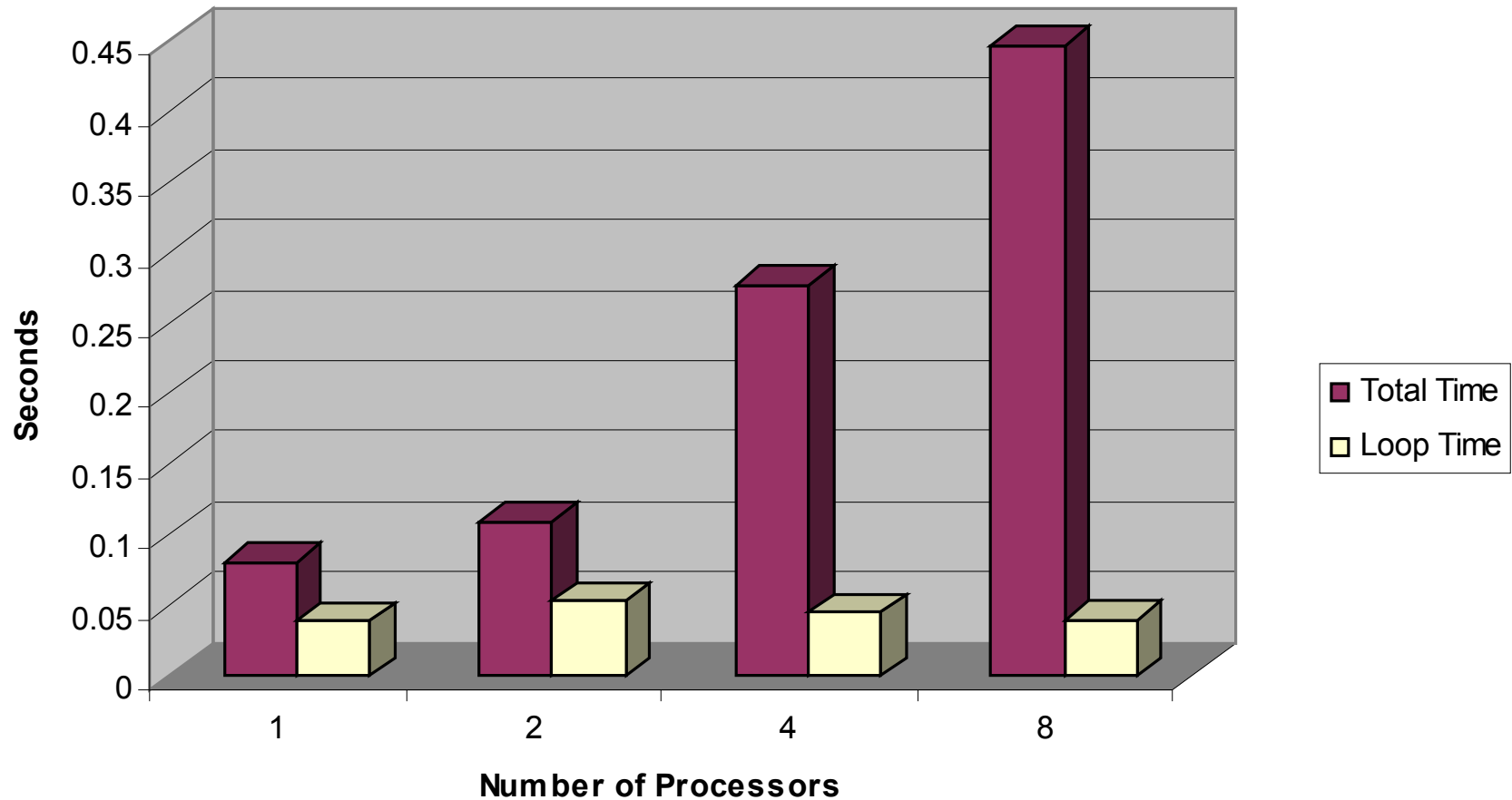
Runtime – Computations Too Small

10x10 Grid over 10 Iterations

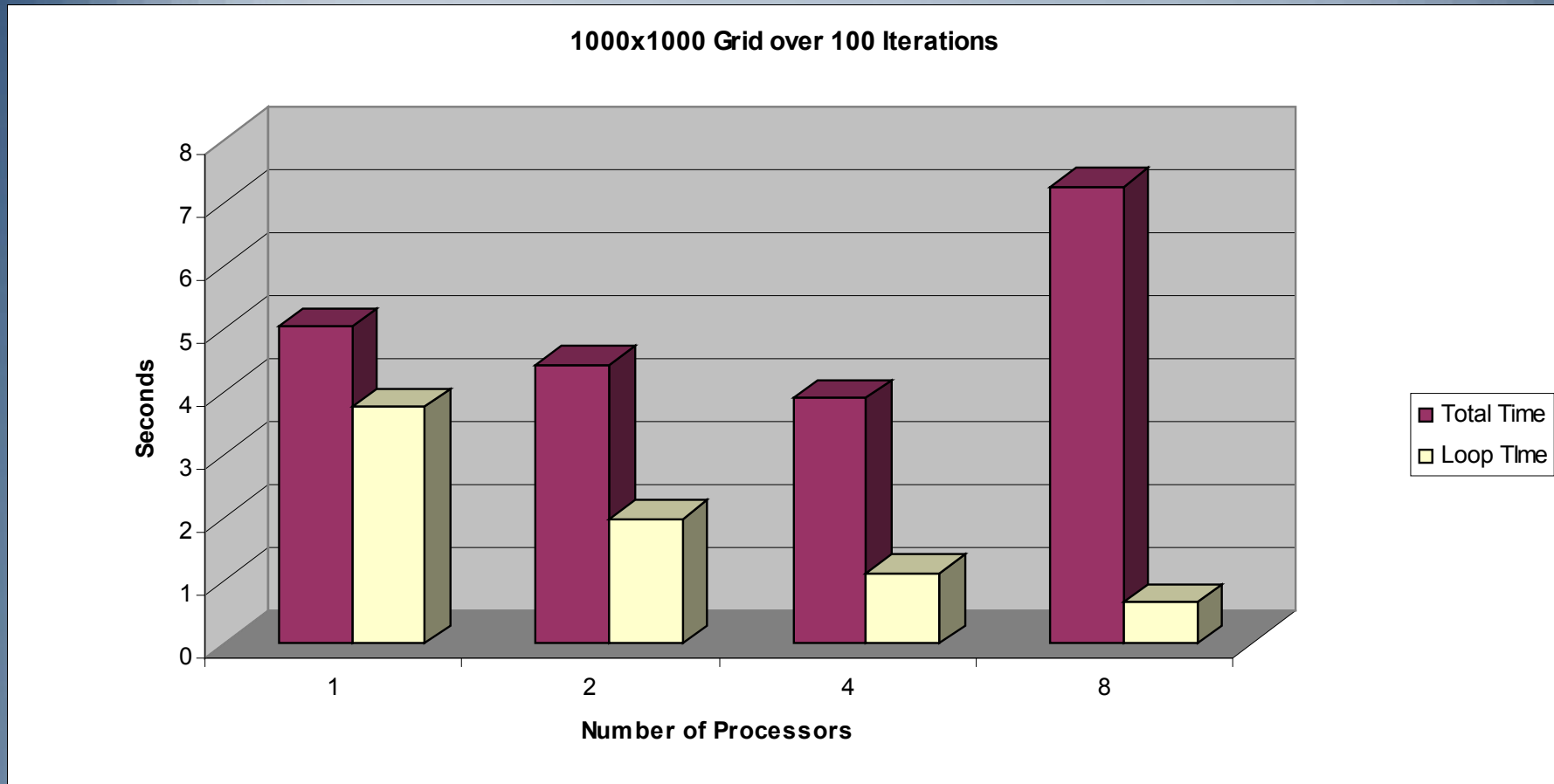


Runtime – No CPU Gain, Bad I/O

100x100 Grid over 100 Iterations

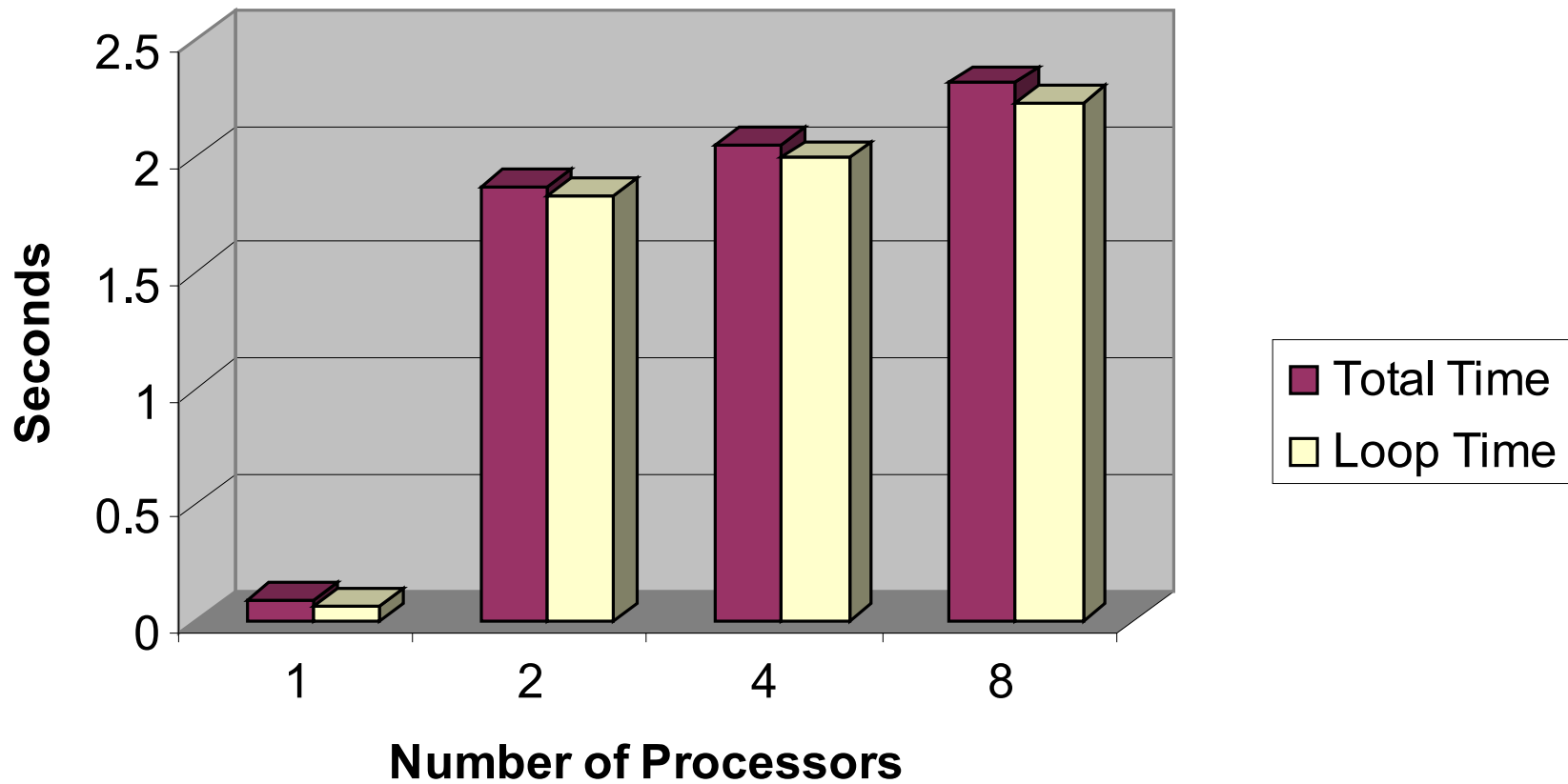


Runtime – Disk I/O Hurts Overall

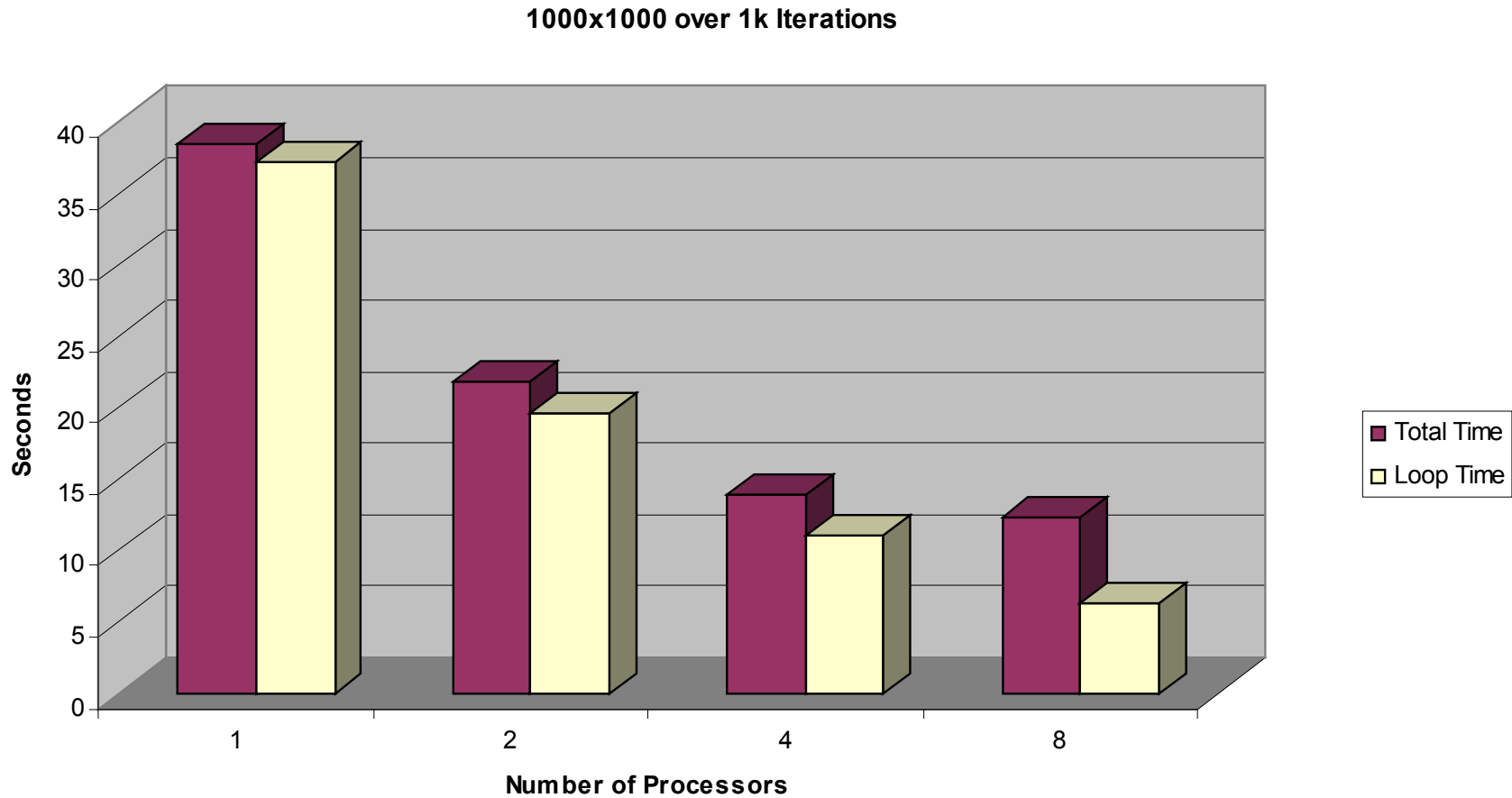


Runtime – Data Spread too Thin

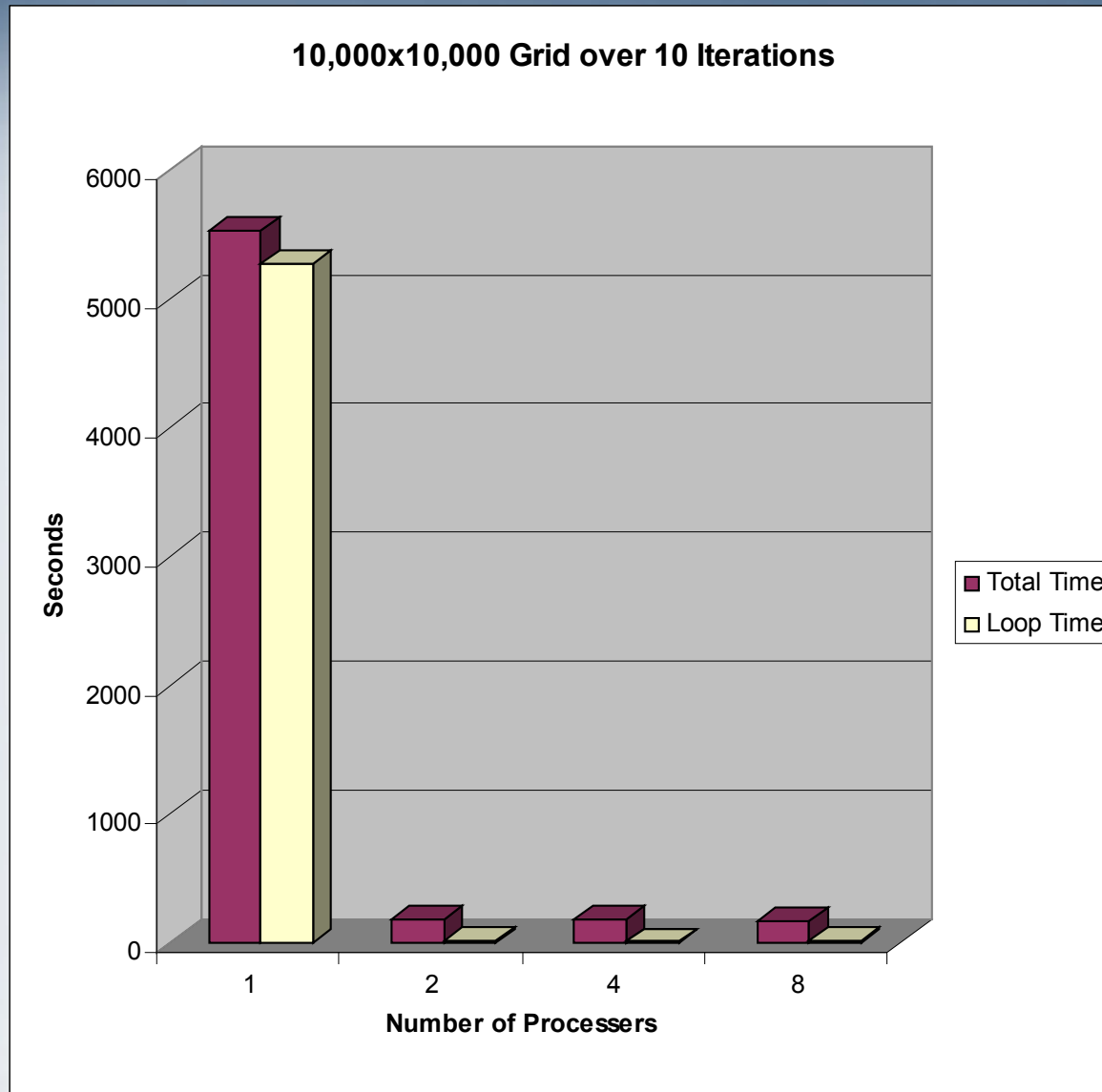
10x10 Grid over 10k Iterations



Runtime – Now we get improvement



Runtime – Paging Penalty



Runtime – Long-run Improvements

1000x1000 over 10k Iterations

