

Developing NEPTUNE on HPC for U.S. Naval Weather Prediction

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NRL's Marine Meteorology Division is developing NEPTUNE, a new global weather model to go into U.S. Navy operational forecasting early next decade. NEPTUNE is based on the Naval Post Graduate School NUMA spectral element dynamical core (Giraldo, et al.) to be memory local, computationally dense and scalable to higher numerical order and larger problem sizes. Model development is proceeding with full-physics real-data testing and verification, data assimilation using the JEDI framework based on ECMWF's OOPS, HPC performance characterization and optimization, and evaluation of programming models for performance portability. This talk will provide an introduction to goals and status of the NEPTUNE project emphasizing computational readiness challenges with result of testing on different processors, including ARM, and early experiences with programming models for performance portability, including early testing of NEPTUNE kernels using the DOE's Kokkos library.

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