Abstract

Parallel computing plays a crucial role in state-of-the-art numerical weather and ocean
Role of Parallel Computing in Numerical Weather Forecasting Models

forecasting models like WRF, POM, ROMS and RCAOM. The present study is an attempt to explore and examine the computational time required for the highly complex numerical simulations of weather and ocean models with multi core processors and variable RAM/processor speeds. The simulations, carried out using machines of different computational capability/configuration viz. quad core and Xeon machines, have been investigated with different synthetic experiments to evaluate the role of parallel computing in the operational forecasting system. The saturation rates with different number of processors are also calculated before carrying out forecasting studies. Serial and parallel computations have been carried out with WRF (Weather Forecasting Model) model for simulating the track of a natural hazard viz. the Thane cyclone. The simulations reveal that in the initial stage the computational time decreases exponentially with number of processors and later it reaches saturation stage, even though the number of processors is increased. Additionally, parallel computing simulations showed that the model simulations depend upon the model time step, grid resolution, number of cells in the domain, system architecture, and finally number of vertical levels and their resolutions.

References

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