Computer Hardware Recommendations for Terra Applications

Processor / Graphics Card / RAM

- TerraScan, TerraPhoto, TerraMatch, TerraModeler and TerraBatch code runs on CPU only
- CPU speed determines how fast the applications run

- Only one use case where you get a speed improvement from a good NVIDIA graphics card:
  - TerraPhoto uses GPU when reading PhaseOne .iqq raster files

- Large point clouds require a good amount of RAM
  - 16GB RAM minimum to run the software
  - 32GB RAM recommended minimum for doing real work
  - More RAM means you can read in more points at the same time or run more instances of TerraBatch

Processor & Number of Cores

- TerraScan, TerraPhoto, TerraMatch and TerraBatch have many routines which are multithreaded
- Code is currently limited to maximum 256 processing threads (June 2025)
- User can specify how many concurrent threads applications are allowed to utilize (1-256)

- Some routines are single threaded
- Most of time consuming steps are multithreaded
- Both single thread speed and multiple thread speed are important when choosing CPU

Workstation Recommendations in Order of Importance

1. Big screen (larger screen saves user time – less time spent zooming in, zooming out)

2. Enough RAM (32GB or more)

3. Fast processor

4. Fast hard disk (M.2 SSD)

# Workstation / Server For Running Batch Processes

- Many batch processes can be run using multiple instances of TerraBatch
- Number of instances that can be run is limited by RAM memory
- Number of processor cores affects how big speed improvements can be achieved running multiple instances

- Number crunching computer recommendation:
  - 256GB or more of RAM
  - Processor with a high core count
  - Fast hard disk system

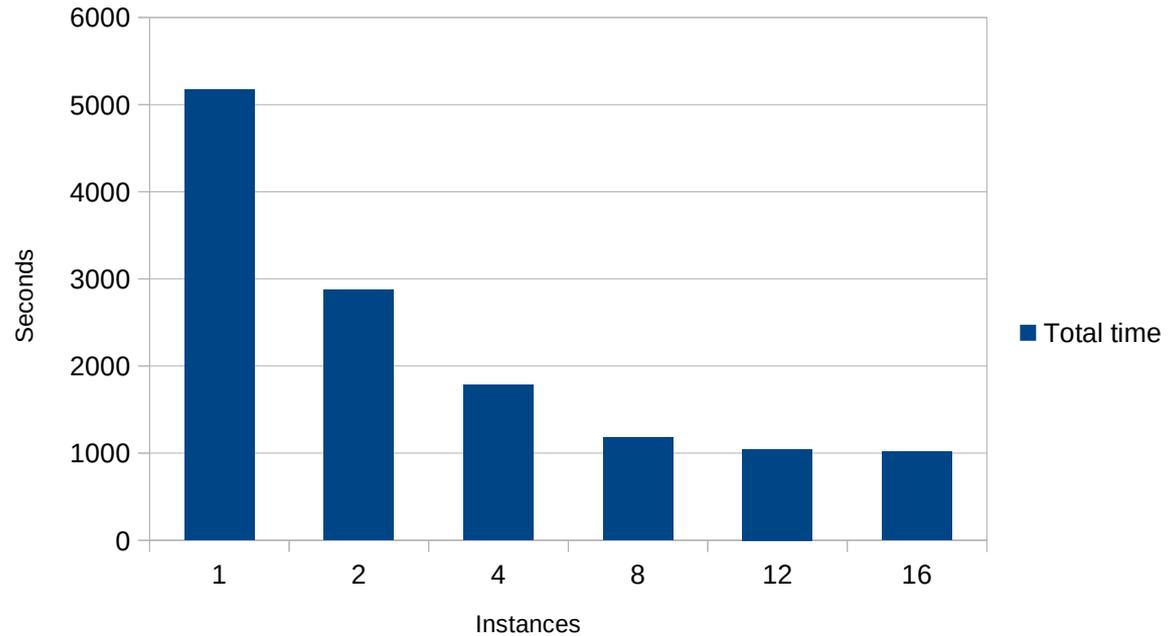# Speed Improvement from Running Multiple Instances

- Running multiple instances of TerraBatch speeds up batch processes
- Speed improvement is big if:
    - Macro has time consuming steps which are not so multithreaded (such as ground routine)
    - File format is LAZ (reading and writing is time consuming single threaded process)

- Example task: ground macro on 120 blocks using LAZ format, 10m neighbours
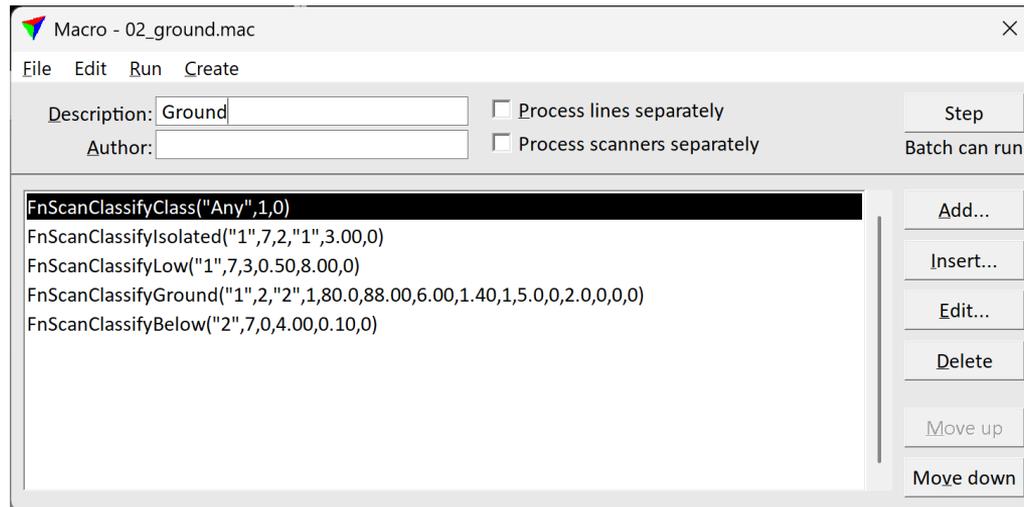
Speed Improvement from Running Multiple Instances

- Test computer: notebook, 256 GB RAM, Intel Core Ultra 9 275HX, 24 cores, M.2 SSD
- Run time 1 instance: 5169 sec
- Run time 2 instances: 2873 sec
- Run time 4 instances: 1782 sec
- Run time 8 instances: 1177 sec
- Run time 12 instances: 1047 sec
- Run time 16 instances: 1018 sec

Speed Improvement from Running Multiple Instances

- Test computer: workstation, 256 GB RAM, AMD Threadripper PRO 7995WX, 96 cores, M.2 SSD
- Run time 1 instance: 4796 sec
- Run time 2 instances: 2445 sec
- Run time 4 instances: 1254 sec
- Run time 8 instances: 671 sec
- Run time 12 instances: 483 sec
- Run time 16 instances: 391 sec
- Run time 20 instances: 342 sec
- Run time 24 instances: 308 sec
- Run time 28 instances: 279 sec
- Run time 32 instances: 291 sec