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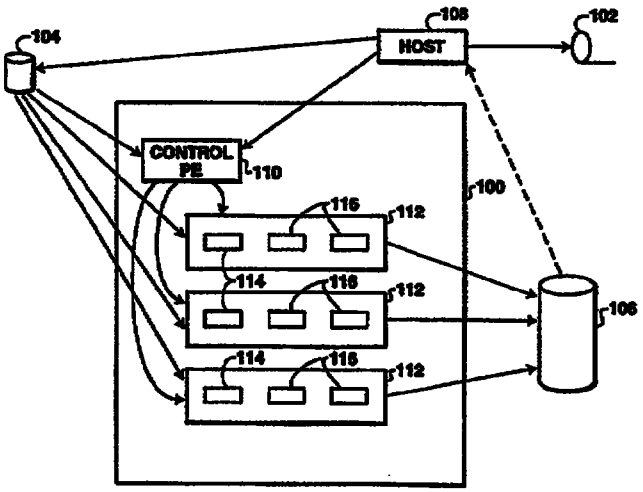
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(54) Title: METHOD FOR DETERMINING SEISMIC DATA TRAVELTIME FIELDS ON A MASSIVELY PARALLEL COMPUTER



(57) Abstract

A method (Figure 3) of determining traveltime fields for use in processing geophysical data. The method is implemented on a computer (100) having massively parallel processors (114, 116). The input to the method is a three-dimensional velocity model of a volume of the subsurface (121) of the earth. The method assigns the traveltime calculations to groups of processors (112), which calculate traveltimes for individual shots. A preliminary simulation of the traveltime calculation process is performed to determine the number of processors required in each group (112). The groups of processors (112) perform the traveltime calculations independent of the other groups. Calculations are performed in spherical coordinates ($r\theta\phi$), with traveltimes interpolated to a rectangular grid for storage (106) and subsequent use. The final traveltimes are compressed in a differential format to reduce data storage and transfer requirements. A control processor (110) is used to dynamically assign calculation tasks to processor groups (112), thereby ensuring load balance across all groups and maximizing throughput of the massively parallel processors (114, 116).