

????Numpy
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 Numpy LAPACK

 500

 60000×60000

☐ ☐ ☐ ☐ ☐ ☐ ☐ Numpy ☐ ☐ ☐ ☐ LAPACK

☐ MKL ☒ OpenBLAS ☐ ATLAS

Intel CPU MKL

```
conda install numpy
```

☐ Anaconda ☐ CPU ☐ Intel ☐ MKL ☐ AMD ☐ OpenBLAS

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ conda-forge ☐ ☐ ☐ ☐ ☐ ☐

pip

```
pip install numpy
```

OpenBLAS

MKL???

MKL

Numpy

MKL_NUM_THREADS

Numpy

-

CPU

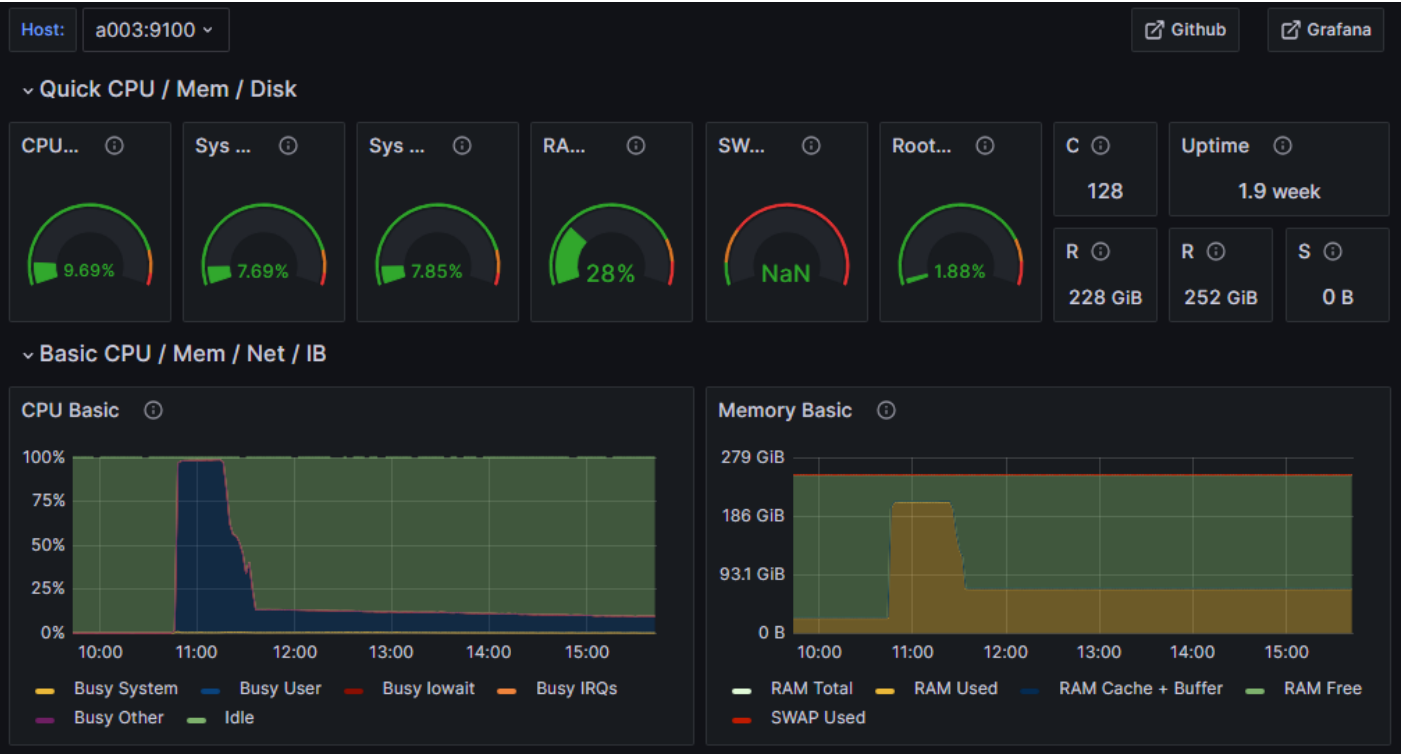
MKL

OpenBLAS

AMD

MKL_DEBUG_CPU_TYPE=5

MKL



```
(work) [hfd_jitz@login1 test_50nm]$ sh show_results.sh
output_44813828:#BSUB -n 48
output_44813828:    Run time :                               1726 sec.
output_44813830:#BSUB -n 16
output_44813830:    Run time :                               835 sec.
output_44813831:#BSUB -n 12
output_44813831:    Run time :                               5551 sec.
output_44813832:#BSUB -n 10
output_44813832:    Run time :                               5654 sec.
output_44813833:#BSUB -n 8
output_44813833:    Run time :                               958 sec.
output_44813834:#BSUB -n 6
output_44813834:    Run time :                               1252 sec.
output_44813836:#BSUB -n 2
output_44813836:    Run time :                               2543 sec.
```



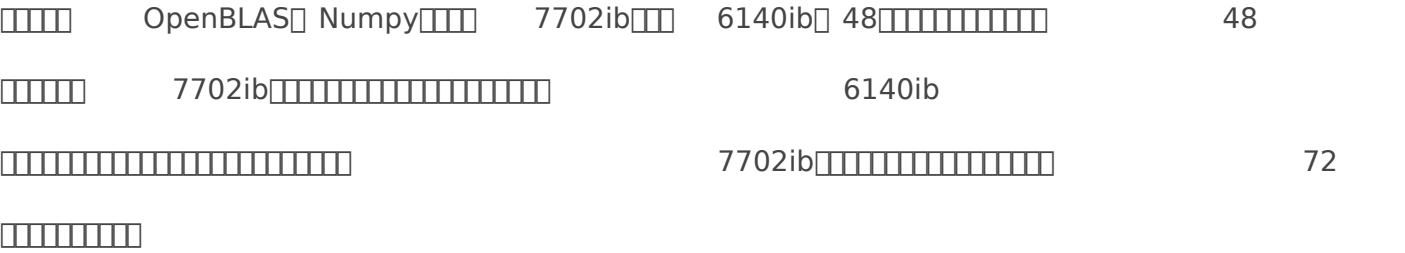
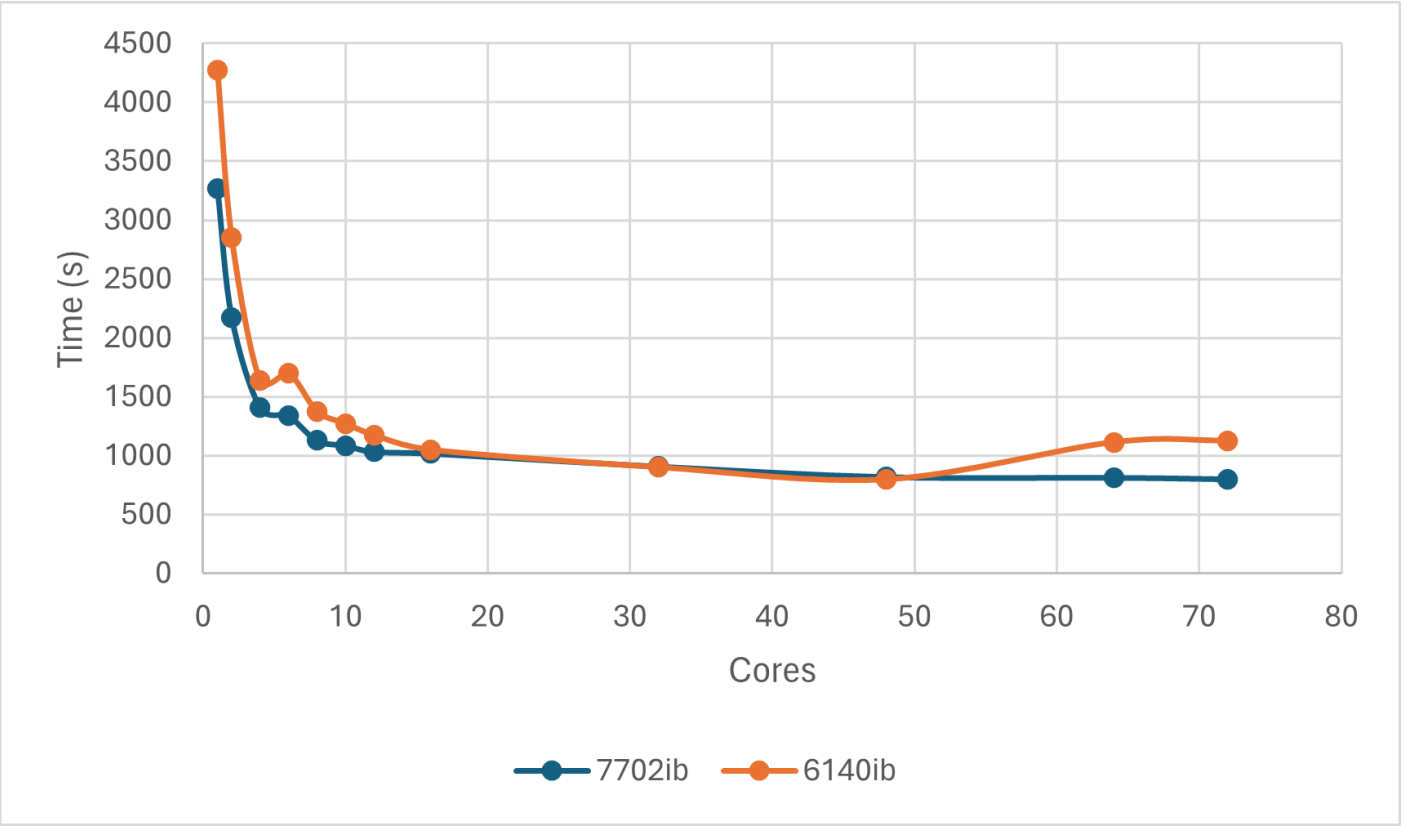
LAPACK

AMD CPU

☐ ☐ ☐ ☐ ☐ ☐ ☒ OpenBLAS ☐ Numpy ☐ ☐ ☐ ☐ ☐ ☐

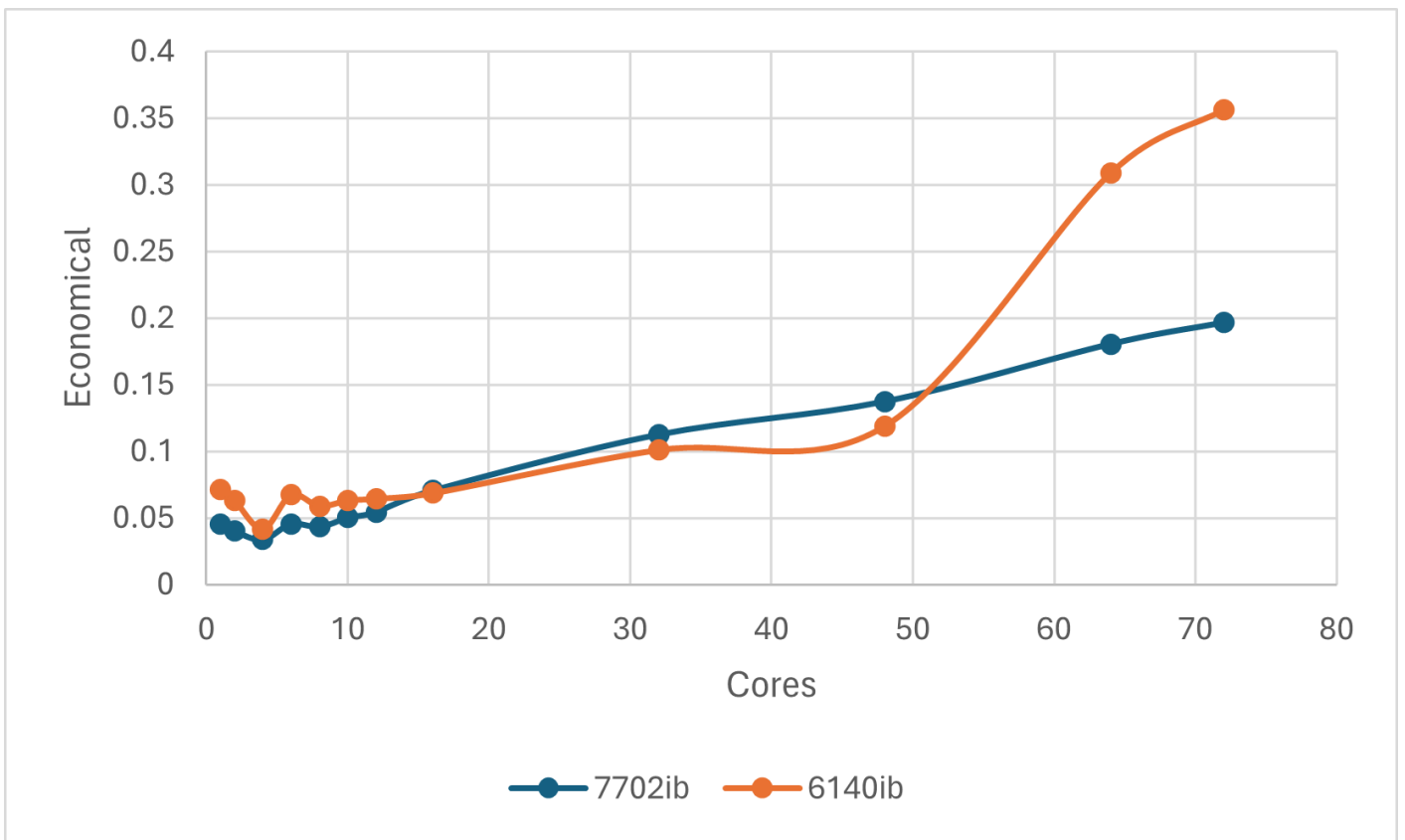
??????

MKL 4 BUG 8 OpenBLAS 24



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☐ Numpy ☐ OpenBLAS

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NumPy

1. NumPy

2. MKL NumPy Numpy

LAPACK MKL
OpenBLAS

3. NumPy

4~5

4~16 4