

硬件配置

- 1. CPU型号：13th Gen Intel(R) Core(TM) i9-13900HX
- 2. 核数：16
- 3. 频率：2419.201 MHz
- 4. avx和avx2
- 5. 31GB

CPU理论峰值计算

- 1. 619.3 GFLOPS

软件系统环境

- 1. 操作系统环境：Ubuntu 24.04.1 LTS
- 2. MPI：mpirun (Open MPI) 4.1.6
- 3. libblas3：3.12.0-3build1.1。
- 4. libopenblas-dev：0.3.26
- 5. libopenblas-pthread-dev：0.3.26。
- 6. libopenblas0：0.3.26。
- 7. libopenblas0-pthread：0.3.26。
- 8. liblapack3：3.12.0-3build1.1。

参数调优的过程和说明

- 1. 首先用自动调参生成一段数据，测得结果为362.34 GFLOPS

2. 自动生成的N为57600，我打算使用内存的85%，计算是59510,测得结果为383.64 GFLOPS

```
li@localhost:~/hpl/bin/linux$ ./xhpl
=====
HPLinpack 2.3  --  High-Performance Linpack benchmark  --  December 2, 2018
Written by A. Petitet and R. Clint Whaley,  Innovative Computing Laboratory, UTK
Modified by Piotr Luszczyk, Innovative Computing Laboratory, UTK
Modified by Julien Langou, University of Colorado Denver
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An explanation of the input/output parameters follows:
T/V      : Wall time / encoded variant.
N        : The order of the coefficient matrix A.
NB       : The partitioning blocking factor.
P        : The number of process rows.
Q        : The number of process columns.
Time     : Time in seconds to solve the linear system.
Gflops   : Rate of execution for solving the linear system.

The following parameter values will be used:

N       : 59510
NB      : 192
PMAP    : Row-major process mapping
P       : 1
Q       : 1
PFACT   : Right
NBMIN   : 4
NDIV    : 2
RFACT   : Crout
BCAST   : 1ringM
DEPTH   : 1
SWAP    : Mix (threshold = 64)
L1      : transposed form
U       : transposed form
EQUIL   : yes
ALIGN   : 8 double precision words

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- The matrix A is randomly generated for each test.
- The following scaled residual check will be computed:
  ||Ax-b||_oo / ( eps * ( || x ||_oo * || A ||_oo + || b ||_oo ) * N )
- The relative machine precision (eps) is taken to be 1.110223e-16
- Computational tests pass if scaled residuals are less than 16.0

=====
T/V      N      NB      P      Q      Time      Gflops
-----
WR11C2R4 59510  192      1      1      366.24      3.8364e+02
HPL_pdgesv() start time Mon Sep 23 15:28:53 2024

HPL_pdgesv() end time  Mon Sep 23 15:34:59 2024

-----
||Ax-b||_oo/(eps*(||A||_oo*||x||_oo+||b||_oo)*N)= 2.21228942e-03 ..... PASSED
=====

Finished      1 tests with the following results:
              1 tests completed and passed residual checks,
              0 tests completed and failed residual checks,
              0 tests skipped because of illegal input values.

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End of Tests.
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```

遇到的问题及解决方案