Graphics/Plotting packages for Public Analysis Tools

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Introduction

- We need plotting tools for Science Tools -U8
- Want to distribute these with Analysis tools to the astrophysical/physics community.
- All requirements for graphics package not yet defined. At SSC a group of us have tried to define additional requirements
  - Dave Davis, Jim Chiang, Cathie Meetre, Robin Corbet and yours truly.
- Augmented reqs. leads us to a few packages.

Requirements

- Basic (+augmented) requirements:
  - The package must be free and we must be allowed to distribute it with our analysis tools.
  - Must be able to run on Windows, Linux, and Solaris.
  - Must be able to make scatter , line, and contour plots, and 3D plots. (Not sure we need 3D, but nice to have).
  - Must have a programmable interface to C++, Java, or a high level scripting language.
  - Must appear to have a life longer than 1 year and appear to be supported by some institution
  - Must not depend on many libraries in some complicated way (that would make it a nightmare to install.)
  - Must make graphs of publication quality.

Requirements (Continued)

- The program can be made to use custom created widgets. At a minimum this means a low-level interface to the API.
- Must be able to display, overlay, and possibly rotate images.
- Must output graphics in some format that a browser can read.

Table made of free packages

- Widgets – Is the package capable of making custom widgets?
- Plottype - Plots all of the following: histograms, scatter, countour, 3D?
- Image Man - Does Image manipulation: overlays, rotation, rescaling of images?
- Pkg Type – Is The package a library (L), an analysis environment (E), i.e., need to enter commands
- in its own defined macros, or both (B)
- API – What is a program interface for our macros? What language (F=fortran, C=C or C++, L=command line, or O=other)
- Platforms - runs on Linux, Windows, Solaris?
- Life - Is it supported? Is it likely to still be supported after 2006?
- Dep. - Does it NOT depend in a complicated way on other software pckgs/libs?
- Qual - Does it produce publication quality graphs?
- Out - Does it produce output that can be easily displayed in a browser?

Then

- Collected suggestions for 21 different packages
- Looked at packages only to determine if they met requirement or not - a real evaluation remains to be done.
- After applying all of the requirements (a bit lax on image manipulation)...

Packages Found

Package	Widgets	Plot Type	Image Man	Pkg Type	API	Plat forms	Life	Dep.	Qual	Out
Plotting tools										
HIPPOD RAW	Y?	Y-3D?	N?	B??	J	Y	Y?	Y	Y	Y
JAS	Y?	Y/no 3-D	N	B	J	Y	Y?	Y	Y	Y
ROOT	Y	Y	N?	B	C	Y	Y	Y	Y	Y
Plplot	Y?	Y	Y?	L	C,F	Y	Y?	Y	Y	Y
Image/ graphic										
VisAD	Y	Y	Y	L	C	Y	Y	Y	Y	?
VTK	Y	Y?	Y	L	C	Y	Y	Y	Y	?

bad

good

Conclusions

- Have made a search into plotting packages.
- Found some good candidates: Hippodraw, JAS, ROOT, PLplot, VisAD, VTK
- Please have a look at these yourselves.
- Please let me know if you have any good packages in mind that can meet these

good

bad

Packages Looked at so Far...

Package	Widgets	Plot Type	Image Man	Pkg Type	API	Platforms	Life	Dep.	Qual	Out
Plotting tools										
Dataplot	N?	Y	N	E	F	Y	Y	Y	Y	Y
Gnuplot	Y?	Y	N	B	C	Y	Y	Y?	Y?	Y
HIPPODRAW	Y?	Y	N?	B??	J	Y	Y?	Y	Y	Y
JAS	Y?	Y/no 3-D	N	B	J	Y	Y?	Y	Y	Y
PAW	?	Y	N	B	F	Y	Y	Y?	Y	
QDP	N	Y	Y?	E	F	Y-Win?	Y	Y?	Y	Y
ROOT	Y	Y	N?	B	C	Y	Y	Y	Y	Y
Plotting and Image										
ChIPs	N	Y	Y	E	O=s-lang	N	Y	Y?	Y	Y
ESO-MIDAS	N?	Y	Y	E	L,F, C	N	Y	Y	Y	Y
NCAR_graohics	N?	Y	Y	B	C,F	Cyg Win?	Y	Y	Y	Y
Pdl	Y	Y	Y	B	O= Perl	Y?	Y	Y?	Y	Y
Pgplot		Y	Y?	L	C,F	N Win?	Y	Y	Y	Y
Plplot		Y	Y?	L	C,F, O= Tcl	Y	Y?	Y	Y	Y
Image/graphic tools										
AstroMD	Y	N	Y	B	C	Y	N?	Y?	Y	Y
Ds9	N - Tcl	N	Y	E	O= XPA	N-Sol	Y	Y	Y	Y
FOX	Y	N	Y	L	C	Y	Y	Y	?	?
Fv/ POW	?	Y/no 3-D	Y	B	O= Tcl	Y	Y	Y?	Y	Y
Qt	Y	N	Y	L	C	Y	Y	Y	Y?	?
VisAD	Y	Y	Y	L	C	Y	Y	Y	Y	?
VTK	Y	Y?	Y	L	C	Y	Y	Y	Y	?
ximage		N	Y	E	L	N (Win)	Y	Y	Y?	?

Links

- Line Plot based
- Dataplot
  - http://www.itl.nist.gov/div898/software/dataplot/
- gnuplot
  - http://www.gnuplot.info/
  - Note there is a Qt front end for GNUplot:
  - http://www.flash.net/~dmishee/xgfe/xgfe.html
  - http://sourceforge.net/projects/gnuplot/
- hippodraw
  - http://www.slac.stanford.edu/grp/ek/hippo/
- JAS - Java Analysis Studio
  - http://www-sldnt.slac.stanford.edu/jas
- PAW - Physics Analysis Workstation?
  - http://wwwinfo.cern.ch/asd/paw/
- QDP
  - http://heasarc.gsfc.nasa.gov/docs/software/ftools/others/qdp/node3.html (front end for PGPLOT)
- ROOT - ROOT Analysis package -
  - http://root.cern.ch

Links (2)

- Both Line Plot and Image manipulation

- ChiPS Chandra Plotting and Image Manipulation Tool
  - http://cxc.harvard.edu/ciao/download/doc/chips_html_manual/index.html
- ESO-MIDAS
  - http://www.eso.org/projects/esomidas/
- NCAR_Graphics
  - http://ngwww.ucar.edu/ng4.2/
- PDL - The PERL data Language
  - http://pdl.perl.org/
- PGPLOT
  - http://www.astro.caltech.edu/~tjp/pgplot/
- Plplot
  - http://plplot.sourceforge.net/

Links (3)

- Image Manipulation programs

- AstroMD - Multi Dimensional visualization and analysis toolkit for astrophysics
  - http://www.cineca.it/astromd/
- ds9 - Astronomical Data Visualization Application
  - http://hea-www.harvard.edu/RD/ds9/
- FOX
  - http://www.fox-toolkit.org
- fv/POW - FITS viewer
  - http://heasarc.gsfc.nasa.gov/docs/software/ftools/fv/
- Qt
  - http://www.trolltech.com
- VISAD
  - http://www.ssec.wisc.edu/~billh/visad.html
- VTK
  - http://public.kitware.com/VTK
- ximage
  - http://heasarc.gsfc.nasa.gov/docs/xanadu/ximage/ximage.html

Other links

- Not listed in table:

- SAL - Scientific Data Processing & Visualization - Software Packages
  - http://sal.kachinatech.com/D/1/index.shtml
- (contains links to many packages)