



Processed Pulse Files

Tessella's support for the JET project over the past 20 years is a prime example of our abilities to provide robust, flexible and maintainable data archives. The JET data archive has undergone a number of very significant platform migrations over this period and remains the world's most valuable resource for fusion research.

The JET Project in Oxfordshire is the world's leading centre for research into nuclear fusion.

For over 20 years, teams of scientists from all over Europe have been conducting fusion experiments with a view to generating a plentiful and environmentally safe energy source.

Business Problem

JET produces huge amounts of data - approximately 60,000 experimental pulses have been conducted resulting in many terabytes of data. These data are in a variety of different formats, all of which need to be stored and available for retrieval worldwide and around the clock. Between each pulse, a suite of programs analyze the data and provide key diagnostic information used in the next pulse.

Tessella Solution

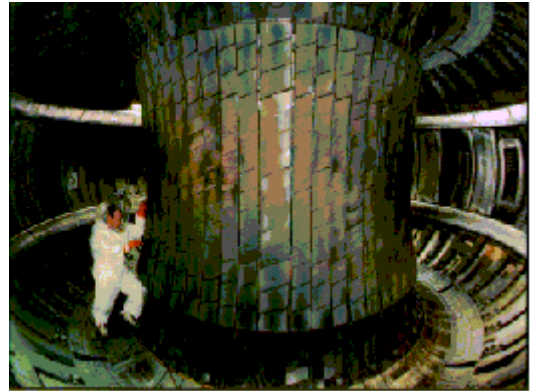
Tessella's involvement in JET has been continuous over the last 20 years. Originally, JET's computing facility was centred on an IBM mainframe with a disk farm and tape libraries. This system was used for storing data, and for running data-analysis software. Tessella were involved in supporting both the software and hardware of this system.

A basic processed data storage and retrieval system (known as the Processed Pulse File or PPF system) was developed by JET in 1983. To cope with increased data volumes and numbers of users, Tessella consultants completely rewrote the system in 1986. They continued to support administer and enhance this system, until the IBM was replaced by a Unix system in 2001.

During those 15 years, the system was continually upgraded to accommodate the ever increasing volume and complexity of the data stored, and to permit access to clients running on NT, Solaris, AIX and Linux platforms.

In 2001, when the IBM was replaced by Unix and Windows NT systems, a new PPF system was developed. Tessella staff managed the project and much of the work was undertaken by Tessella consultants. The new system was designed such that it was modular and did not rely on proprietary technologies. The original IBM-specific data files (some 2.5 million of them) were converted to a platform-independent format and transferred to a Solaris data-server. Validation of data during conversion was an essential part of this process. Users have not been given direct access to the files themselves but instead, via a directory database serving as an index to the data files. This database is stored in a commercial Relational Database Management System. Use of these technologies ensures that the system can be easily maintained and upgraded to embrace newer technologies as they become appropriate. To ensure that the context of the data will never be lost, they are stored together with metadata describing the data.

Tessella have also been involved with the development of a remote data-access system allowing scientists to access JET data not only from within JET but also, using an Internet-based protocol, from other laboratories around the world.



The PPF stores data for pulses in the Torus

Results and Benefits

Data is now stored at JET such that any experimental data can be accessed conveniently within an average time of a few seconds. Furthermore, this data can now be accessed globally over the Internet.

The PPF system ensures that processed data stored today, 20 years ago or in the future will be available, easily accessible and in a platform independent format.

Thus, the new systems will greatly ease maintenance as well as ensure the integrity of the data into the future.

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