Installation of GAMIT-GLOBK

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Material from R. King, T. Herring, M. Floyd (MIT) and S. McClusky (now ANU)

Sources of prerequisite information

http://web.mit.edu/mfloyd/www/computing/gg/pre/

ftp://guest@chandler.mit.edu/updates/documentation/GAMIT_prerequisites.pdf

http://web.mit.edu/mfloyd/www/computing/mac/gfortran/

http://web.mit.edu/mfloyd/www/computing/mac/gv/

Master installation directory

Master installation directory

- Choose a suitable directory for installing the software
  - Suggested place in home directory, e.g. `~/src/gg`, `~/Programs/gg`, etc. For example, I install GG version 10.5 in `/Users/Mike/Programs/gg/10.5`
  - Alternative may be your `/usr/local` directory, e.g. `/usr/local/gg/10.5`
- Change to this directory for downloading the source code
- This will ultimately be the directory that is linked to from your home directory (`~/gg`)

Downloading source via FTP

FTP server

- chandler.mit.edu
  - username: guest
  - password: [changeable]
- Use FTP client, such as `ftp` or `ncftp`
- Alternatively, use internet browser
  - ftp://guest@chandler.mit.edu

Source code

- Change directory to `updates/source/`
- Need *at least*:
  - com
  - gamit
  - help
  - kf
  - libraries
  - tables
  - incremental_updates (if any)
- Also download install_software
- Depending on your processing strategy, may also need to download grids (e.g. ocean-tide loading, atmospheric loading grids, etc.) from ftp://everest.mit.edu/pub/GRIDS

Updates!

- Incremental updates are made available approximately every month, so please check
  - SV-PRN translation tables
  - Leap seconds
- Example: 2015-06-30T23:59:60Z leap second
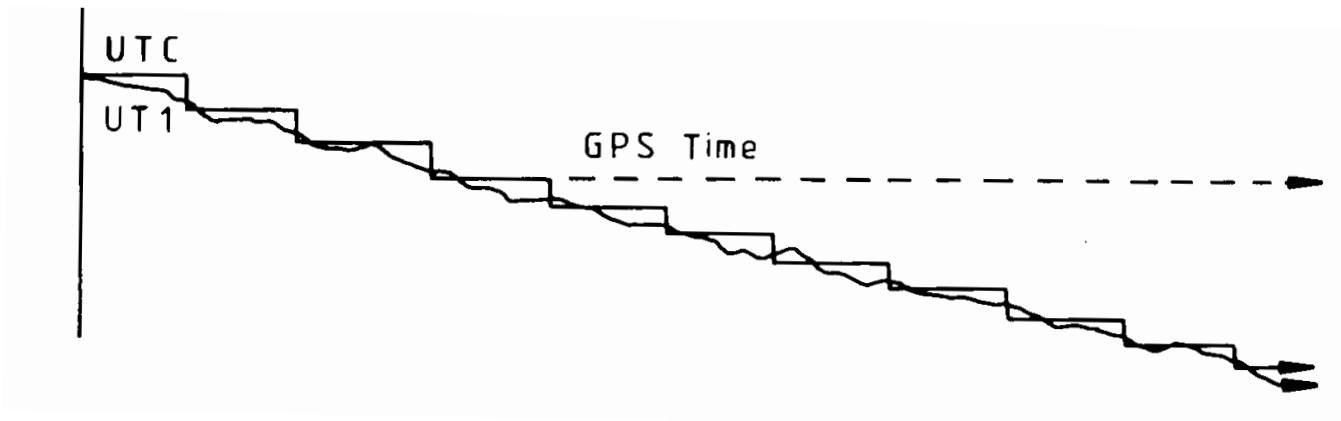
Documentation

- Top-level "README" file at
  ftp://guest@chandler.mit.edu/updates/README
- Change directory to `updates/documentation/`
  - GAMIT-GLOBK prerequisites in **GAMIT_prerequisites.pdf**
    ftp://guest@chandler.mit.edu/updates/documentation/GAMIT_prerequisites.pdf
  - Introductory GPS material in **Intro_GG.pdf**
    ftp://guest@chandler.mit.edu/updates/documentation/Intro_GG.pdf
  - GAMIT reference manual in **GAMIT_Ref.pdf**
    ftp://guest@chandler.mit.edu/updates/documentation/GAMIT_Ref.pdf
  - GLOBK reference manual in **GLOBK_Ref.pdf**
    ftp://guest@chandler.mit.edu/updates/documentation/GLOBK_Ref.pdf

Installing GAMIT-GLOBK etc.

Required tools

Depending on your system, a number of programs may need to be added. One needs:

- A Fortran code compiler
- A C code compiler
- X11 libraries and headers, specifically:
  - libX11.a, libX11.so, libX11.dylib or libX11.la (depending on your system)
  - Xlib.h
- Linux
  - Be sure a C-shell (csh and tcsh) is installed (this is not the case by default with Ubuntu, for instance)
  - X11 libraries and headers may also need to be installed
- Mac
  - Have an Apple ID and download the latest "Command Line Tools for Xcode" (Mac OS X 10.7.3 or later) or "Xcode" (prior to Mac OS X 10.7.3) appropriate to your system from https://developer.apple.com/downloads/index.action
  - X11 was replaced by XQuartz (http://xquartz.macosforge.org/) for Mac OS X 10.8 (Mountain Lion) and later
- Windows (Cygwin)
  - Devel/make
  - Math/bc
  - Shells/tcsh
  - X11/libX11

Notes on known problems

- Very new gfortran releases, especially those with a version number ending in 0 (e.g. 4.9.0), often are buggy and produce compilation problems
  - If this is the case, try compiling a program using only the '-O3' flag or revert to an older, stable version of gfortran
- I currently run gfortran 4.8.2 on my laptop with Mac OS X 10.10 (Yosemite) and 4.7.3 on MIT computers with Ubuntu Linux
  - Note Ubuntu's gfortran 4.8 appears to be buggy

Running install_software

From the master installation directory, where the source tar-files and install_software should be copied

- Run `./install_software`
- As you pass through the installation process, *please read the questions*, e.g.
  - ```
    Searching directories set in libraries/Makefile.config for X11
    installation
    Verified these paths to X11 libs and includes
    X11LIBPATH:
    X11INCPATH:
    Are these paths complete and correct for your system? (y/n)
    ```
- If they are not correct, say "n" then install_software will search or exit and one can then edit libraries/Makefile.config appropriately

A note here on permissions

- A computer may read ("r"), write ("w") and/or execute ("x") a directory or file
- Each action may be allowed by a user ("u"), group ("g") or others ("o")
- A computer must follow instructions, called "permissions", on if it allowed to do any or all of these for any
- Any file that you want to run as a program must be made "executable"
  - `chmod a+x <file>`
  - Change moderations (permissions) so executable ("x") permissions are added to <file> for all ("ugo")
- You may find you need to verify that directories and files are readable, writable and/or executable as necessary throughout your UNIX experience

Potentially necessary edits

- libraries/Makefile.config is the main control file for the installation process
- Check:
  - X11LIBPATH (path to libX11)
  - X11INCPATH (path to Xlib.h)
  - MAXSIT (max. number of sites to process simultaneously)
  - MAXSAT (do not change)
  - MAXATM (max. atmospheric estimates per session)
  - MAXEPC (max. epochs per session, e.g. 24 hours at 30 s interval = 2880 measurement epochs)
  - OS block (usually no need to change)

Setting environment variables

- sh/bash (e.g. in ~/.bashrc or ~/.profile):
  ```
  gg='/usr/local/gg/10.4'
  PATH="$gg/com:$gg/gamit/bin:$gg/kf/bin:$PATH"
  && export PATH
  HELP_DIR="$gg/help/" && export HELP_DIR
  INSTITUTE='MIT' && export INSTITUTE
  ```

- csh/tcsh (e.g. in ~/.cshrc):
  ```
  set gg = '/usr/local/gg/10.4'
  setenv PATH "$gg/com:$gg/gamit/bin:$gg/kf/
  bin:$PATH"
  setenv HELP_DIR "$gg/help/"
  setenv INSTITUTE 'MIT'
  ```

Additional software

- Generic Mapping Tools (GMT) (http://gmt.soest.hawaii.edu/)
  - Required for plotting scripts to work
  - Download and run install_gmt.sh and follow prompts
- Tom's GGMatlab tools (http://www-gpsg.mit.edu/~tah/GGMatlab/)
  - tsview
  - velview

GMT

Install netCDF (http://www.unidata.ucar.edu/downloads/netcdf/current) first:

- If unable to install via, e.g. Ubuntu Software Manager then…
- Download latest source code to suitable directory (e.g. ~/src)
  - `wget http://www.unidata.ucar.edu/downloads/netcdf/ ftp/netcdf-4.3.0.tar.gz`
- Expand tar-file
  - `tar xvfz netcdf-4.3.0.tar.gz`
- Change directory and configure *without* netcdf-4 support (unless you have required HDF5 and zlib installed) and install in /usr/local
  - `cd netcdf-4.3.0`
  - `./configure --disable-netcdf-4`
- Run the usual make sequence to install in /usr/local (configure's default)
  - `make`
  - `make check`
  - `sudo make install`

GMT

- Download and execute install_gmt.sh (http://gmt.soest.hawaii.edu/gmt/install_gmt.sh)
- Answer the questions appropriately (most defaults settings are adequate)
- Default configuration installs netCDF in /usr/local/lib, /usr/local/include, etc. (previous slide)
- Suggested installation directory for GMT is /usr/local/GMTX.Y.Z (where X.Y.Z is currently 4.5.9)
- Be sure to follow the instructions regarding setting *environment variables* (PATH, MANPATH)

Processing directories

Processing directory

- The *processing* directory will not have the same structure as the *master installation* directory

- Choose a different location, do not process in your master installation directory

- We will, however, be copying or linking to the master installation tables (soft link or "shortcut" ~/gg/tables)

Example continuous GPS structure
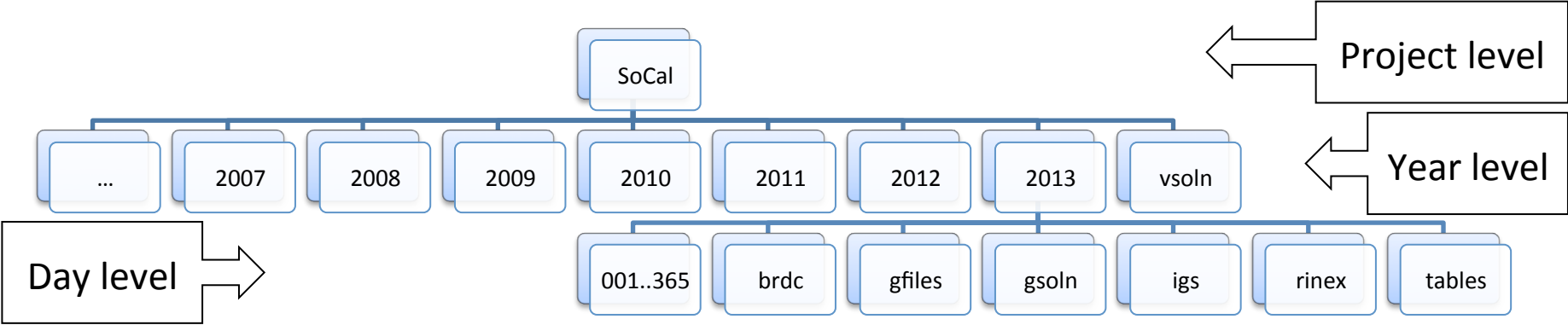
Example survey GPS structure