Fast flow accumulation

This project will improve the speed of flow accumulation.

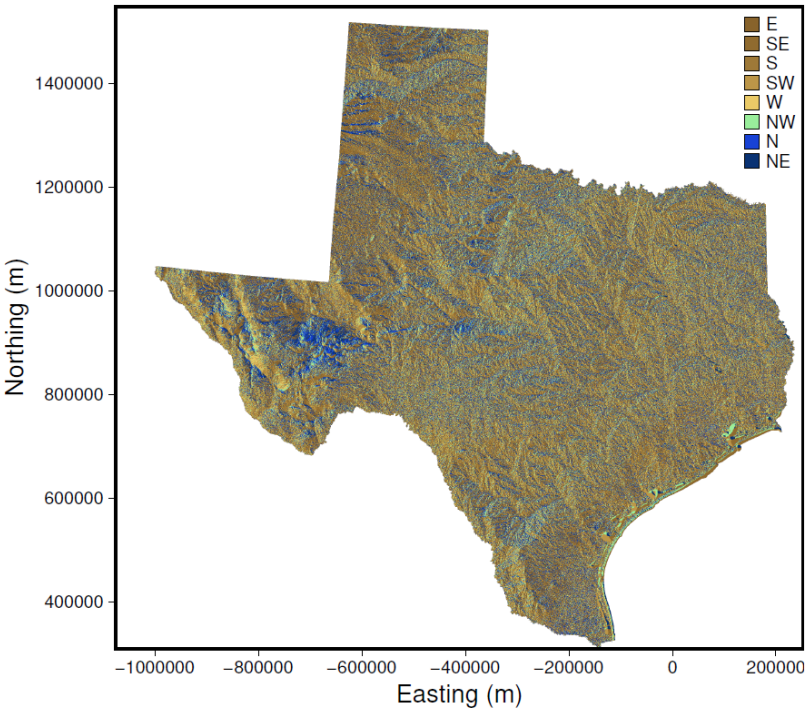
MEFA

Preliminary results

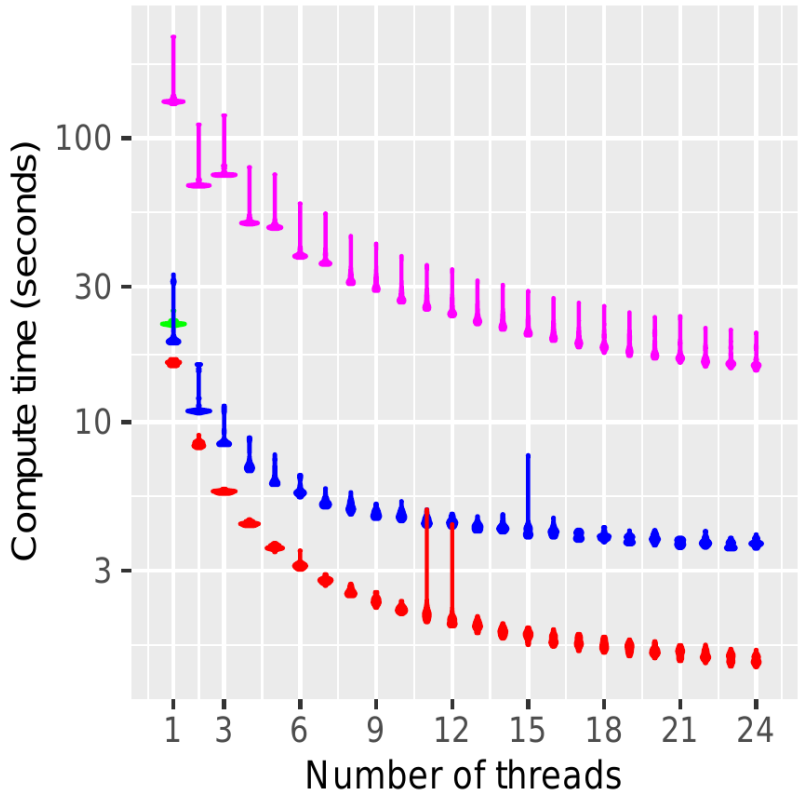
- Systems
  - Linux 4.14.39 with SSD and 16GB RAM on Yoga 370
  - ArcGIS on UNG Windows with SSD and 32GB RAM
- Data: Texas drain raster from Efficient longest flow path algorithm
- Benchmark algorithms from https://github.com/zhouguiyun-uestc/FastFlow

Program	Algorithm only (sec)	Total (sec)
`FastFlow Zhou fdr.tif fac.tif`	61	87
`FastFlow Wang fdr.tif fac.tif`	174	277
`FastFlow Recursive fdr.tif fac.tif`	178	204
`FastFlow Jiang fdr.tif fac.tif`	304	333
`FastFlow BTI fdr.tif fac.tif`	118	144
TauDEM `aread8 -p taud8.tif -ad8 tauad8.tif`	402	607
TauDEM `mpiexec -n 2 aread8 -p taud8.tif -ad8 tauad8.tif`	310	514
ArcGIS Flow Accumulation		478
Arc Hydro Flow Accumulation		681
Coming soon	**48**	**107**
Yet another coming soon	**21**	**33**

Results



Projection: NAD83 / Conus Albers (EPSG:5070)



Discussion

Too much overhead for raster I/O. Need to reimplement I/O using GDAL or from scratch? Done using GDAL.

References

- A fast and simple algorithm for calculating flow accumulation matrices from raster digital elevation models (https://doi.org/10.1007/s11707-018-0725-9)
- Raster API tutorial
- TIFF - Image File Format
- Reading a Single TIFF Pixel Without Any TIFF Tools

projects