Metview developments

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Abstract

Metview is a software package to access, visualise, and manipulate meteorological data on Unix workstations, developed at ECMWF in collaboration with INPE (Brazil) and Météo-France. Metview is based on ECMWF standard software packages - MARS for accessing data, MAGICS for visualising, and Emoslib for data coding (GRIB and BUFR). Also, Metview comes with a powerful, meteorologically oriented macro language, well suited for the most complex calculations with meteorological data. In this text - and slides that follow - we describe some recent Metview developments, as seen by one imaginary Metview user. Let me introduce him, we shall call him 'Immu', short for 'Imaginary Male [1] Metview User'.

New modules

There are two new modules that Immu likes a lot. The first one is an application to convert a GRIB data file into a geopoints file (geopoints is a Metview custom ASCII format for point data such as observations). Immu likes this application because sometimes he needs to work with GRIB data outside Metview. He has no time to write a Fortran program to decode GRIB messages, but now Immu can easily read any geopoints file, reformat it, and input the reformatted data into other applications.

Immu also likes the new Trajectory model. He still remembers all the tricky manual steps required to visualise trajectories with the old Metview Trajectory model. The new Trajectory model is a fully integrated Metview application, with two new icons to run it. Immu uses the first icon to define trajectories (max 12 trajectories in one run). Then Immu executes the second icon – a macro with a User Interface – to define trajectory visualisation, and drops the first icon into Macro User Interface. After a while trajectories are plotted on his screen.

Help connections

In Metview 'Everything is an icon'. Some of the icons contain lots of different parameters and sometimes Immu gets puzzled by which parameters and what values to use. In such cases he presses the 'Question Mark' button available in the upper right corner of all Metview icon editors. This button opens the corresponding web help page in Immu's web browser.

New geographical projections

In addition to older projections we have introduced geographical Aitoff and Lambert projections, and a special Ocean Cross Section projection for oceanographic data. Immu likes the simplicity and beauty of the new Aitoff projection and he is planning to use Aitoff projection plots in his next paper.

Macro editor(s)

Metview comes with a simple built-in Macro editor. Because the built-in editor is quite restricted, it has a button that allows users to swap the built-in editor to the editor of their own choice. If Immu wants to do some serious editing he presses this button and Metview switches his macro source automatically to Emacs – his favourite editor (any text editor could be used here). We have started working with NEdit (a public domain editor available for many platforms) to customise NEdit for better Metview macro editing. So far we have added macro syntax highlighting. Currently we are working with several new issues:

Macro editor – Function listing

Immu is writing a new macro. He remembers that a certain macro function exists but does not remember the name. With the new functionality feature all available Metview macro function names - with a short description - can be easily viewed in a pop-up window. Immu finds easily the function he was looking for.

Macro editor – Call tips

Immu now knows the name of the function but he is not sure about its parameters - how many, what type, and in which order. With the second new functionality feature Immu can request a more detailed function description.

[1] Immu could as well be female. Here we have chosen male because of the shorter pronoun 'he'

This time the pop-up window will show all parameters and their types, plus a longer description on how the function works.

Macro editor – Code Templates

Immu now needs to add a small piece of code – a for-loop – but because he does programming in Fortran, C/C^{++}, Java, Perl, Python, plus several Unix shells, he does not remember the exact Macro for-loop syntax. With the third new functionality feature Immu can request a list of code templates, select a for-loop, and a for-loop code snippet is inserted into the NEdit window. Now Immu can easily fill in the missing parts.

Common macro library

Immu feels that writing macros has become much easier. But why write a certain macro if somebody else has already written a similar one. What Immu is missing is a Common Metview Macro Library, which users like Immu could browse and use as a source for tested, working macros and macro functions.

Metview has always provided a functionality to share macros, but until now there have not been many macros to share. The situation is changing as we are starting to collect macros and build a Common Macro Library. This library will be of use also for users outside ECMWF, as it will be shipped as part of Metview Export version for users running their own local Metview installation.

Metview availability

If Immu has an ECMWF user id he can run Metview remotely on 'ecgate' server. If Immu works in a Member State meteorological institute, he can ask Metview to be installed locally in his own institute. Or - if Immu works outside ECMWF Member States community – he can buy Metview, install it, and run Metview locally.

Metview runs on Unix workstations, the most popular current platform being Linux (see the slide for tested platforms). Currently Metview has been installed in some 25 countries.

Future

Metview is a mature software package. We celebrated Metview's 10th birthday in December 2003. Currently we are working on the new macro editor, and on adapting Metview to the ever-changing environment – to new data formats, to new visualisation requirements, to new computing wishes. Soon, when the new MAGICS^{++} implementation becomes more mature, Metview visualisation modules will be rewritten to take advantage of this new technology.