

Develop a Low-Cost Portable Parallel Computer for Numerical Weather Prediction and Applications

ChihYing Chen¹, Nan-Ching Yeh², Yao-Chung Chuang², Chuan-Yao Lin¹

(1)Research Center for Environmental Changes, Academia Sinica, (2)Department of Military Meteorology, Air Force Institute of Technology

In recent years, due to the advantages of Single Board Computer (Single Board Computer) with low price, low power consumption, etc., and the prevalence of Edge Computing (Edge Computing), such single-board computers are more and more widely used. Many applications and research have been on single-board computers in web pages, parallel computing, or IoT. But this is less applied in meteorology, which has been heavily using large-scale high-speed computing computers. This research aims to develop an automatic portable numerical weather forecast system with high mobility and low price by combining the numerical weather forecast and assimilation system for meteorology using single-board computer clusters. It hopes that the development and application of such an integrated system can increase its use by low-budget operating units and research teams, thereby achieving the goal of short-term disaster warning and disaster reduction. This research has completed the development of a 320 core parallel system. Also, we developed and deployed the UCDavis-WRF-GSI, FV3-SAR to the system; it could run fully automatic without any human operation. This system will come with a GPS receiver, an LTE network module to get location and connection soon.

Keywords: Single-Board Computer, Numerical Weather Prediction, Portable Parallel System