

S8 Performance benchmark technical configuration 915

The benchmark is performed on a quad-core CPU (Intel Xeon E5430 @ 2.66GHz) with 916
 4GB RAM, running Linux (Ubuntu 12.04, kernel 2.6.32) with IBMlib compiled by the 917
 Intel compiler (ifort Version 10.1). The benchmark compares two types of flow fields: a 918
 synthetic flow field, which is a horizontal, stratified flow field over a flat sea bed, 919
 constant temperature and salinity. The synthetic flow field does not have a look-up 920
 overhead for interpolating to particle positions and enforcing boundary conditions, nor 921
 does it utilize I/O or memory to represent physics; the other physics module is the 922
 HBM data set as described below, and the performance and resource needs are typical 923
 to realistic data sets with same spatial and temporal resolution. The offline HBM 924
 database of ocean current frames from the HBM model [20–22] used in this benchmark 925
 were stored in a database (Synology NAS DS1812+) with native spatial resolution (10 926
 km horizontal and up to 50 wet z-layers) covering the North and Baltic Sea, with 1 hour 927
 resolution, so that one frame of basics physical data (3D currents, temperature and 928
 salinity) takes up to 12 MB storage space for each data layer. This database was loaded 929
 sequentially by the Lagrangian simulation running on the computer over a 100Mb/s 930
 shared connection. The biological part of the Lagrangian simulation was the same as 931
 detailed in Section "Lagrangian simulations using different circulation models", as well 932
 as the simulation period, however, we varied the number of particles released and the 933
 physical model applied. 934