GAMIT/GLOBK Refresher: Known Issues

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https://geoweb.mit.edu/gg/courses/202206_SAGE-GAGE/

Known Issues

- We have compiled, and continue to add, common known issues along with solutions to a web page: https://geoweb.mit.edu/gg/issues.php
  - There are general issues along with issues specific to certain operating systems (Ubuntu, Debian, openSUSE, Fedora and macOS)
- This is a good place to start if you ever come across new problems
- The following slides describe some of the more recent issues we have come across

Locale settings

- Many languages use a comma for the decimal separator rather than a dot, e.g. 1000,00 not 1000.00
- These locale settings in the operating system's environment can cause issues with numerical computing and printing of numerical values
- Typical messages are:
  - `Looking for rinex files which have data between 2018/04/05  0:00 and 2018/04/05  0:00 and have a minimum span of 0.1 hrs`
    (note the start and end times are the same)
  - `FATAL  :220609:1606:58.0 SOLVE/get_err_apr: a priori error for site  4 is zero`
    `FATAL GAMIT sh_chksolve: Solve failed to complete normally – check screen or log file`
- This situation is solved by setting the environment variable "LC_NUMERIC" to "C", e.g.
  - `LC_NUMERIC='C'; export LC_NUMERIC` (bash/zsh)
  - `setenv LC_NUMERIC 'C'` (csh/tcsh)

gfortran version 10 (and greater)

- Some issues were caused by the stricter standards introduced in gfortran 10 (and greater)

- The source code of GAMIT/GLOBK requires an additional compiler ("FFLAGS") option to allow previous standards during compilation
  - This option is not recognized and causes an error if used with gfortran versions prior to 10
  - We are left with having to edit libraries/Makefile.config and gamit/solve/Makefile.generic to accommodate the version of gfortran

- As always, we *never* include a compilation file in incremental updates where it might overwrite a local version, but instead rename any update with the ".new" suffix, so first rename (copy of move) the file after expanding the incremental_updates tar-file

gfortran version 10 (and greater)

- libraries/Makefile.config.new
  - Rename (copy or move) to libraries/Makefile.config, then edit for your operating system in the same way as your original local file
  - Be careful only to uncomment the one "FFLAGS" line that is relevant to your version of gfortran/gcc in the appropriate operating system block (e.g. "Linux" or "Darwin" for macOS)
- gamit/solve/Makefile.generic.new
  - Rename (copy or move) to gamit/solve/Makefile.generic, then edit for your operating system in the same way as your original local file
  - Be careful only to uncomment the one "FFLAGS" line that is relevant to your version of gfortran/gcc

curl with OpenSSL version 3 (and greater)

- Security updates have caused connection issues to CDDIS
- Allow legacy ("unsafe") renegotiation, following https://github.com/Kong/insomnia/issues/4543#issuecomment-1126771807:
  - Edit /usr/lib/ssl/openssl.cnf or /etc/ssl/openssl.cnf (depending on your system) to add the following lines:

```
:

[openssl_init]
# providers = provider_sect. # commented out

# added
ssl_conf = ssl_sect

# added
[ssl_sect] system_default = system_default_sect

# added
[system_default_sect]
Options = UnsafeLegacyRenegotiation

# List of providers to load
[provider_sect] default = default_sect

:
```

Mac M1 chips

- Apple's transition from Intel to their own M1 chips requires redevelopment of many apps and programs to accommodate the different architecture

- gfortran appears to have some issues with memory registration for very large programs (requiring > 4 GB RAM), which we hope will be resolved by further development of GNU's GCC compilers

- In the meantime, Macs with M1 chips must have a couple of GAMIT/GLOBK programs reduced in size or removed to compile properly:
  - Reduce "`parameter ( max_ent = 22571599 )`" in ~/gg/kf/blsum/tssum.h
  - Remove track from ~/gg/kf/