1.4 Performance-related developments in WRF

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Our work to adapt and optimize the Weather Research and Forecast model for current and next generation processors is progressing. We have benchmarked whole-code performance on the Intel MIC architecture and have implemented a number of physics packages, most recently the RRTMG radiation, on both Intel MIC and NVIDIA GPU architectures. We have conducted detailed performance analysis identifying bottlenecks and are providing this information both to the vendors and the WRF model developers. Key factors are concurrency, vectorization, and low memory latency which emphasizes the importance of keeping the code as lean as possible to take best advantage of current and future architectures. In the case of RRTMG, the codes have been significantly modified to take full advantage of the GPU. We will present benchmark results that show WRF may be moving in the wrong direction with regard to efficiency in the most recent V3.6 release, and we will suggest possible measures to address the upward tendency in resource requirements.