Dependencies and Their Versions

Kurt Böhm[1]*, Olaf Ippisch[1]

[1]Institute of Mathematics, Clausthal University of Technology,
Erzstraße 1, 38678 Clausthal-Zellerfeld, Germany

*Corresponding author. E-mail: kurt.boehm@tu-clausthal.de

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1 LINEAL Dependencies

LINEAL depends on a few libraries, which we list together with the versions used for the performance measurements: LINEAL's most foundational dependency is our library THESAUROS, which depends on BOOST.PREPROCESSOR 1.87.0 (header-only) [22], `expected` 1.1.0 (single-header) [5], and `{fmt}` 11.1.1 [38]. LINEAL additionally depends on our library GREX as well as `ankerl::unordered_dense` 4.5.0 (single-header) [31], neither of which has dependencies of its own. The executables which were used to gather the measurements additionally depend on our libraries named JAYBIRD, which is used for JSON I/O and depends on THESAUROS as well as JSON for Modern C++ 3.11.3 (single-header) [33], `mhd-io`, which we use to read METAIMAGE headers [27] and only depends on THESAUROS, and PLAZMA, which we use to compress/decompress XZ files and which depends on THESAUROS, `{fmt}`, and `xz` 5.6.3 [9]. Lastly, we use `argparse` 3.1 (single-header) [29] to handle command-line arguments.

2 HYPRE Dependencies

Unless stated otherwise, the package versions and citations are the same as in the article.

For compiling HYPRE, we enabled the use of 64 bit indices through the `bigint` option, since there are more than 2^{32} non-zero entries in the left-hand side of the diffusion problems, as well as support for OPENMP and SUPERLU 7.0.0 [15, 16, 20]. HYPRE depends on BLAS and LAPACK as well as SUPERLU_DIST 9.1.0 [16, 36, 37, 32]. SUPERLU_DIST, in turn, was used with OPENMP enabled and depends on BLAS and LAPACK, COMBBLAS 2.0.0 [2, 7], METIS at commit `e0f1b88` [25, 23], PARMETIS at commit `8ee6a37` [26, 24], and COLAMD from SUITESPARSE 7.8.3 [14, 13].

3 DUNE Dependencies

Unless stated otherwise, the package versions and citations are the same as in the article and Section 2.

The DUNE measurements use the DUNE COMMON [4, 17] and DUNE ISTL [3, 18] modules, both at version 2.10.0. We used DUNE COMMON with the following optional dependencies: BLAS and LAPACK, GNU MP C++ 6.3.0 [19] and Vc 1.4.4-1 [28] (both Ubuntu *Noble Numbat* packages), and multiple packages from SUITESPARSE 7.8.3 [8, 1, 14, 11, 12, 10, 13]. We found that enabling METIS/PARMETIS or SCOTCH/PTSCOTCH [34] and using the corresponding repartitioning operations worsened performance and therefore conducted our measurements without them, i.e. the number of processes remains constant until all are merged into one. The following additional optional dependencies of DUNE ISTL were additionally enabled: SUPERLU, which depends on BLAS and METIS, and ARPACK++ at commit `d1bec4e` [35] (header-only), which in turn depends on BLAS, LAPACK, SUPERLU, multiple packages from SUITESPARSE, and ARPACK-NG 3.9.1 [30, 21], which depends on BLAS and LAPACK.

4 GINKGO Dependencies

Unless stated otherwise, the package versions and citations are the same as in Section 2.

We configured GINKGO to use METIS and `hwloc` 2.10.0 [6] as provided by the official Ubuntu *Noble Numbat* packages.

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