



IDL / Matlab Interfaces

UKAEA – Fusion are a world leader in fusion technology and research. Apart from their own laboratory they also operate the JET facility for the European Fusion Development Agreement. JET is the largest fusion device in the world.

Business and IT challenge

Fusion research generates huge amounts of data, much of it stored in proprietary binary files. An Application Programming Interface (API) exists to allow users to access this data through code written in Fortran or C. However, many of the scientists at JET wanted to use more modern languages such as Matlab and IDL to examine the data. These higher-level languages have been designed from the outset to enable rapid development of applications which involve manipulating and visualizing large quantities of data.

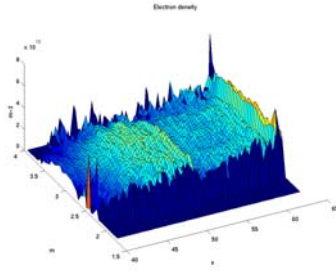
Being able to access the data in a straightforward manner from these languages would allow quicker analysis of data, evaluation of ideas and aid program development.

Delivering the vision

If designing a new system from scratch, the

natural solution would be to write out data in a format that could be read directly by Matlab or IDL. However, the vast quantity of data which already existed in the current format precluded the use of that approach. Instead, Tessella chose to use the capabilities of IDL and Matlab to call the existing API.

An interface was designed between the low-level file access routines and the higher-level programming languages, consisting of a series of functions wrapping the original API.



Accessing the data through IDL

These wrappers needed to deal with several issues including the checking of inputs, conversion of variables into the correct type and any transformations required. One particular problem involved the representation of character strings, which is different in each of IDL, Matlab, C and Fortran.

In order to speed up the process of creating the wrappers, an automatic generator was written that could do the bulk of the work automatically. The resulting wrappers allowed access to all the existing functionality in a manner which was guaranteed to be backwards-compatible. In addition, the power of Matlab and IDL meant that simplified versions of some API functions could be created.

Results and Benefits

Tessella's new routines allow the scientists to read, view, analyze and write data in a quick and simple manner. They have proved very popular and most of the new development of analysis and visualization code has been done using high-level languages.

Without these interfaces the scientists would have had to carry on their development in Fortran and C.

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