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Evaluation of RDBMS packages for use in astronomy

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Tabular datasets arise in many areas of astronomical data analysis, from raw data (such as photon event lists) to final results (such as source catalogs). The Starlink Catalog Access and Reporting package, SCAR, was originally developed to handle IRAS data and it has been the principal relational DBMS in the Starlink software collection for several years. But SCAR has many limitations and is VMS-specific, while Starlink is in transition from VMS to Unix. Rather than attempt a major re-write of SCAR for Unix, it seemed more sensible to see whether any existing database packages were suitable for general astronomical use. We first drew up a list of desirable properties for such a system and then used these criteria to evaluate a number of packages, both free ones and those commercially available. It is already clear that most commercial DBMS packages are not very well suited to our requirements, for example most cannot carry out efficiently even fairly basic operations such as joining two catalogs on an approximate match of celestial positons.

This paper reports the results of our evaluation exercise and notes the problems in using a standard DBMS package to process scientific data.

In parallel with this we have started to develop a simple database engine that can handle tabular data in a range of common formats including simple direct-access files (such as SCAR and Exosat DBMS tables) and FITS tables (both ASCII and binary). Details of this are also reported.