

Flux-View Data Processing Software

Customer

The Centre for Ecology and Hydrology (CEH) is the UK's leading research centre in terrestrial and freshwater environmental sciences.

Business Problem

CEH had developed a new field instrument, the Hydra 4, for measuring the turbulent fluxes of heat, water vapour and CO₂ from the land surface. The instrument records continuously at 20 Hz on to a memory card. It is typically installed in remote locations such as the Brazilian rainforest, and may be running unattended for several weeks. A two-week run generates approximately 0.5 Gb of data.

Raw data processing was carried out by expert scientists using a range of programs. This typically had several stages and a lengthy quality control process before a dataset could be released. CEH required a streamlined process to cope with an increasing volume of data.

The challenge for Tessella was to develop a data pipeline system for downloading, preliminary processing, quality control and archiving of field data.

Tessella Solution

Tessella developed the Flux-View system to allow an experienced user or project manager to set up data processing pipelines for specific instrumental setups. The pipelines consist of modules to read, process, quality control and archive the data. Several processing modules are strung together, for

example to carry out initial processing, then to apply corrections and quality control.

Following the initial pipeline setup, a relatively inexperienced user in the field can download and process data simply by selecting the correct instrumental setup, entering some metadata such as the height of the crop or vegetation, and starting the process. A visualization tool, also configurable by the project manager for a particular instrumental setup, allows the processed data to be quickly displayed as time series and XY scatter plots, providing feedback on the quality of the data and helping to point out any problems with the instrumentation.



Visual Basic 6.0 was chosen to develop the software, with a Microsoft Access database used to save the instrumental setups and to archive the processed data. By using Tessella, CEH has ensured that the code is written and documented to a very high standard, allowing CEH staff to easily modify the code base.

Benefits

The data processing software has increased the throughput of data analysis and ensured a backlog of data does not develop. The software has also enabled relatively unskilled operators to carry out the data processing.

In addition to the Hydra 4 system, CEH has a variety of similar systems for which it is desirable to use the same processing software. The modular design of the data pipeline described here makes that extension possible.

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