

# Compilation and Installation of aips++ under FC6

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Snapshots of a failed attempt to compile `aips++` with `g++` 4.1.1 and `java` 1.5.0\_03 under the `Fedora` Core 6 version of Linux are provided, using the current file layout in the `strw.leidenuniv.nl` domain. The information given here is similar to [http://www.aoc.nrao.edu/~rurvashi/DataFiles/fc4\\_aips++\\_build.html](http://www.aoc.nrao.edu/~rurvashi/DataFiles/fc4_aips++_build.html), but much more specific on the installation of auxiliary packages.

## I. OVERVIEW

`Aips++` is currently distributed as a `rpm` for a Red Hat Linux version of the `i386` architecture. The disadvantages of this situation are

- The generic user does not sufficient write permissions in the file system, directories `/usr` etc, to install `rpm`. Instead, the files ought be written into a local file tree like `/${HOME}/work`, which I'll refer to as if it had been put into the shell variable `USERROOT` with a `setenv` command. This assumes that `USERROOT/bin` is a component of `$PATH` and `USERROOT/lib` a component of `$LD_LIBRARY_PATH`.
- The local processor architecture might be `i686`, reported by `uname -a` on the individual computer.
- The local operating system might be `Fedora`, with a different file system than what is assumed by the `rpm`, causing problems at dynamic link time.<sup>[1]</sup>

For these reasons, the installation must be modified relative to the description in <https://wikio.nrao.edu/bin/view/Software/ObtainingCasaRedHat>. What follows has been obtained by setting `JAVA_HOME` to `/software/local/jdk1.5.0_03` to attach to a newer compiler than the Sterrewacht default; use `javac -version` to check versions.

The zoology of installation tools that we'll meet on the road includes

- UNIX make in the version of `gmake`
- `antlr`
- `ccmtools`
- `configure` and `autoconf`
- `rpm`

Four out of these five packages are already available on FC6. Everything with the exception of the `aips++` package itself can be downloaded to a temporary directory, typically `$TMP`, and—to the relief of the quotas set by the system administrator on the `USERROOT`—distributed with `--prefix` options into `USERROOT`. The `casa` directory itself will occupy 992 MB in `USERROOT`.

## II. INSTALLATION OF HEADER FILES

Missing C/C++ header files is a generic problem with the standard Fedora distribution. For almost all “application” programming these are needed, but only the compiled libraries are provided by the `rpm`.

The Sterrewacht installation of `python` is incomplete since the C header files have not been installed; this is indicated by the fact that no file `Python.h` can be found but the apparently very old `/software/local/include/python1.5/Python.h`. This is cured by re-installation of a private version.

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### A. ncurses

Since compilation of `python` needs the `curses.h` header file which isn't installed, we first install the `ncurses` package from <http://rpmfind.net/linux/rpm2html/search.php?query=ncurses-devel> which we put into `$TMP/ncurses-5.4-17.src.rpm`. To bypass the standard `rw-restrictions` on system directories for the ordinary user, an auxiliary `rpm` directory is set up first...

```
rpm --initdb --dbpath $TMP
mkdir -p $TMP/usr/src/redhat
rpm --install --root $TMP --prefix $USERROOT ncurses-5.4-17.src.rpm
cd $TMP/usr/src/redhat/SOURCES ; bunzip2 *.tar.bz2 ; tar xf ncurses*.tar
mv ncurses-5.4 $TMP
cd $TMP/ncurses-5.4
./configure --prefix=$USERROOT --without-debug --with-libtool \
  --enable-termcap --without-ada --enable-overwrite
make
make install.includes install.libs
```

There might be ways to install only the header files with `make install.includes` instead, because the `libcurses*` files are already installed. The problem with such an approach is that the directory prefixes for include and library files will differ later on (`$USERROOT` vs. `/usr`).

A side effect of this might be that `vim` calls complain about errors in `/etc/termcap[2]`, which may probably be avoided by moving `$USERROOT/lib/libncurses*` out of sight after installation.

### B. Tcl/Tk

The source code has been obtained from <http://tcl.sourceforge.net/>, again for the purpose of getting the header files,

```
gunzip tcl*.gz tk*.gz
tar xf tcl8.5a5-src.tar
tar xf tk8.5a5-src.tar
cd tcl8.5a5/unix
./configure --prefix=$USERROOT --enable-shared --disable-symbols --enable-man-symlinks
make
make install
cd tk8.5a5/unix
./configure --prefix=$USERROOT --enable-shared --disable-symbols --enable-man-symlinks
make
make install
```

### C. Python-2.4

The source code can be obtained from <http://www.python.org/download/>, then

```
gunzip Python*.tgz ; tar xf Python*.tar
cd Python-2.4.4
setenv CPPFLAGS -I$USERROOT/include
./configure --prefix=$USERROOT --enable-shared
make >& build.log
make install
```

## III. F77

The Sterrewacht Fedora installation is incomplete w.r.t. providing `libg2c`, because a symbolic link from `libg2c.so.0` to `libg2c.so` is missing in `/usr/lib`.<sup>[3]</sup> The workaround is to provide a local copy with

```
ln -s /usr/lib/libg2c.so.0 $USERROOT/lib/libg2c.so
```

See <http://dis2001.bo.infn.it/alice/alice-doc/mll-doc/ali-inst/node40.html>.

## IV. COMPILATION OF CCMTOOLS

### A. dbxml-2.3.8

The source code is obtained from <http://www.oracle.com/technology/software/products/berkeley-db/xml/index.html>; db-4.5.20 is already included. Again, we find the (some) libraries in `/usr/lib/libdb*`, but the C/C++ header files are missing.

The source code is expanded with

```
gunzip dbxml-2.3.8.tar.gz
tar xf dbxml-2.3.8.tar
cd dbxml-2.3.8
sh buildall.sh -p linux --prefix=${USERROOT} --enable-java >& build.log
```

The option `--enable-perl` for `buildall.sh` would lead to errors on missing write permissions to `/usr/lib/perl5`; it is *not* used.

### B. mico

The source code is obtained from <http://www.mico.org/mico-2.3.12.tar.gz>.

```
gunzip mico*.tar.gz
tar xf mico*.tar
cd mico
./configure --prefix=$USERROOT --enable-final
make >& build.log
make install
```

### C. confix

We obtain `Confix-1.3pre21` from <ftp://ftp.cv.nrao.edu/casa/src>. (I did not manage to compile/install the package based on a newer version from <http://sourceforge.net/projects/confix>, because `confix2.py` looks for files named `Confix2.cfg` that are not found in the `confix` documentation nor provided in the `ccmtools` sources.)

```
gunzip Confix*.gz
tar xf Confix*.tar
cd Confix*.[0-9]
python setup.py install --prefix=${USERROOT} >& build.log
setenv PYTHONPATH /usr/lib/python2.4/site-packages:${USERROOT}/lib/python2.4/site-packages
```

### D. ccmtools

#### 1. configuration

We obtain `ccmtools-0.5.5.tar.gz` from <ftp://ftp.cv.nrao.edu/casa/src>.

```
gunzip ccmtools*.gz
tar xf ccmtools*.tar
setenv CCMTOOLS_HOME $USERROOT
cd ccmtools-0.5.5/ccmtools
setenv CLASSPATH ${CLASSPATH}:${USERROOT}/lib/dbxml.jar:${USERROOT}/lib/db.jar
ant install -Dprefix=${USERROOT} >& build.log
setenv CLASSPATH ${CLASSPATH}:${CCMTOOLS_HOME}/lib/ccmtools.jar
```

Add a file `/${HOME}/.confix` with the contents

```
# The Confix profile for CCM Tools
ccmtools_profile = {
  'PREFIX': '/home/.../work', # insert $USERROOT here
  'ADVANCED': 'true',
  'USE_LIBTOOL': 'true',
  'CONFIX': {
  },
  'CONFIGURE': {
    'ENV': {
      'CC': 'gcc',
      'CXX': 'g++',
      'CFLAGS': "-g -O0 -Wall ",
      'CXXFLAGS': "-g -O0 -Wall ",
    },
    'ARGS': [
      '--with-mico=/home/.../work/lib/mico-setup.sh' # insert $USERROOT/lib/mico-setup
    ]
  },
}

PROFILES = {
  'default': ccmtools_profile
}
```

## 2. patches

To avoid an intermediate complaint on a non-existing directory

```
mkdir ${USERROOT}/repo
```

To avoid python error messages put both lines in the two files `wx/Makefile.py` and `ccm/Makefile.py` into comments (that is: insert `#` at the beginning of the lines).

To avoid an error message on an unexpected `propagate_only` argument remove the `propagate_only=1` arguments in `wx/external/mico/basic/Makefile.py` and `wx/external/mico/coss/Makefile.py`.

To enable installation of the `CCM_Python` subdirectory (which will be used by some `aips++` modules)

- call

```
touch cpp-environment/ccm/CCM_Python/Makefile.py
```

to create an empty file there.

- add a slash right in front of the `namespace` string in the third but last lines of `ccm/CCM_Python/HomeFinder.h`, which then has three slashes in that line
- append a `// /namespace CCM_Python` to the third but last line of `ccm/CCM_Python/Py.h` and `ccm/CCM_Python/PySub.h`, after the curly closing brackets.
- change the value of `pythonversion` in `cpp-environment/build.xml` from 2.5 to 2.4 to correspond to the action of Section II C.
- add the line

```
// CONFIX:FILE_PROPERTIES({'MAIN': 0})
```

at the end of the file `ccm/CCM_Python/Py.cc` to tell `confix` not to handle this as an executable with a `main`.

### 3. more patches and installation

Then

```
cd ccmtools-0.5.5/cpp-environment
setenv CPPFLAGS "-I${USERROOT}/include/python2.4 -I'pwd'/ccm"
confix.py --packagename=wx --prefix=${USERROOT} --packageversion='0.5.1-pre5' \
  --builddir=$TMP --packageroot='pwd'/wx \
  --bootstrap --configure --make --targets=install

confix.py --packagename=ccm --prefix=${USERROOT} --packageversion='0.5.1-pre5' \
  --builddir=$TMP --packageroot='pwd'/ccm \
  --bootstrap --configure --make --targets=install
```

- There may be errors on broken pipes with `echo` commands from `libtool`. If one has an editable copy of the `libtool`, one can simply suppress the additional `echo` lines with `vi libtool` (searching for the string `--version` in the script) such that the output of

```
libtool --version
```

consists of only one line. This means putting `#` in front of the four additional lines that emit the superfluous copyright statements. This way of patching the error generally means to copy the file `'which libtool'` into the `$PATH` to obtain a file with write-permission.

- There are many syntax errors from the `g++` compiler about missing explicit code pieces in conjunction with using template classes derived from the STL `vector` class in `CCM_Local/CCM_OCL/OclHelpers.h`. This can be patched in each individual case by adding the `this->` string before each occurrence of `operator[]` or `size()` pointed out by the compiler. The second `confix.py` above, with the package root set to the `ccm` subdirectory, must be repeated after each of these editor sessions on the file `CCM_Local/CCM_OCL/OclHelpers.h`. Examples: the original code `const int s = size()` would be changed in `vi` oder `emacs` to `const int s = this->size()`, and the code `const T& element = operator[](index);` to `const T& element = this->operator[](index);` An alternative is to provide explicitly overloaded functions for `size()` and `operator[]`, but this is roughly the same amount of work.

## V. LAPACK

Newer Fedora core releases are no longer shipped with `lapack` included; this package is in the `extras`. Availability can be tested with s.th. like

```
ls -lA /usr/lib/liblapa*
```

In this case, the sources are available from <http://www.netlib.org/lapack>. What is reported here refers to linking with `lapack 3.1.0`.

## VI. CFITSIO

Since `/software/local/lib/libcfitsio*` are rather old, I overloaded this with my own newer version of `cfitsio` from <ftp://heasarc.gsfc.nasa.gov/software/fitsio/c/cfitsio3030.tar.gz>

```
tar --ungzip -x -f cfitsio*.tar.gz
cd cfitsio
./configure --prefix=$USERROOT
make ; make shared
make install
```

This is also needed because the C/C++ header files `fitsio.h` and `fitsio2.h` are again missing at the standard places in the Sterrewacht file system. (However, one will find roughly a dozen different versions at subdirectories of `/software/local` brought in by various other astronomical software packages.)

It might be possible to save only the header files and then link with `/usr/lib/libcfitsio*` if one deals with the problem of the file suffix similar to what is shown in Section III. Another minimalistic approach which I didn't test is to change the `LD_LIBRARY_PATH` to include `/software/local/vlt/lib` and take the header files of `/software/local/vlt/include`.

## VII. WCSLIB 4.2

This is an *uninstallation* of header files of version 4.2 of the `wcslib` that one may have in the include-path somewhere else. A clash of `wcslib` 4.2 with `cfitsio` 3.030 is reported otherwise as

```
Remaking sdfits2ms (opt) because of sdfits2ms.cc timplinst D0sdfits2ms.cc libtasking.a libdish.a libmsfit
liblattices.a libfits.a libmeasures.a libmeasures_f.a libtables.a libscimath.a libscimath_f.a libcasa.a
/disks/nevec2/mathar/PRIMA_ROOT/include/wcslib/wcs.h:1126: error: using typedef-name 'wtbarr' after 'str
/disks/nevec2/mathar/PRIMA_ROOT/include/fitsio.h:409: error: 'wtbarr' has a previous declaration here
/disks/nevec2/mathar/PRIMA_ROOT/include/wcslib/wcs.h:1207: error: using typedef-name 'wtbarr' after 'str
/disks/nevec2/mathar/PRIMA_ROOT/include/fitsio.h:409: error: 'wtbarr' has a previous declaration here
/disks/nevec2/mathar/PRIMA_ROOT/include/wcslib/wcs.h:1231: error: using typedef-name 'wtbarr' after 'str
/disks/nevec2/mathar/PRIMA_ROOT/include/fitsio.h:409: error: 'wtbarr' has a previous declaration here
make[3]: [/home/mathar/work/aips++/linux_gnu/bin/sdfits2ms] Error 1 (ignored)
```

This might be cured by getting rid of the `wcslib-4.2` version. `aips++` has an internal version which is labelled `wcslib-4.3` but not available from the [Calabretta](#) web site. The wrapper introduced in `fitsio.h` seems not to work for C++ environments.

## VIII. QT4

The source code of `Qt` is taken from <http://www.trolltech.com/developer/downloads/qt/x11>.

```
tar -x -z -f qt*4.2.2.tar.gz
cd qt*4.2.2
./configure --prefix=$USERROOT
make
make install
```

## IX. AIPS++

### A. Source

The source codes are available from <ftp://ftp.cv.nrao.edu/casa/src> with the main file `casa-19.1488.tar.gz`. Attempts of compiling this with `gcc` 4.4.1 are certainly futile, so we continue with the `CVS` version as documented in <http://aips2.nrao.edu/daily/docs/casa.html><sup>[4]</sup>

```
cd $USERROOT
setenv CVSROOT ":pserver:anonymous@cvs.cv.nrao.edu:/home/cvs" # csh, tcsh
cvs co -A casa # alternatively cvs export -f -r HEAD casa
```

which yields version 19.1641.00 at the moment. If this version refuses to compile—which could only be taped by becoming familiar with some specific parts of the code—, it is advisable to retrieve a stable version with a `cvs` run like

```
cvs co -r stable-19-1556 casa
```

where the `cvs` tag is available from <http://aips2.nrao.edu/docs/aips++.html>. At the moment, comparing the amount of compiler errors of Section IX G with those of appendix A, one seems to be better off grabbing the most recent version.

## B. patches

- file `code/lattices/implement/Lattices/LattStatsSpecialize.cc`: Replace `nodeR` by `nodeI` in line 507.
- file `code/synthesis/implement/MeasurementComponents/PBMath2DImage.cc`: Line 928: replace `*reRegridJonesImage_p` by `*imRegridJonesImage_p`.

To avoid multiply defined entries in shared libraries for `convertATtoF`:

- file `code/lattices/implement/Lattices/LatticeStatistics.h`: Remove the body of the private member function `convertATtoF`, that is, replace

```
static Float convertATtoF (AccumType value) {return Float(real(value));};
```

by

```
static Float convertATtoF (AccumType value) ;
```

near line 427.

- file `code/lattices/implement/Lattices/LatticeStatistics.cc`: Add the body of the member function as an extra line near line 114:

```
template <class T> Float LatticeStatistics<T>::convertATtoF (AccumType value)
{return Float(real(value));}
```

To avoid multiply defined entries in shared libraries for `convertT`:

- file `code/lattices/implement/Lattices/LatticeHistograms.h`: Remove the body of the member function `convertT`, that is, replace

```
static Float convertT (const T value) {return Float(real((LatticeExprNode)value));};
```

by

```
static Float convertT (const T value) ;
```

near line 322.

- file `code/lattices/implement/Lattices/LatticeHistograms.cc`: Add the body of the member function as an extra line near line 162:

```
template <class T> Float LatticeHistograms<T>::convertT (const T value)
{return Float(real(value)); }
```

These will probably be persistent patches since they depend on how compilers initialize static class members in shared libraries—and this will probably go unnoticed for a while by the maintainers.

- In `casa/code/display/implement/Display/X11PixelCanvas.h` add the line

```
#undef XK_KP_Home
```

after the last of the `include` lines (just before the `namespace` declaration). This avoids some errors in the `XtkPixelCanvas.cc` files which try to access the pointer `display_` from a `static` member function. We can live with the side effect that the `Home` and `Delete` keys may not be “enabled.” This certainly is a hack since it disables a preprocessor symbol originating from `<X11/kysymdefs.h>`.

- In `casa/code/appsglish/apps/msplot_new/D0msplot.h` embrace the entire code after the last `#include` with a `namespace` declaration

```
namespace casa {
...
}
```

In the same file, near the end, delete (or comment) the line

```
template class msplot<Float> ;
```

and move/add it to `casa/code/appsglish/apps/msplot_new/D0msplot.cc`, near the end before the line saying `End casa namespace`. Otherwise the linker will complain about missing template instantiation and say that corresponding ctor cannot be found.

- In line 679 of `code/display/implement/Display/PSPixelCanvas.cc`, in the call to `drawPSImage`, add a cast to `(int)` to the first two arguments, `itsComponentX` and `itsComponentY`.
- To handle an error of de-referencing a pointer to a NULL-object, edit `casa/code/display/apps/gDisplay/TclTkPixelCanvas.cc` as follows: define a macro

```
#define tk_offset_cast(type, member) ((char *)&(x-> member) - (char *)x)
```

somewhere before the function `TclTkPixelCanvas_Init`. In the function body of `TclTkPixelCanvas_Init`, add the dummy declaration

```
const TclTkPixelCanvas *x ;
```

somewhere close to the beginning, and replace the 8 occurrences of the `Tk_Offset` macro—defined in `tcl.h`—by calls to this new, local macro `tk_offset_cast` with the same two arguments.

- In `casa/code/casa/mirlib/dio.c`, add

```
#include <string.h>
```

to the list of files includes by the preprocessor.

- In `casa/code/casa/mirlib/scrio.c`, replace line 13,

```
char *sprintf();
```

by

```
#include <stdio.h>
```

- In `casa/code/casa/mirlib/xyio.c`, add near line 16,

```
#include <stdio.h>
```

- In `casa/code/casa/mirlib/xyzio.c`, add before line 52,

```
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
```

Remove the 2 lines (approximately line 1411)

```
char *malloc() ;
int free() ;
```



### C. configuration

```
mv casa ${USERROOT}
setenv AIPSR00T ${USERROOT}/casa
cd ${USERROOT}/casa/code
install/configure --source
source $AIPSR00T/code/install/aipsinit.csh
mkdir -p $AIPSR00T/linux_gnu/python/2.4
```

where the site might be set to `strw`, the host name to the output of `uname -n`, `amer` in my case, and the configuration to `linux_gnu`, and where the printer variables `printer*default` and `printer*paper` are set to `op42` and `A4`, the system memory to `512000` and the processor number to `1`. More specific values could be retrieved from

```
cat /proc/cpuinfo
```

The variables in the `strw/makedefs` file are edited

- change `X11ROOT` to `/usr`. Change `MotifROOT` to `/software/local/LessTif/Motif2.0`. Do not use `Motif2.1` because this directory does not have the `include` subdirectory.
- change `C++ROOT` to `/usr`,
- remove the `-Wmissing-prototypes` from the `C++STD` because this will otherwise produce tons of warnings on the fact that this option is only available for `ObjC`. Add `-Wno-parentheses`.
- optionally add `nfra` to the `CONSORTIA` entry, after the `nrao`.
- tentatively replace `-lfftw -lrlfftw` by `-lfftw3` since the `fftw` interface that compiled into `libfftw.so` is obsolete.

When the message *If you need to make corrections...* appears, variables in the `install/makedefs` are edited according to the guidelines

- to reflect the Sterrewacht file system change `LAPACKROOT` to `/usr`, change `TEXROOT` to `/usr/share/texmf`, change `TEXBINROOT` to `/usr`,
- to match the actual names of the libraries of Sect. II B change `TCLROOT` to `$(USERROOT)`, `-ltcl` to `-ltcl8.5` and `-ltk` to `-ltk8.5`. Add `-I$(USERROOT)/include` to `AIPSINCL`.
- `HDSDEFS :=`
- to ensure that no unresolved symbols like `png_write_raw` appear at link time, append `-lpng` to `PGPLOTLIB` and `XmPGPLOTLIB`.
- Depending on whether section II C had been executed, `PYTHONROOT := $(USERROOT)` and perhaps also a modification of `PYTHONVER` if version 2.5 was installed.
- Depending on the results of section VI, change `CFITSIOROOT` to `$(USERROOT)` and `CFITSIOINCD` to `$(CFITSIOROOT)/include`.
- Adaptation to the results of section VIII is done by changing `QTR00T` and `QT4R00T` to `$(USERROOT)`.
- Since some of the `demo` code has not yet been adapted to changes in the `image` class of `DOimage.h`, doesn't find header files etc, remove `demo` from the `PACKAGES`.

We find the C/C++ header files of `Numeric` and `Scientific` in `/usr/include` and the `CCM.Python` files in `$(USERROOT)/include` and therefore append

```
-I/usr/include/python2.4 -I$(USERROOT)/include
```

to the `gmake` variables `CPPOPT` and `CPPDBG` in `install/makefile.imp`.

If the patch of Section III had been applied, insert `-L$(USERROOT)/lib` to the lines with `-lg2c` in the files listed by

```
cd $AIPSR00T ; find . -name "*ake*" -exec fgrep -l lg2c {} \; | fgrep linux_gnu
```

## D. glish

It seems that the standard compilation lets some of the application packages look for `glish` header files before it even is compiled—so we get to this task beforehand. In particular, the `gmake` target `allsys` does not recognize the subdirectory `aips` as a standard package because it does not have the directory layout defined with the `PCKG` variables in `install/makefile.pkg`.

```
cd $AIPSR00T/code/aips/glish
setenv TCLSH $USERROOT/bin/tclsh8.5
setenv PLUSINC "-I$USERROOT/include"
./configure --prefix=$USERROOT --enable-dynamic --tcl-includes=$USERROOT/include \
  --tcl-libraries=$USERROOT/lib
```

Add the switch `-fpermissive` to all lines that contain the `-fPIC` flag in all Makefile, running

```
$EDITOR 'find . -name Makefile -exec fgrep -l PIC {} \;'
```

to convert the errors about conversions of `const` parameters into warnings.

```
source $AIPSR00T/aipsinit.csh
make >& build.log
```

Since the Makefile in the directories `linux.gnu` will have been generated just at this time, it is necessary to re-edit those as before,

```
$EDITOR 'find . -name Makefile -exec fgrep -l PIC {} \;'
```

Add `-I$(USERROOT)/include` to the variable `CINCLUDE` in `glish/clients/glishtk/pgplot/tkpgplot/linux.gnu/Makefile` and `glish/clients/glishtk/pgplot/linux.gnu/Makefile`. and then do again

```
make
make install
```

## E. compilation

Try to compile

```
source $AIPSR00T/aipsinit.csh
cd $AIPSR00T/code
setenv CCMTOOLSROOT $USERROOT
setenv EXTRA_CFLAGS -I${USERROOT}/include
setenv EXTRA_CPPFLAGS -I${USERROOT}/include
make allsys >& build2.log
```

which will need roughly one hour on a 3 GHz Pentium machine (radio astronomers would call this a 10 cm computer).

## F. installation

Sterrewacht users have to bypass `/strw0/sfinx/bin/aips++` which will look into `/strw0/sfinx/local/syscap` to call some other version. Insertion of

```
source ${USERROOT}/casa/aipsinit.csh
```

at some appropriate place in `$HOME/.login` or `$HOME/.cshrc` will overrule this behavior, which can be checked with

```
rehash
which aips++
```

A first test then is to start

```
aips++
```

which hangs forever somewhere while parsing `pgplot.g` (which is difficult to debug since the original parser code seems not to be included), and terminates on CTRL-C with

```
"pgplot.g", line 18: error, F is not a function value
"aips++init.g", line 119: error, F is not a function value
```

```
***** Welcome to AIPS++ *****
Copyright (C) 1995-2003, Associated Universities, Inc. Washington DC, USA
AIPS++ comes with ABSOLUTELY NO WARRANTY
```

```
NORMAL: defaultservers ready
NORMAL: dowait variable is T
NORMAL: Starting server timer
NORMAL: Starting server misc
NORMAL: Starting server quanta
```

```
[0]0x8c4f430  frames:      0x8cad830      X
                11          X
           offsets:      0
[1]0x8cad940  frames:      0x8cad830      0x8c89518
                11          4
           offsets:      0          1
[2]0x8cb5ff8
[3]0x8cde910
[4]0x8d40160
[5]0x8d99600  frames:      0x8dc3350
                4
           offsets:      0
[6]0x8daa0f0  frames:      0x8d9df90      0x8dc34c0      X
                2          7          X
           offsets:      0          1
[7]0x8db2f08  frames:      0x8d9df90      0x8dab4f8      0x8dafdc8      X
                2          34         1          X
           offsets:      0          0
```

```
"servers.g", line 494: fatal internal error (glish), bad offset in Frame::FrameElement
```

## G. Open Problems

Referring to `stable-19-1556`, this is a list of what seem to be coding errors (not mentioning those that have been removed by the patches above):

- `MarshButterworthBandpass_1000 (opt)`  
`/home/mathar/work/aips++/code/include/scimath/Functionals/MarshButterworthBandpass.cc: In construct`  
`s<T>::MarshButterworthBandpass(const casa::Record&) [with T = double]':`  
`/home/mathar/work/aips++/code/scimath/implement/_ReposFiller/tmplinst/MarshButterworthBandpass_1000`  
`/home/mathar/work/aips++/code/include/scimath/Functionals/MarshButterworthBandpass.cc:83: warning:`  
`o 'void casa::SimButterworthBandpass<T>::setMinOrder(casa::uInt) [with T = double]'`  
`/home/mathar/work/aips++/code/scimath/implement/_ReposFiller/tmplinst/MarshButterworthBandpass_1000`  
`/home/mathar/work/aips++/code/include/scimath/Functionals/MarshButterworthBandpass.cc:84: warning:`  
`o 'void casa::SimButterworthBandpass<T>::setMaxOrder(casa::uInt) [with T = double]'`  
`Thu 2007/02/22 23:27:39 MET`
- `MarshButterworthBandpass_1010 (opt)`  
`/home/mathar/work/aips++/code/include/scimath/Functionals/MarshButterworthBandpass.cc: In construct`  
`s<T>::MarshButterworthBandpass(const casa::Record&) [with T = float]':`  
`/home/mathar/work/aips++/code/scimath/implement/_ReposFiller/tmplinst/MarshButterworthBandpass_1010`  
`/home/mathar/work/aips++/code/include/scimath/Functionals/MarshButterworthBandpass.cc:83: warning:`  
`'void casa::SimButterworthBandpass<T>::setMinOrder(casa::uInt) [with T = float]'`

- ```

/home/mathar/work/aips++/code/scimath/implement/_ReposFiller/tmplinst/MarshButterworthBandpass_1010
/home/mathar/work/aips++/code/include/scimath/Functionals/MarshButterworthBandpass.cc:84: warning:
  'void casa::SimButterworthBandpass<T>::setMaxOrder(casa::uInt) [with T = float]'

```
- `dfftpak` (opt)

```

/home/mathar/work/aips++/code/scimath/fortran/dfftpak.f: In subroutine 'drfti1':
/home/mathar/work/aips++/code/scimath/fortran/dfftpak.f:82: warning:
  CALL DRFTI1 (N, WSAVE(N+1), WSAVE(2*N+1))
      1
/home/mathar/work/aips++/code/scimath/fortran/dfftpak.f:87: (continued):
  SUBROUTINE DRFTI1 (N, WA, IFAC)
      2
Argument #3 (named 'ifac') of 'drfti1' is one type at (2) but is some other type at (1) [info -f g7
/home/mathar/work/aips++/code/scimath/fortran/dfftpak.f: In subroutine 'drftf1':
/home/mathar/work/aips++/code/scimath/fortran/dfftpak.f:214: warning:
  CALL DRFTF1 (N, R, WSAVE, WSAVE(N+1), WSAVE(2*N+1))
...

```
  - `IonosphModelPIM` (opt)

```

/home/mathar/work/aips++/code/ionosphere/implement/Ionosphere/IonosphModelPIM.cc: In member function
ofile> casa::IonosphModelPIM::getED(casa::LogicalVector&, const casa::SlantSet&, const casa::Vector
or<unsigned int>&)' :
/home/mathar/work/aips++/code/ionosphere/implement/Ionosphere/IonosphModelPIM.cc:606: warning: pass
to 'casa::uInt casa::IonosphModelPIM::sizeF107(casa::Int, casa::Int)'
/home/mathar/work/aips++/code/ionosphere/implement/Ionosphere/IonosphModelPIM.cc:606: warning: pass
to 'casa::uInt casa::IonosphModelPIM::sizeF107(casa::Int, casa::Int)'
/home/mathar/work/aips++/code/ionosphere/implement/Ionosphere/IonosphModelPIM.cc:607: warning: pass
to 'casa::uInt casa::IonosphModelPIM::sizeAp(casa::Int, casa::Int)'
/home/mathar/work/aips++/code/ionosphere/implement/Ionosphere/IonosphModelPIM.cc:607: warning: pass
to 'casa::uInt casa::IonosphModelPIM::sizeAp(casa::Int, casa::Int)'
/home/mathar/work/aips++/code/ionosphere/implement/Ionosphere/IonosphModelPIM.cc:613: warning: pass
to 'void casa::IonosphModelPIM::readApF107(casa::Vector<double>&, casa::Vector<double>&, casa::Int
/home/mathar/work/aips++/code/ionosphere/implement/Ionosphere/IonosphModelPIM.cc:613: warning: pass
to 'void casa::IonosphModelPIM::readApF107(casa::Vector<double>&, casa::Vector<double>&, casa::Int

```
  - `WBSkyEquation` (opt)

```

/home/mathar/work/aips++/code/include/synthesis/MeasurementEquations/WBSkyEquation.h: In member fun
asa::WBSkyEquation::get(casa::VisBuffer&, const casa::ComponentList&)' :
/home/mathar/work/aips++/code/include/synthesis/MeasurementEquations/WBSkyEquation.h:52: warning: m
turning non-void
/home/mathar/work/aips++/code/include/synthesis/MeasurementComponents/WideBandFT.h: At global scope
/home/mathar/work/aips++/code/include/synthesis/MeasurementComponents/WideBandFT.h:229: error: defa
e 'casa::Int&' has type 'int'
make[3]: [/home/mathar/work/aips++/linux_gnu/tmp/synthesis/opt/WBSkyEquation.lock] Error 1 (ignored

```

Some linker problems are

- `/tmp/mathar/ccgA814N.o`: In function `'imager::makemodelfromsd(casa::String const&, casa::String const&)'`:

```

D0imager_mega.cc:(.text+0x1a8): undefined reference to 'casa::Imager::makemodelfromsd(casa::String
::String const&, casa::String&)'
/tmp/mathar/ccgA814N.o: In function 'imager::clone(casa::String const&, casa::String const&)' :
....

```
- A sub-problem is that scanning `build2.log` contains some 24 thousand lines, which ought to be reduced by removal of warnings about hidden virtual functions, non-virtual destructors, suggested parentheses, non-initialized variables, `lex` conflicts by some tweaking of `g++` options of the `-W` class. These warnings are helpful to the package developers, but not for the end user. This probably means removal of `-Woverloaded-virtual` for `C++STD` in `strw/makedefs`.

## X. CLEANUP

### A. Documentation

Some of the packages leave `html`, `pdf` and `gif` files in `$USERROOT/docs` which one might remove.

### B. idl executable

At that point the command

```
which idl
```

reveals that there may be an executable for a **CORBA** Interface Definition Language (IDL) in the `$PATH` which might take priority over an executable with the same name for the **CREASO** Interactive Data Language (IDL). The majority of astronomers wants to see the latter; in this case,

```
chmod -x 'which idl'
```

will effectively disable this intermediate installation product.

## Appendix A: Compiler errors casa-19-1641

Some of the problems shown in Sec. IX G still exist, others are new:

- Some of the files seem to be compiled in the wrong order, generating

```
depend: Generating dependencies for demo-MeasurementEquations...
  pSimulator.cc
pSimulator.cc:39:55: error: ../../../appsglish/apps/app_image/D0image.h: No such file or directory
pSimulator.cc:40:53: error: ../../../appsglish/apps/imager/D0imager.h: No such file or directory
pSimulator.cc:41:59: error: ../../../appsglish/apps/simulator/D0simulator.h: No such file or directory
  pSimulatorEnd.cc
pSimulatorEnd.cc:7:59: error: ../../../appsglish/apps/simulator/D0simulator.h: No such file or directory
/home/mathar/work/aips++/code/demo/implement/MeasurementEquations/pSimulator.cc: In function 'int m
/home/mathar/work/aips++/code/demo/implement/MeasurementEquations/pSimulator.cc:174: error: no match
: image(casa::String&, casa::String&, casa::Index&, casa::Bool&, casa::Bool&)'
/home/mathar/work/aips++/code/demo/implement/MeasurementEquations/pSimulator.cc:233: error: no match
:: setimage(casa::Int&, casa::Int&, casa::Quantity&, casa::Quantity&, casa::String&, casa::Bool&, ca
casa::Quantity&, casa::String&, casa::Int&, casa::Int&, casa::Int&, casa::MRadialVelocity&, casa::
t>&, casa::Int&, casa::Int&, casa::Quantity&)'
```

I suspect this does no harm but have no further information on this.

- `ObjectController (opt)`  

```
/home/mathar/work/casa/code/tasking/implement/Tasking/ObjectController.cc: In member function 'casa
op()':
/home/mathar/work/casa/code/tasking/implement/Tasking/ObjectController.cc:560: warning: right-hand
/home/mathar/work/casa/code/tasking/implement/Tasking/ObjectController.cc: In member function 'casa
sGUI()':
/home/mathar/work/casa/code/tasking/implement/Tasking/ObjectController.cc:591: warning: right-hand
```
- `depend: Generating dependencies for display-QtAutoGui...`  

```
QtAutoGui.cc
QtAutoGui.cc:34:26: error: QtAutoGui.qo.h: No such file or directory
QtAutoGui.cc:35:25: error: QtXmlRecord.h: No such file or directory
QtAutoGui.cc:36:27: error: QtGuiEntry.qo.h: No such file or directory
QtAutoGui.cc:37:22: error: QtLayout.h: No such file or directory
  QtAutoGui.moc.cc
```

```

QtAutoGui.qrc.cc
QtGuiEntry.cc
QtGuiEntry.cc:30:27: error: QtGuiEntry.qo.h: No such file or directory
QtGuiEntry.cc:31:26: error: QtAutoGui.qo.h: No such file or directory
QtGuiEntry.moc.cc
QtLayout.cc
QtXmlRecord.cc
QtXmlRecord.cc:33:25: error: QtXmlRecord.h: No such file or directory

```

- There are other tcl related problems

```

XtkPixelCanvas (opt)
/home/mathar/work/aips++/code/include/display/Display/X11PixelCanvas.h: In static member function '
:HandleWidgetEvent(void*, XEvent*)':
/home/mathar/work/aips++/code/include/display/Display/X11PixelCanvas.h:652: error: invalid use of m
lay_' in static member function
/home/mathar/work/aips++/code/display/implement/Display/XtkPixelCanvas.cc:236: error: from this loc

```

- 
- [1] Sterrewacht helpdesk id 2003 and 2022, [http://www.strw.leidenuniv.nl/local/computers/it\\_local/casa.php](http://www.strw.leidenuniv.nl/local/computers/it_local/casa.php)  
[2] Sterrewacht helpdesk id 2124  
[3] Sterrewacht helpdesk id 1469  
[4] Thanks go to [A Schonemakers](#) and [T Foley](#) for pointing this out...