

Radix-k: Large-Scale Parallel Image Compositing for Sort-Last Rendering

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Image compositing is the final stage in sort-last parallel visualization algorithms, and its cost can dominate the run-time of these algorithms as the number of processes approaches the full scale of leadership computing machines. Radix-k is a configurable algorithm that in many cases outperforms earlier compositing algorithms such as direct-send and binary swap, by tuning the algorithm to machine architectures and taking advantage of optimizations such as active-pixel and run-length encoding more effectively than its predecessors. Using 32 K processes, we have demonstrated up to five times faster performance over binary swap and a peak compositing rate of 12 frames per second for 64 megapixel volume-rendered images.