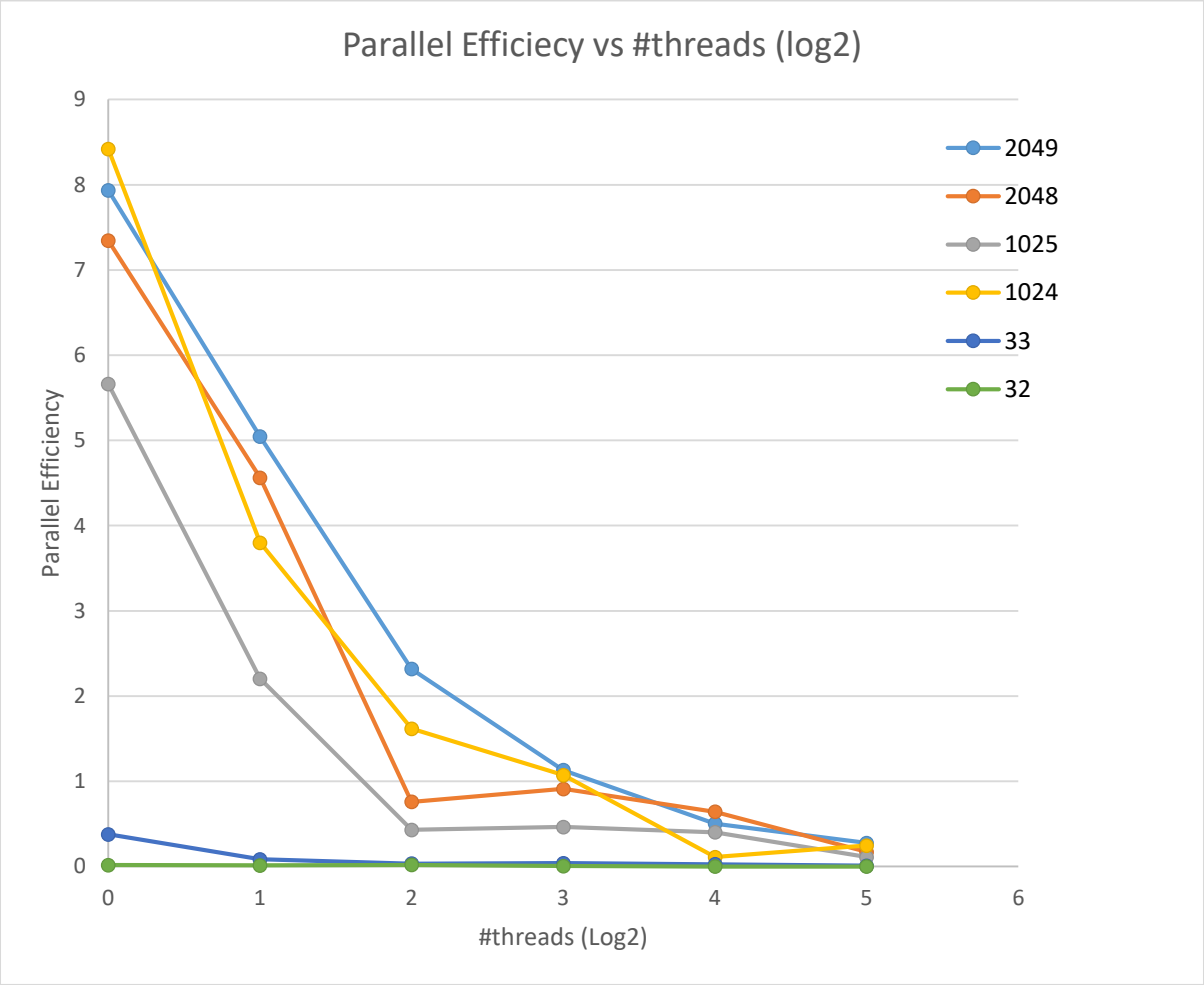
Performance plots for Elliptic PDE Solver using Open MP

- **Team Member**: Gholap Vinayak (22065422)
  Patel Mayank (22080480)

- **Description**:
  This document contains parallel efficiency and parallel runtime graphs for various no of threads.

1. Plot: Parallel Efficiency Vs number of threads



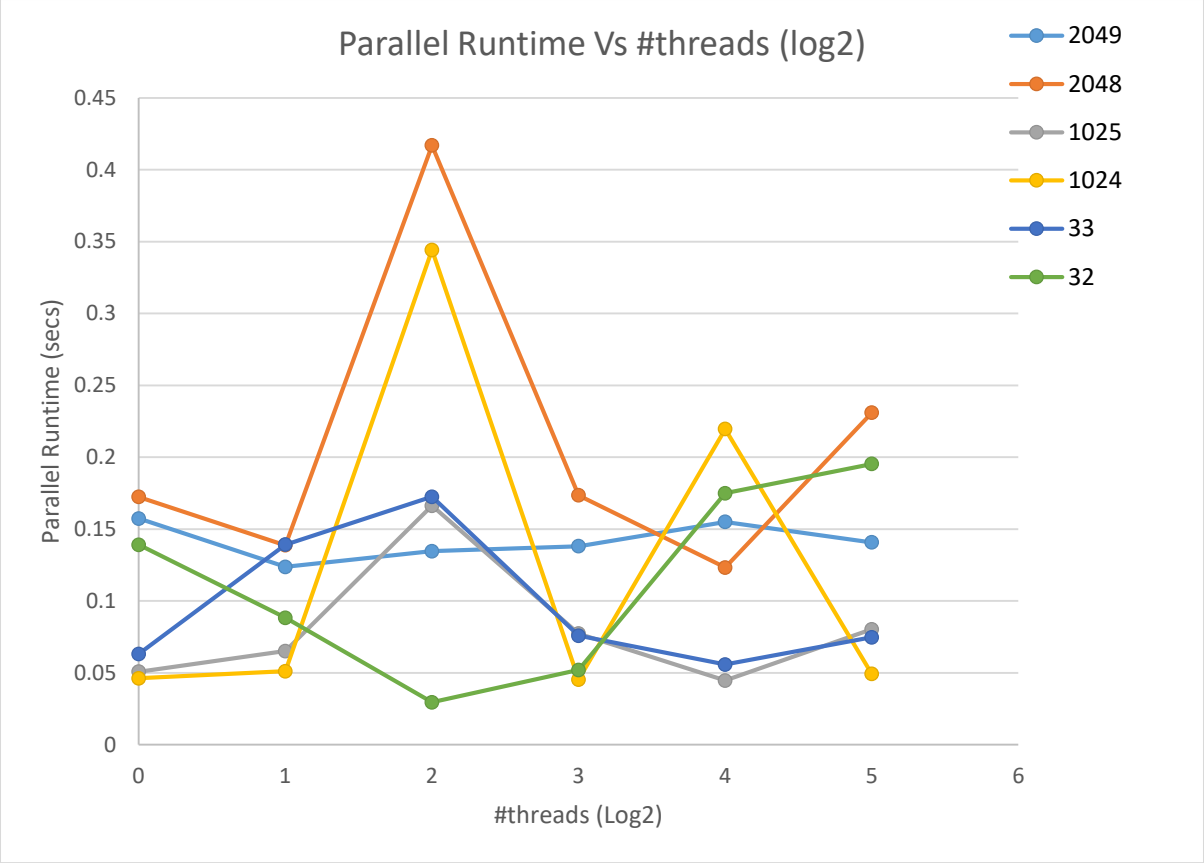
Description:

- According to Gustafson's Law,

$$\boldsymbol{Speed - up} = \mathbf{1} + \frac{\boldsymbol{p}}{\boldsymbol{s}} \boldsymbol{N^a}$$

- Parallel efficiency is speed-up divide with no. of threads so it is obvious that if we increase no. of threads our parallel efficiency decrease.
- For less works, serial part is dominating while for large work size parallel part is dominating. Therefore, parallel efficiency is high for largest problem size.

2. Plot: Parallel Runtime Vs number of threads



Description:

- In our code, we take in consideration of symmetry of solution. According to hardware architecture, each core has own L1 and L2 cache and L3 cache are shared, so if our data comes from L1 and L2 cache than we need to pay overhead for communication.
- For 2049×2049, parallel runtime is high than nx = ny < 1500. When we increase no. of threads than runtime increases as synchronization overhead.