# HPC - Exercise 2

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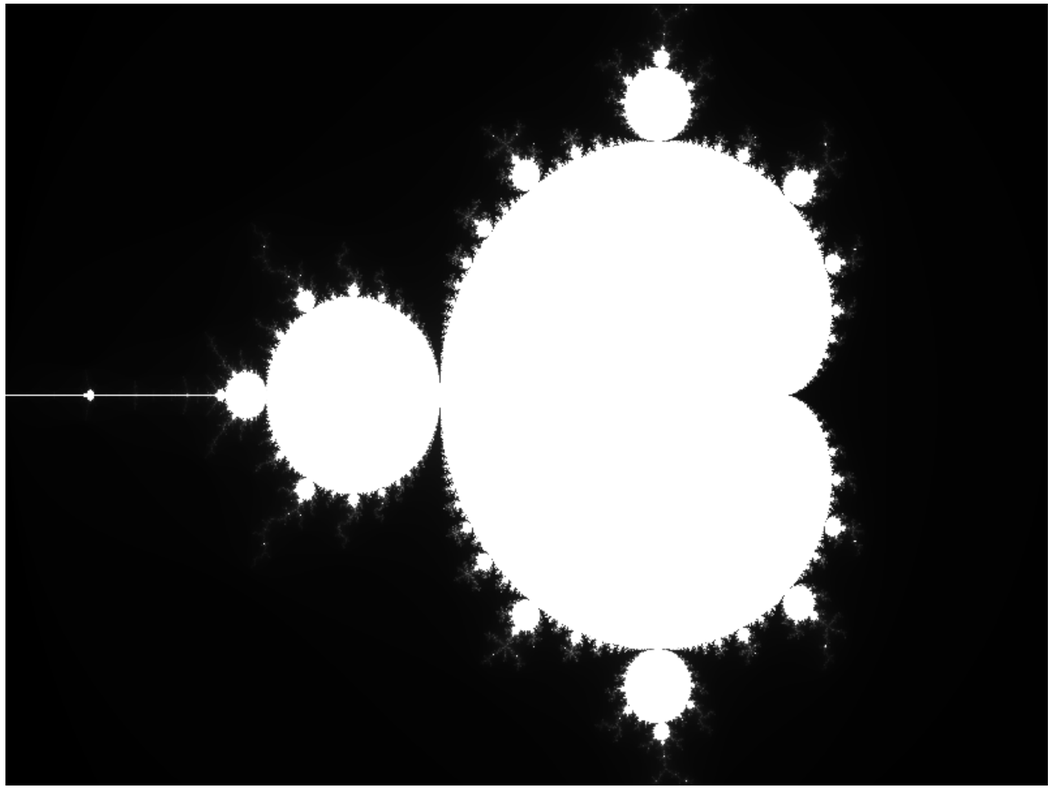
# Objective

## Computing the Mandelbrot set

- Distributed memory parallelization (MPI)
- Shared memory parallelization (OMP)



# Experimental Setup

## ORFEO CLUSTER

- 2 THIN node (48 cores)
- Static partitioning
- Strong scaling
- Weak scaling

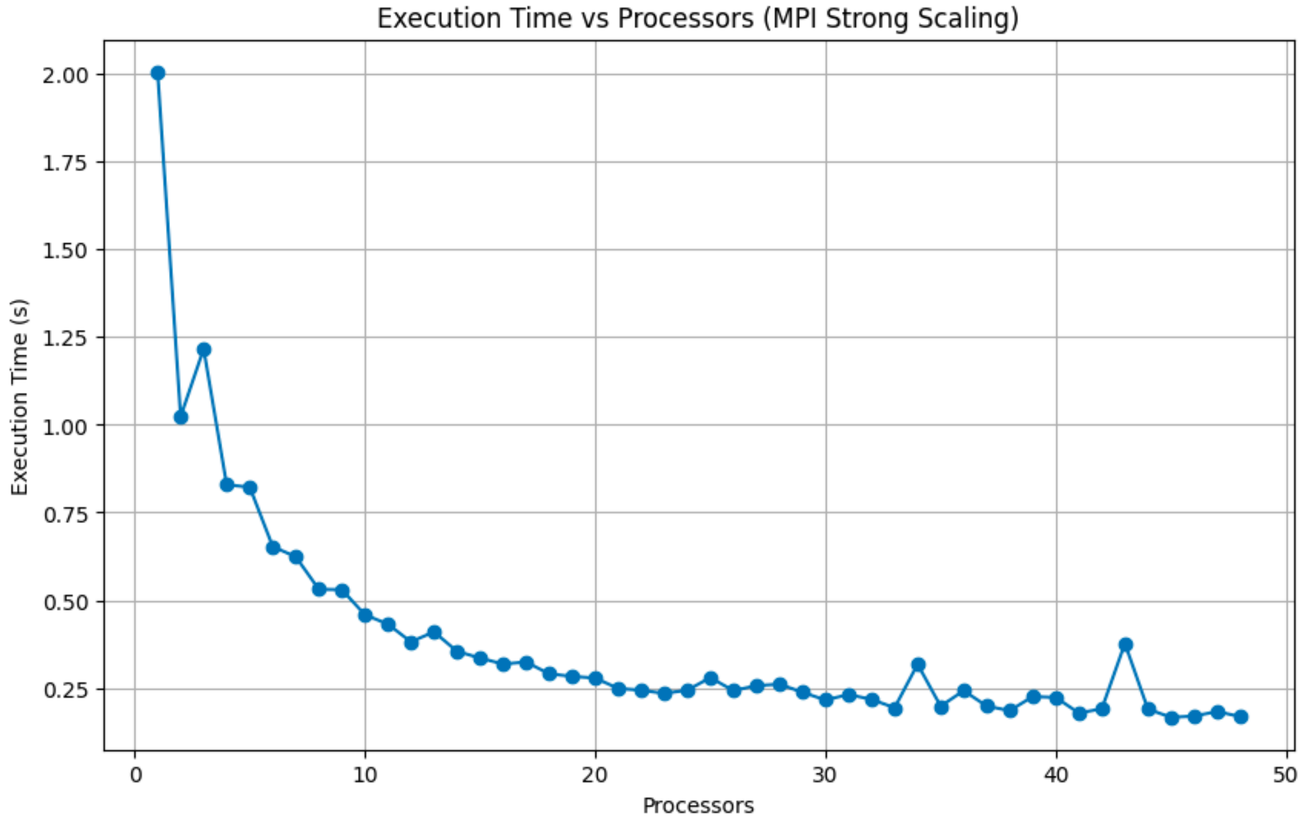
# Assessment

- Speedup $S(n) = \frac{T(1)}{T(n)}$
- Efficiency $E(n) = \frac{T(n)}{T(1)}$

# Strong scaling

# Strong scaling

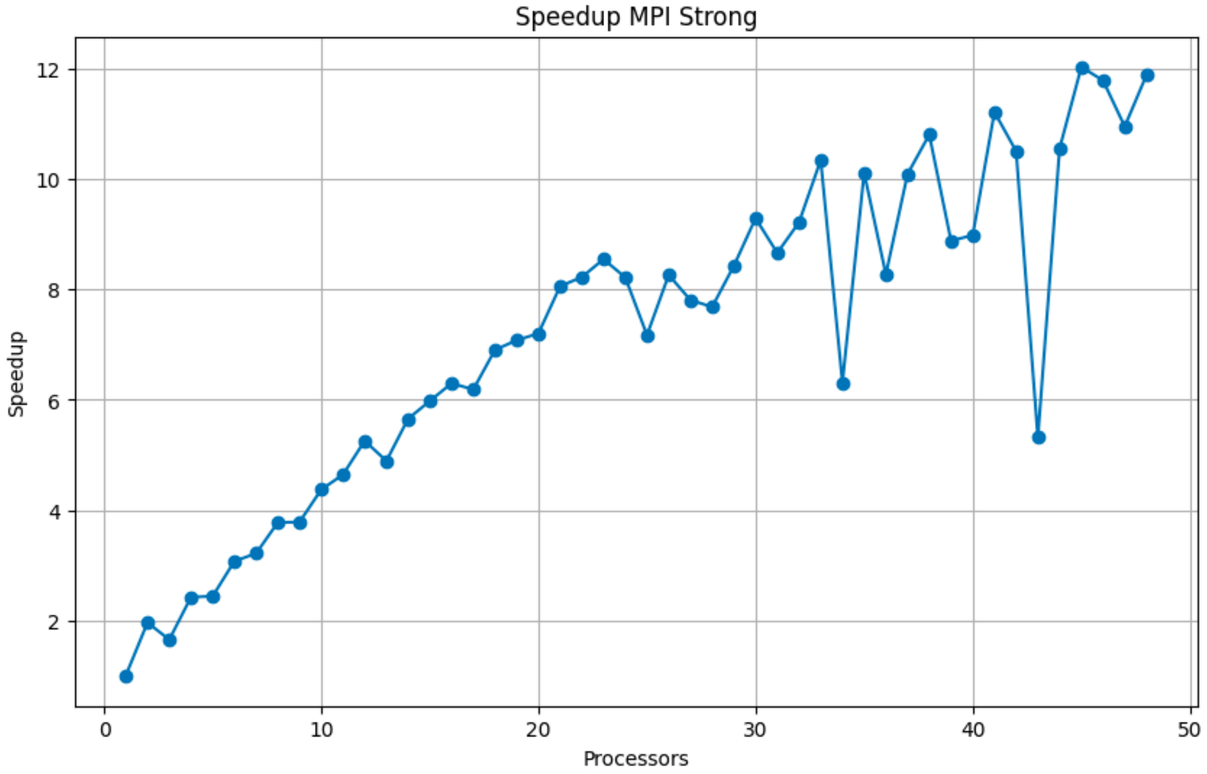
## MPI

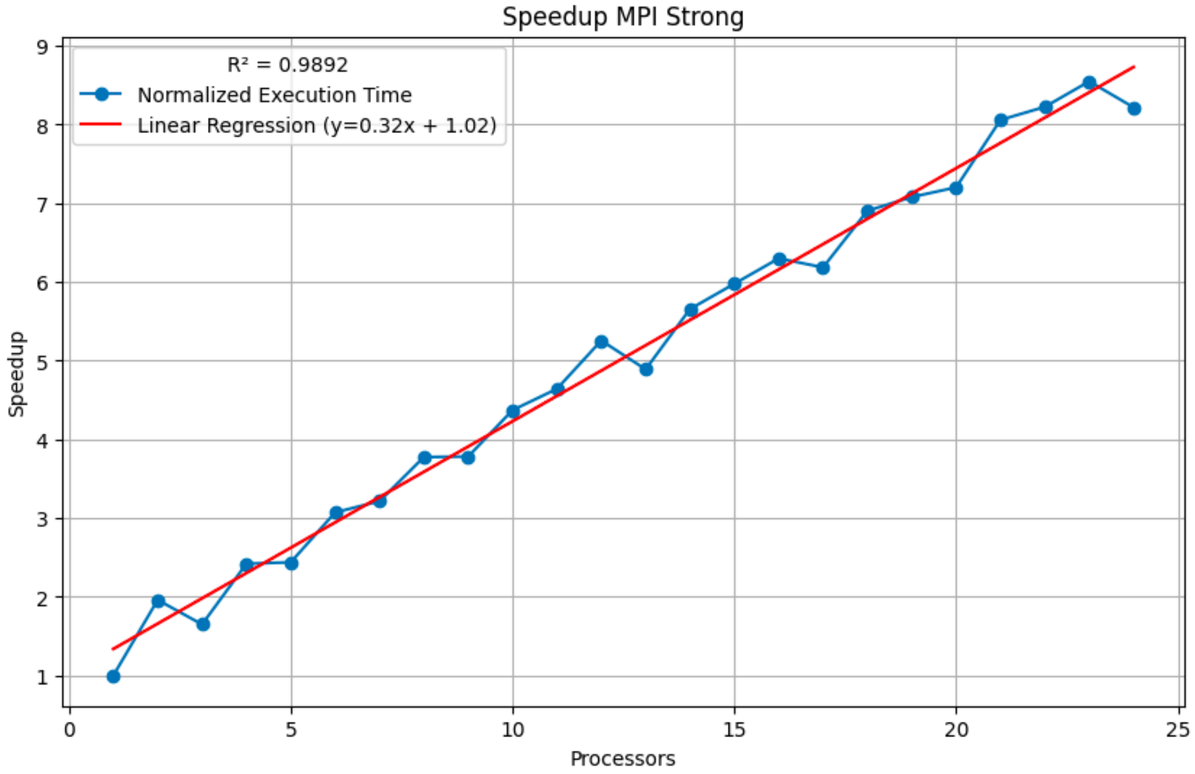



Matrix dimensions: 1600x2400

# Strong scaling

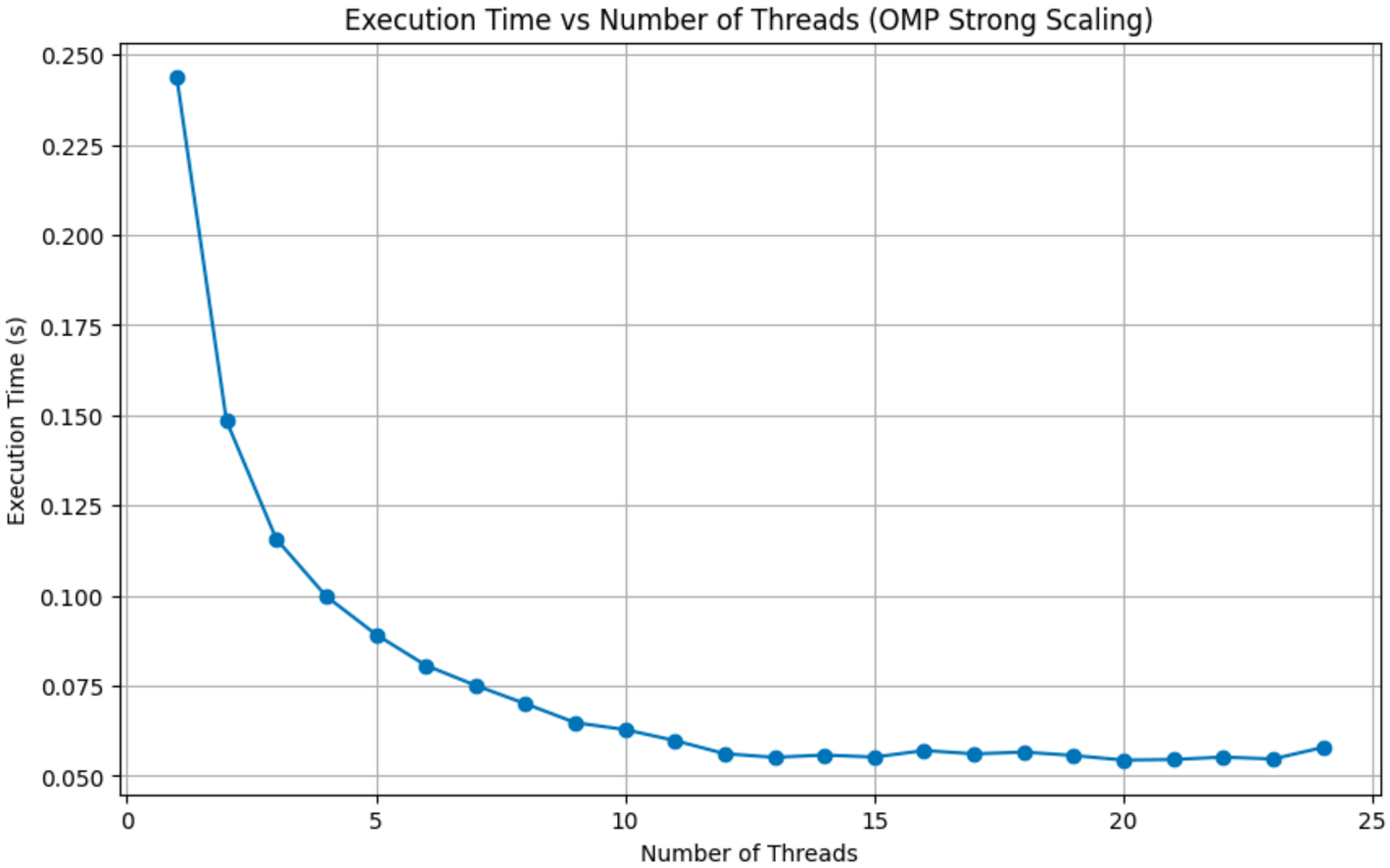
## MPI - Speedup



# Strong scaling

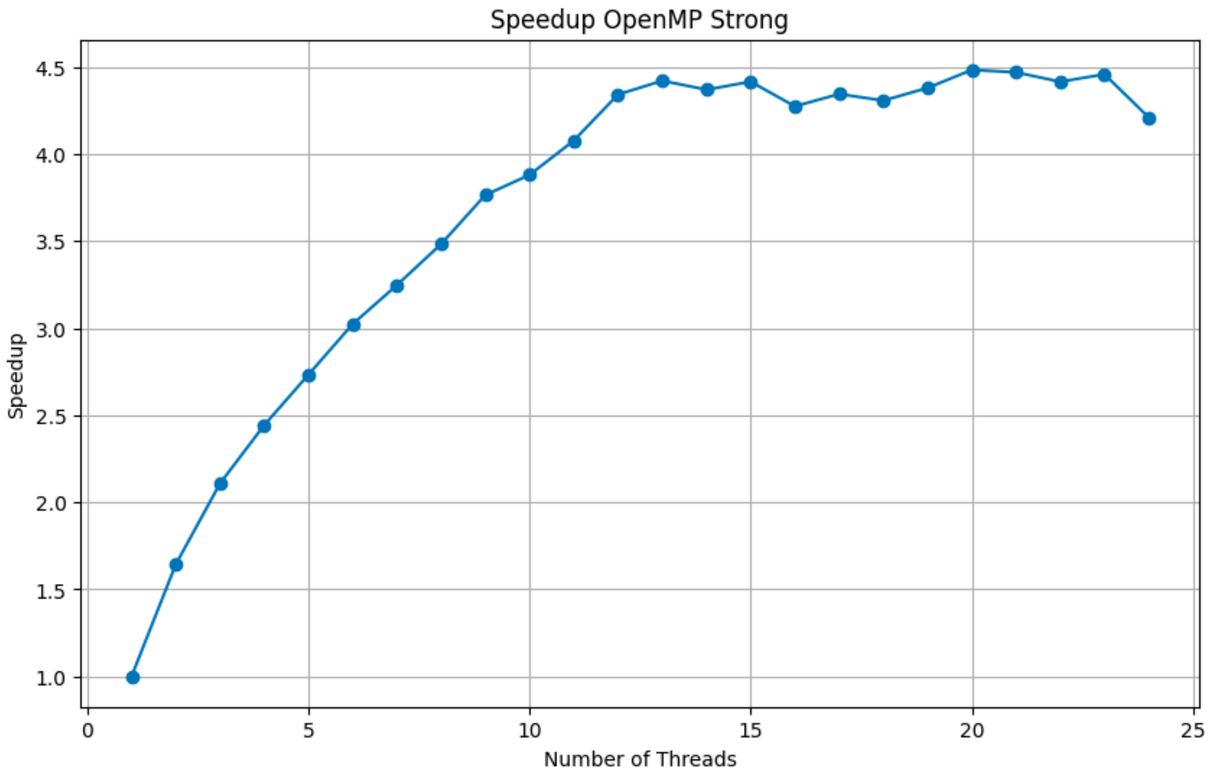
## OMP

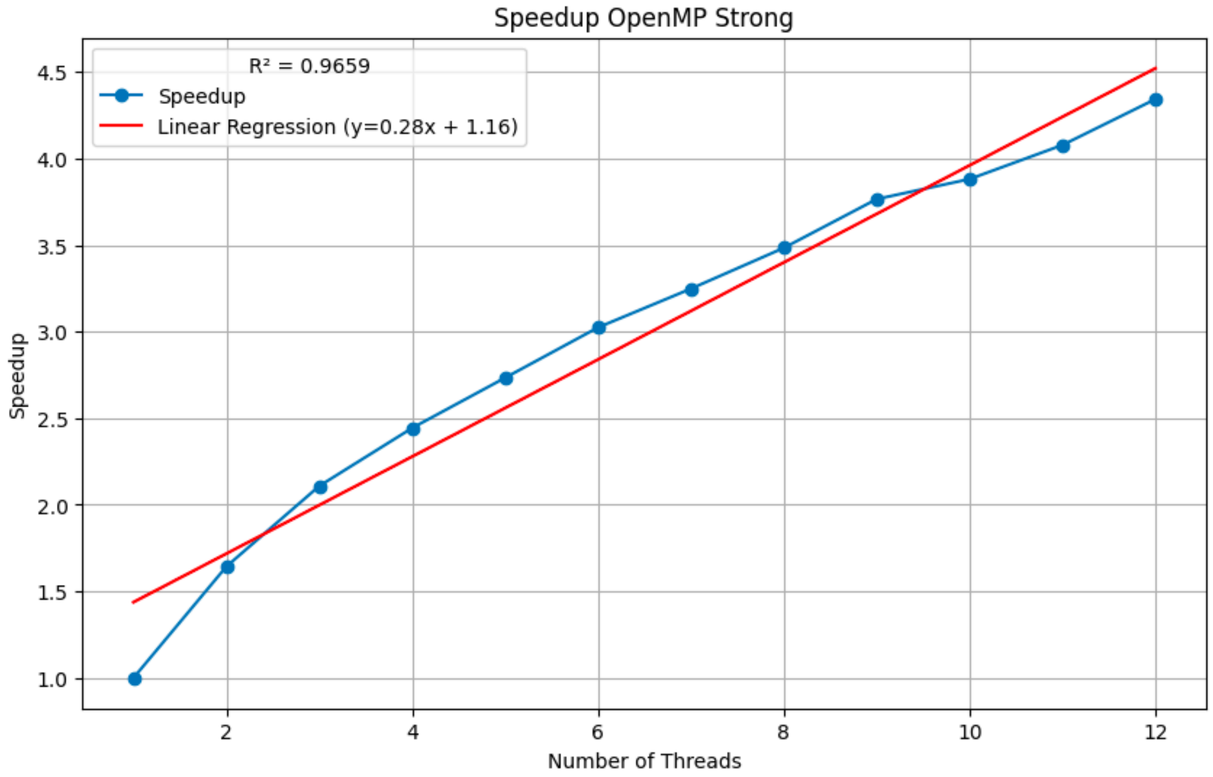



Matrix dimensions: 600x800

# Strong scaling

## OMP - Speedup



# Weak scaling

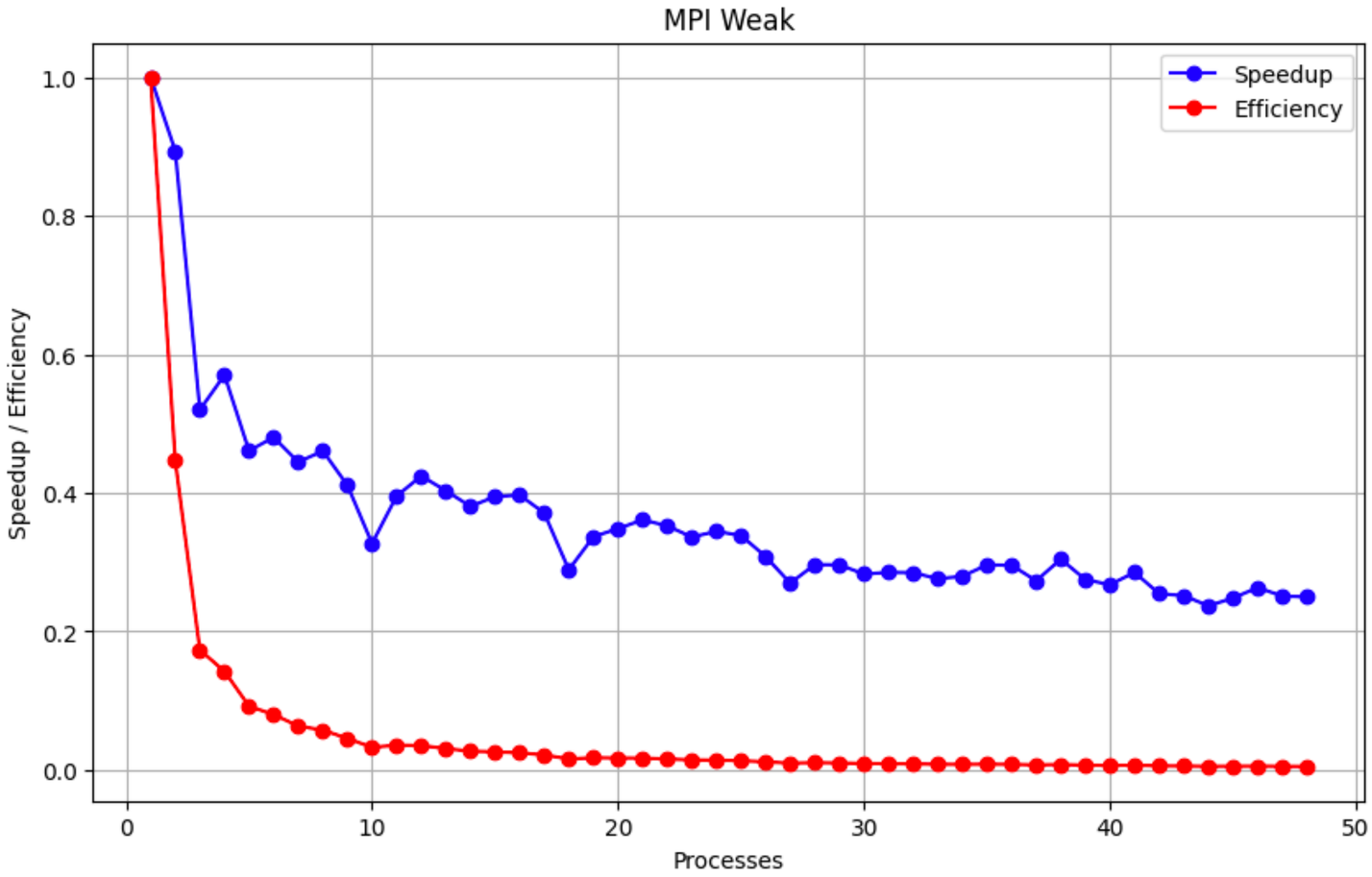
# Weak scaling

## MPI


Matrix dimensions: 1000x1000 to 48000x1000

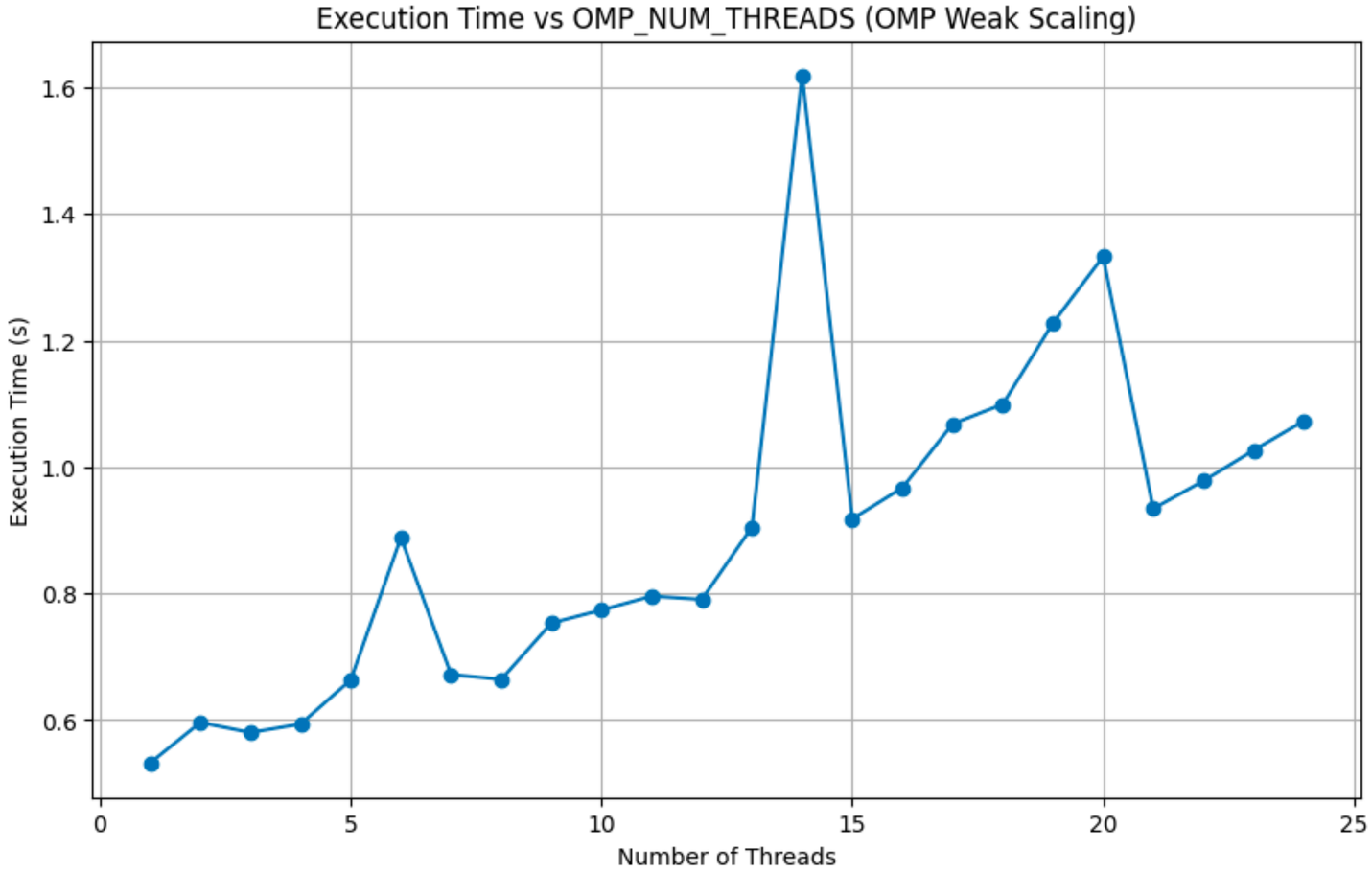
# Weak scaling

## MPI - Speedup and efficiency



# Weak scaling

## OMP




Matrix dimensions: 1000x1000 to 48000x1000

# Weak scaling

## OMP - Speedup and efficiency