

A High-productivity Framework for Weather Prediction Code on Multi-GPU Computing

***Takashi Shimokawabe¹, Takayuki Aoki¹, and Naoyuki Onodera¹**

¹Global Scientific Information and Computing Center, Tokyo Institute of Technology, Japan

*Corresponding author: shimokawabe@sim.gsic.titech.ac.jp

Recently, several peta-scale supercomputers equip GPUs along with conventional CPUs in order to achieve their high performance with relatively-low electric power consumption. Obtaining good parallel efficiency using more than thousand GPUs often requires skillful programming, for example, both MPI for the inter-node communication and NVIDIA GPUDirect for the intra-node communication. The Japan Meteorological Agency is developing a next-generation high-resolution meso-scale weather prediction code ASUCA. We are implementing it on a multi-GPU platform by using a high-productivity framework for mesh-based application. Our framework automatically translates user-written functions that update a grid point and generates both GPU and CPU codes. The framework can also hide the complicated implementation for the efficient communications described above. In this presentation, we will show the implementation of the weather prediction code by using this framework and the performance evaluation on the TSUBAME 2.0 supercomputer at Tokyo Institute of Technology.

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