TOPCAT Plotting from STILTS
API and Command Line
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Introduction
TOPCAT is a desktop GUI application for analysis of tabular data, particularly source catalogues. Among other capabilities it provides high-performance interactive visualisation for large (and small) datasets. The plotting capabilities are focussed on representations of point clouds in two or three dimensions, with special attention to large (many rows) and high-dimensional (many columns) datasets. Many options are available. The visualisation is supported by a custom Java plotting library. This library is now bundled and documented as part of the STILTS package (v3.0) for use outside of TOPCAT. All TOPCAT’s plotting capabilities can be used.

This poster describes how you can use the library to generate plots from your own Java application code, or from the STILTS command-line interface.

STILTS Invocation
The STILTS package provides access to TOPCAT functions from the command line or a Jython front end. New commands plot2plane, plot2sky, plot2cube etc produce interactive plots on the screen or bitmapped/vector output files, also incorporating STILTS’s sophisticated pipeline processing options. Animations can also be generated.

API Invocation
There are two ways to configure a plot: the low-level API or key-value pairs.

Low-Level API
Setting up a plot with the low-level API is fairly complex, but it provides compile-time checking. Full javadocs are provided.

Key-Value API
Only a small number (~4) of values must be supplied to draw a simple scatter plot with default settings, but many more (~100) parameters are available for complex plots or fine tuning.

Options can always be set with string values, facilitating command-line and inter-process control. Alternatively, from the API values can be given as typed Java Objects for convenience and extensibility.

Configuration keys are comprehensively documented in the STILTS user document, but are also self-documenting objects, with methods to return user documentation and GUI components. Application code can either use hard-coded configuration keys, or build its own graphical/text UI by interrogating the plotting API (TOPCAT and STILTS do the latter).

Data Input
Plot data is supplied as a StarTable object. This may be a file read from disk in one of STILTS’s supported formats (FITS, VOTable, CSV, ...) or a custom iterable over user-supplied data rows. The data may be static or may change with time for an animated plot.

Graphs Output
Plots can produce a live resizable and interactive graphics window (JComponent) posted to the screen or under control of a host application. This supports interactive user navigation in 2 dimensions pan and isotropic or anisotropic zoom, in 3 dimensions rotation, pan, isotropic or anisotropic zoom, and panning.

Alternatively, graphics can be exported to bitmapped (PNG, GIF, JPEG) or plots output file (bitmapped or vector).

Further Information
Downloads and full documentation:
TOPCAT: http://www.starlink.ac.uk/topcat/
STILTS: http://www.starlink.ac.uk/stilts/
Expect enhancements in future releases. STILTS plotting is working but still somewhat experimental. Email m.b.taylor@bristol.ac.uk for assistance!