A Distributed Approach To 3-D Seismic Traveltime Calculation (presented at SIAM Geosciences 1999)

We present an efficient scheme for the distributed calculation of traveltimes in three dimensions using Sethian's Fast Marching solution to the eikonal equation. Our technique is designed to exploit unused compute cycles on heterogeneous networks of workstations: by using dynamic load balancing and user activity detection, large traveltime problems can be solved without interrupting routine tasks. Shot-level parallelization guarantees almost independent processes allowing reasonable performance on low bandwidth networks. Current work involves development of a complete system for distributed traveltime tomography including a compact checkpointing facility for long-running computations.

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