

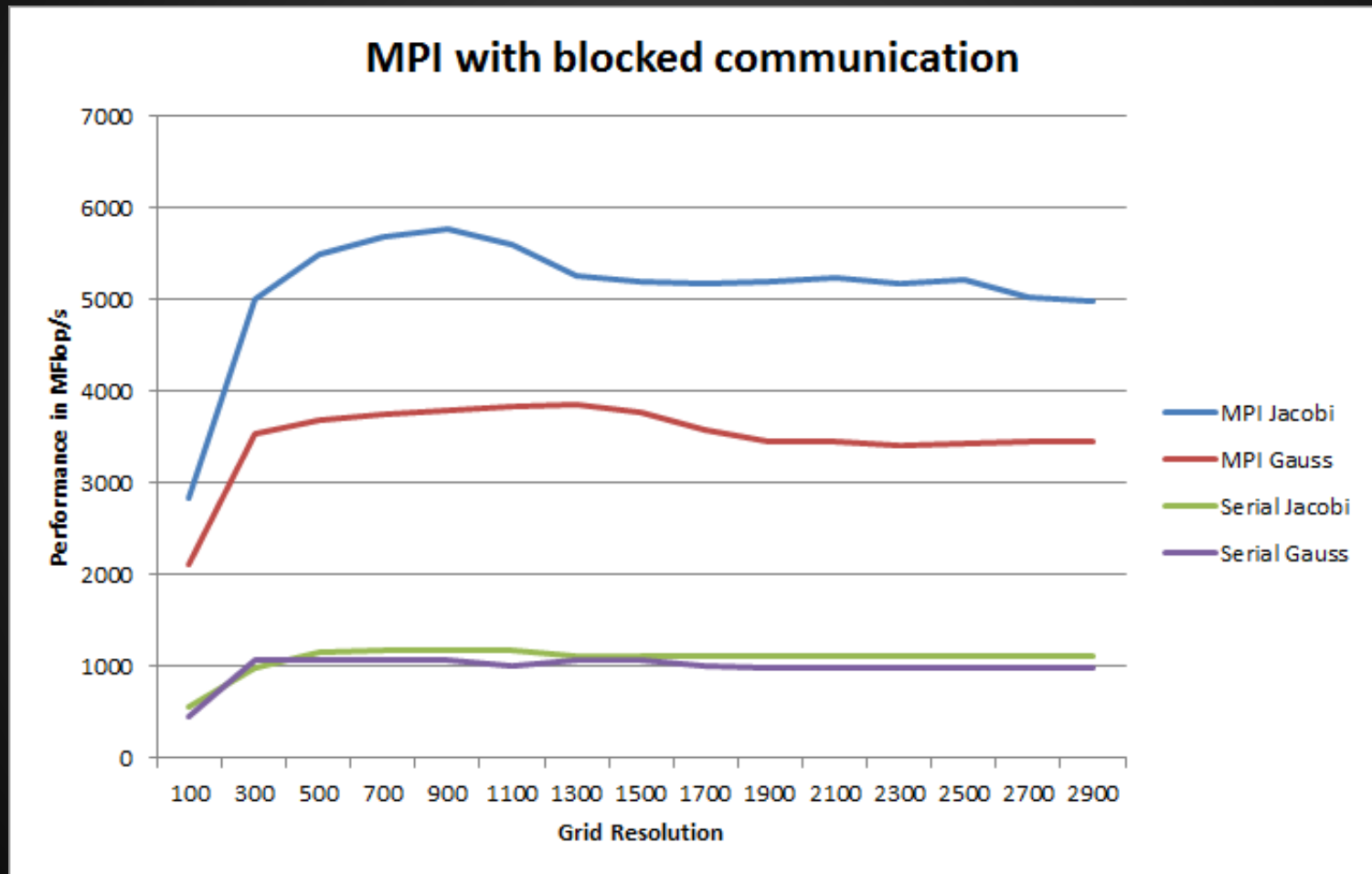
# MPI Parallelization

Shrikant Vinchurkar  
Mayank Chaudhary

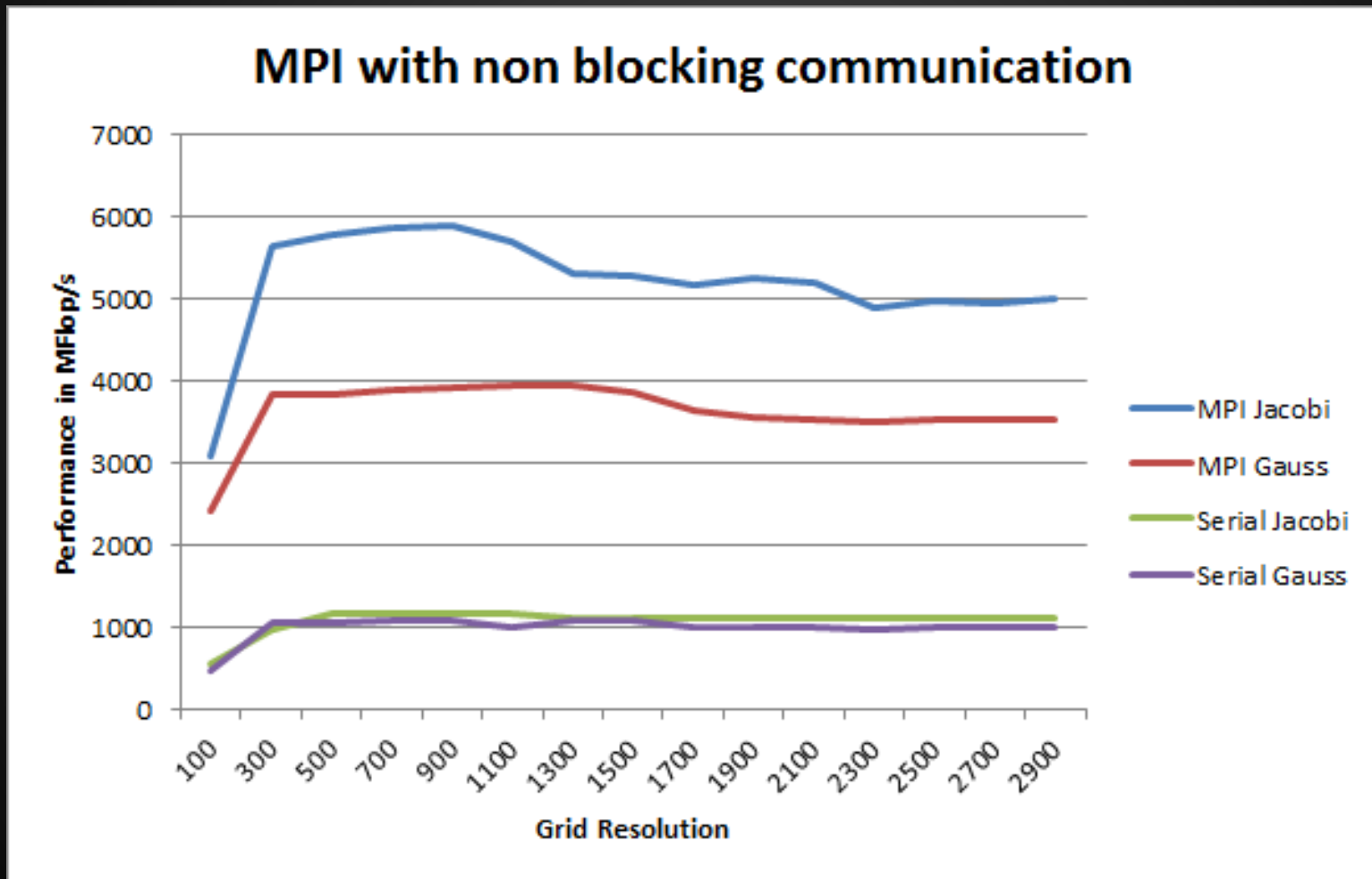
# MPI Parallelization

- Started with sequentially fastest version of Jacobi and Gauss
- Jacobi with loop interchange, avoid copy & modified residual calculation
- Gauss with red black approach, modified residual calculation

# MPI Blocked Communication (4x1)



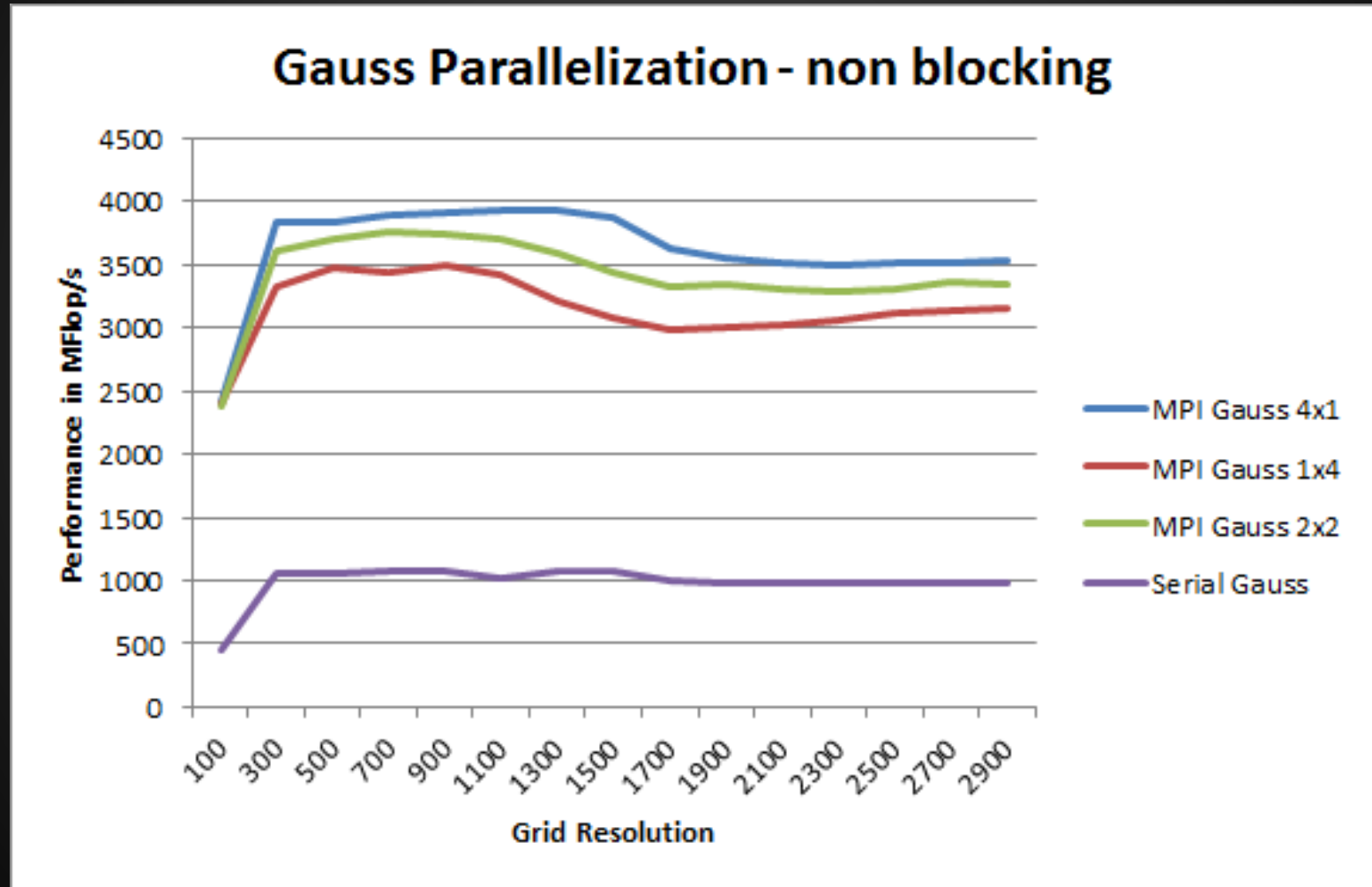
# MPI Non Blocking communication (4x1)



# MPI Communication overhead

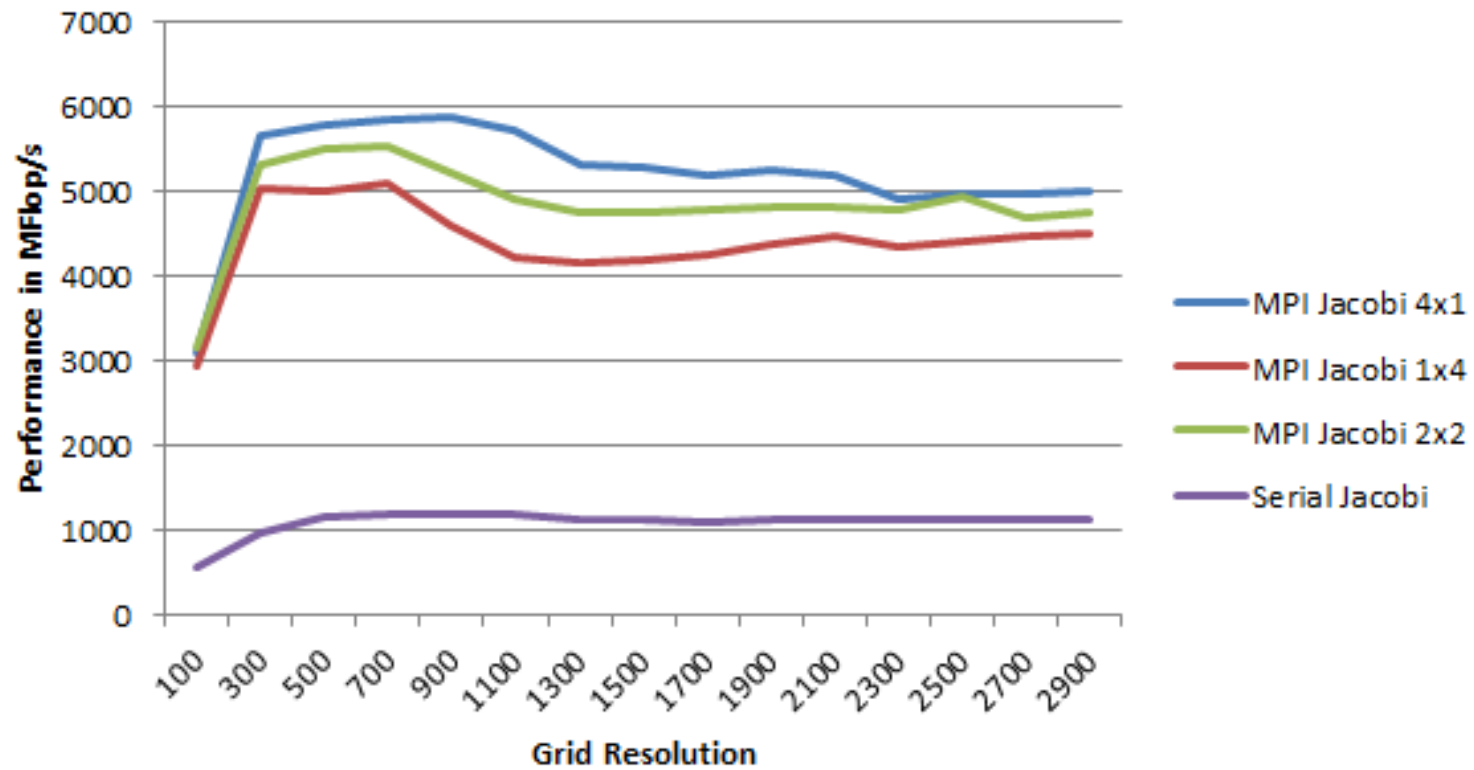
- Measurement for 4x1 topology
  - Communication overhead of 0.03 sec in a total running time of 1.89 sec
- Overlapping communication would not give huge boost up
- Theoretically, peak of 5765 MFlops should increase to 5856 MFlops (actual-5878 MFlops)

# Gauss parallelization - different topologies

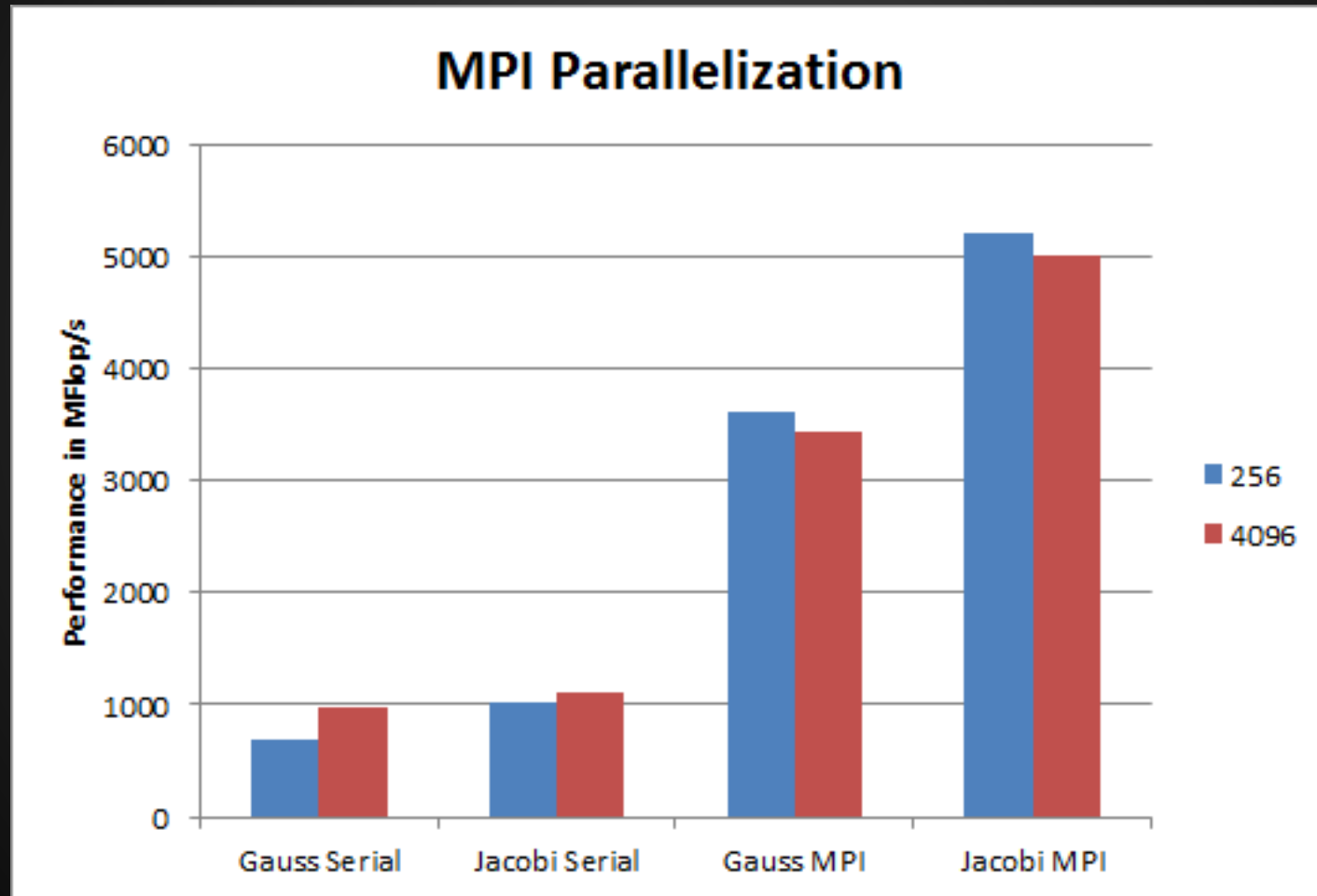


# Jacobi Parallelization - different topologies

**Jacobi Parallelization - Non blocking**

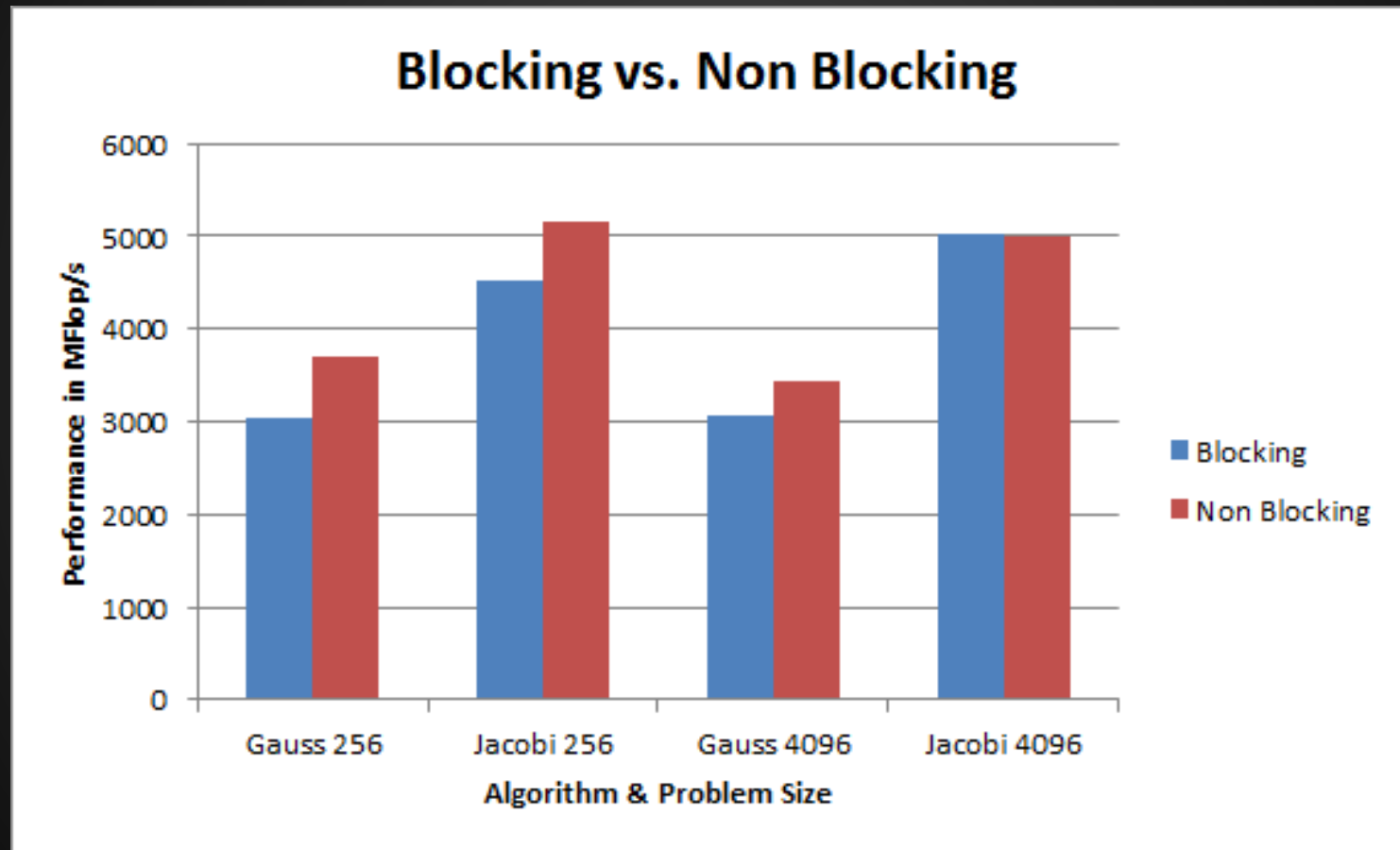


# Results with 256 and 4096 (4x1)



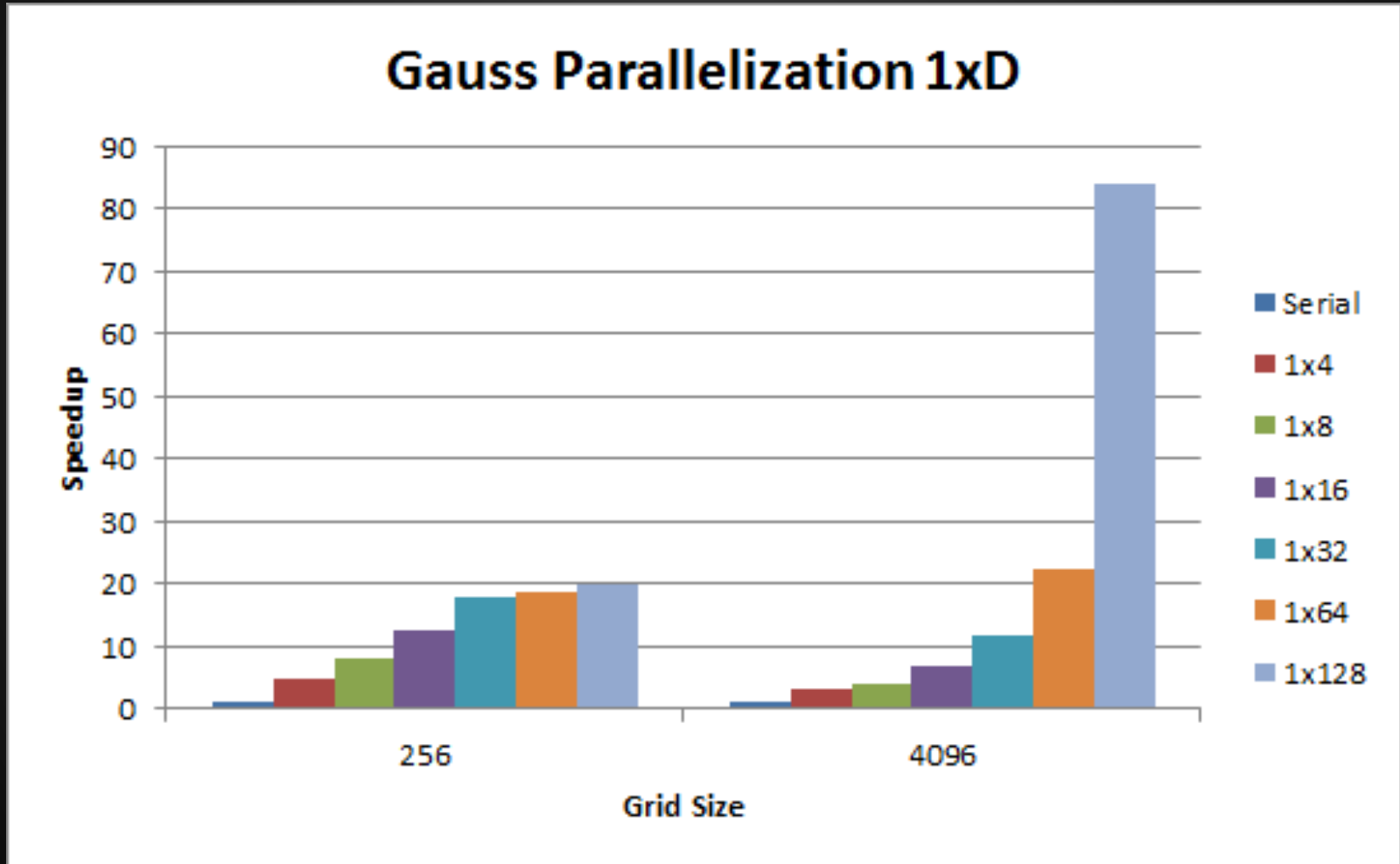


# Communication pattern comparison (4x1)

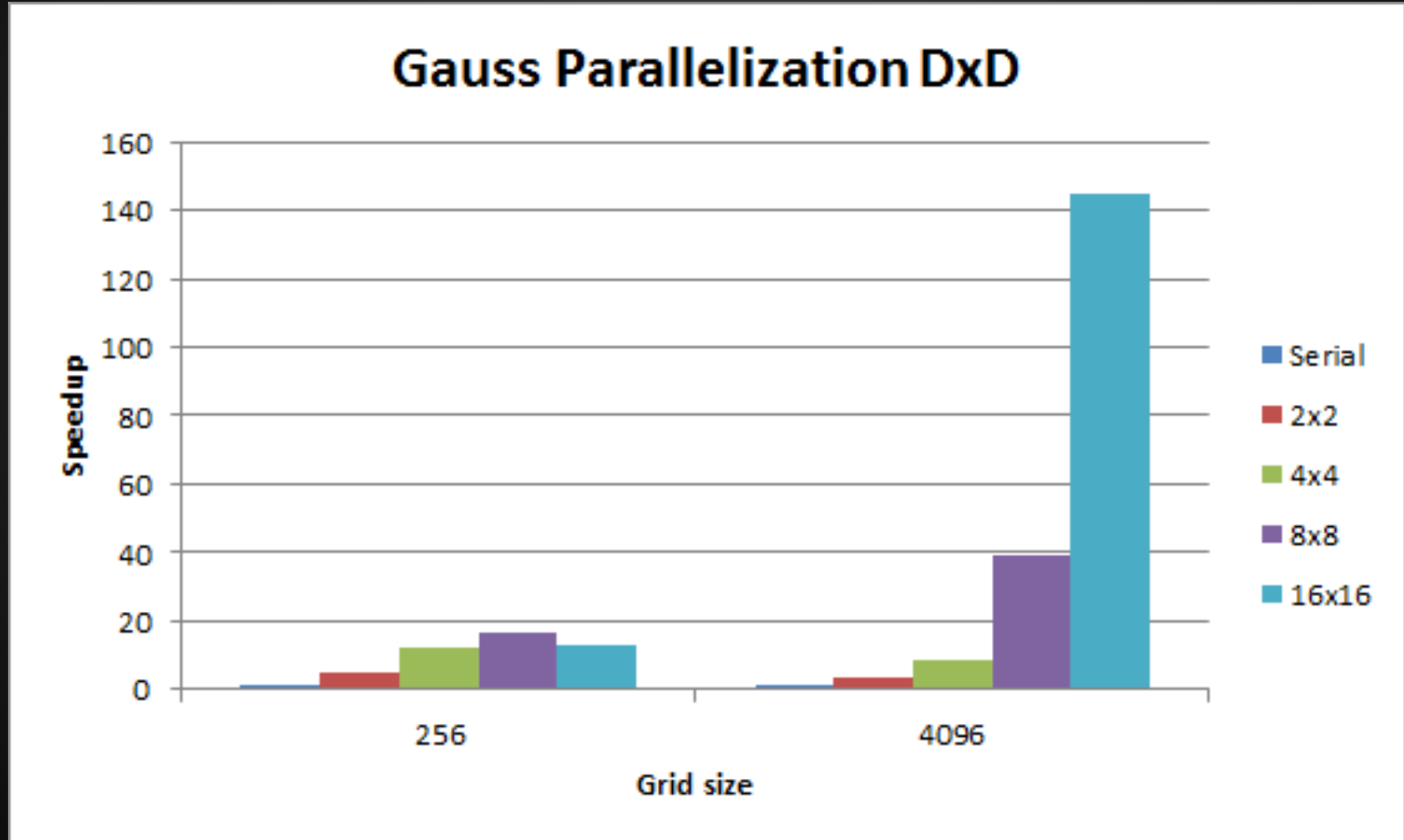


# Results for finer granularity grids

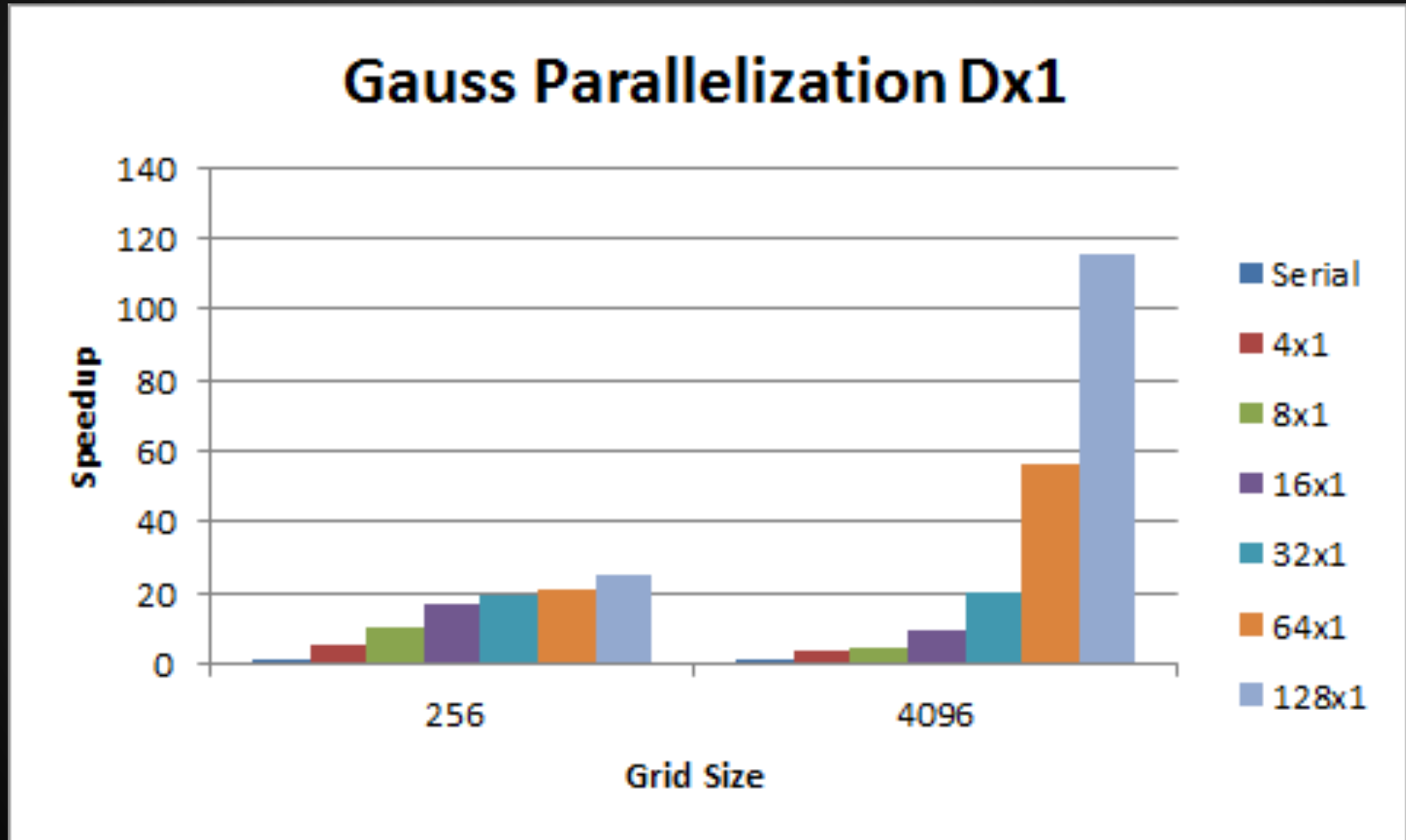
# Gauss Parallelization 1xD



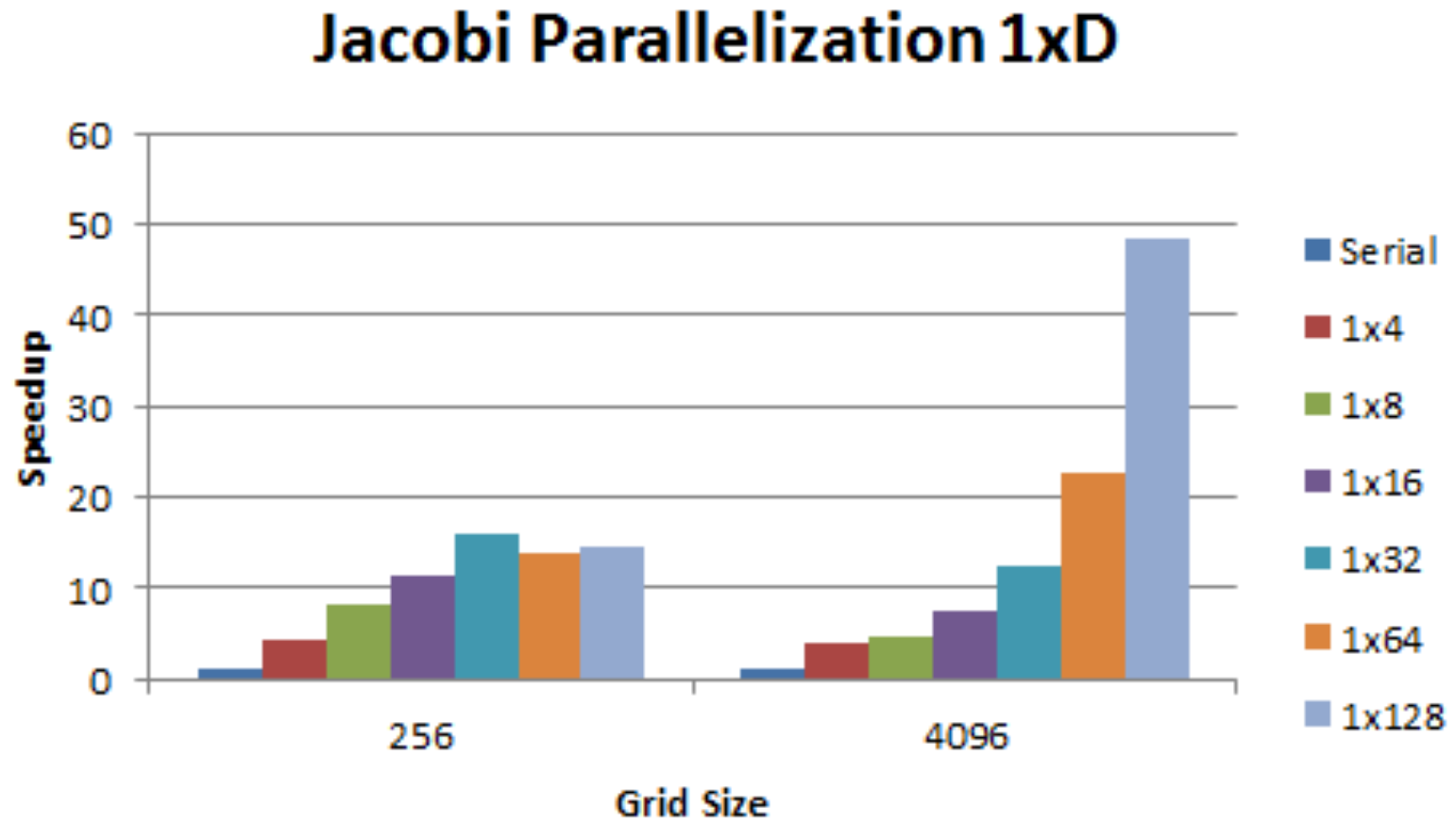
# Gauss Parallelization DxD



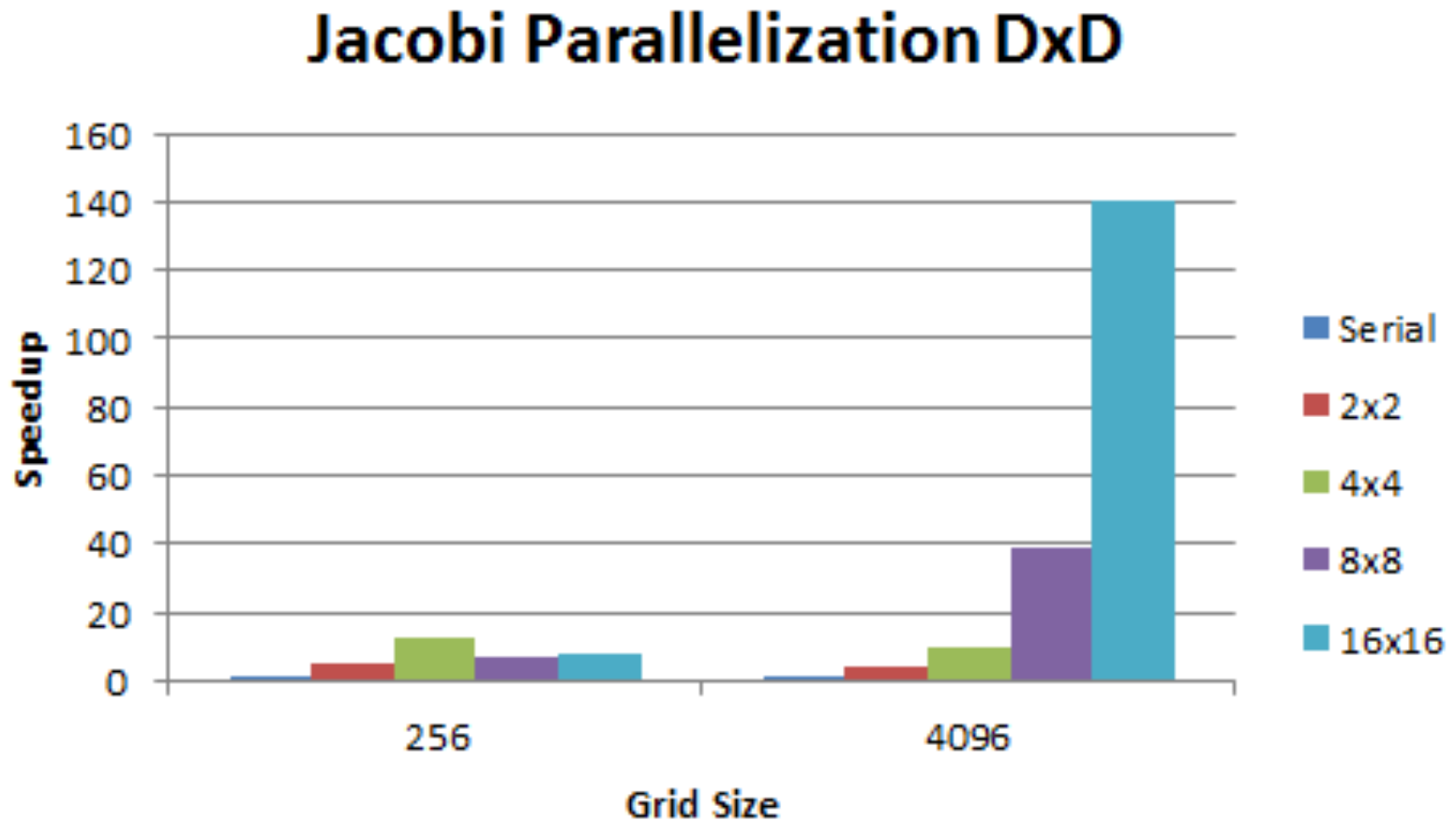
# Gauss Parallelization Dx1



# Jacobi Parallelization 1xD



# Jacobi Parallelization DxD



# Jacobi Parallelization Dx1

