



High Performance Computing for



https://forge.ipsl.jussieu.fr/nemo/wiki/WorkingGroups/NEMO_HPC



Development Strategic Plan 2018-22

Strategic Plan	On Going Actions
3.3.1 Internode communications <ul style="list-style-type: none">- Extending the halo size- Overlapping communications and computations	HPC-08_epico_Extra_Halo - included in v4.2RC HPC-07_mocavero_mpi3 – included in v4.2RC
3.3.2 Shared Memory Parallelism <ul style="list-style-type: none">- Tiling- Use of OpenMP / OpenACC	HPC-10_mcastril_HPDAonline DiagGPU - included in v4.2RC
3.3.3 Single core performance <ul style="list-style-type: none">- Better exploitation of cache memory (Tiling)- Enhancement of vectorization level	HPC-02_daley_Tiling - included in v4.2RC HPC-09_epico_Loop_fusion - included in v4.2RC
3.3.4 Designing a user-friendly code structure <ul style="list-style-type: none">- Performance portability- Separation of Concerns- PSyClone	HPC-01_daley_GPU (PSyClone)
3.4 Additional <ul style="list-style-type: none">- Macro task parallelism- Mixed precision	HPC-04_mcastril_Mixed_Precision TOP-06_emalod_OASIS_btw_TOP_NEMO

Overall considerations

- The NEMO HPC-WG gathers a wider community beyond the members of the System Team
 - BSC, ECMWF, NVIDIA, ATOS
- The HPC-WG meets quite regularly once every three months
- All the recommendations of the Dev Strategic Plan are covered
- Almost all the HPC developments have been included in v4.2RC
- Mixed Precision topic requires a deep discussion
- Use of DSL such as PSyClone should be considered for a next level of developments
- The new HPC improvements can be included in the NEMO trunk with some more restrictive requirements
 - The accuracy of the model must not be “compromised”
 - The developer’s interfaces must be kept easily understandable even by not hpc experts
- Some possible issues are related to the maintenance of the code (i.e. debugging, ticketing, ...) not developed by any of the System Teams members
- All the activities are funded with projects at National or at European level
 - (e.g. IS-ENES3, ESiWACE2, IMMERSE, ESCAPE2, 'ExCALIBUR, ...)