Objectivity Case History

Customer Information

Customer: Space Telescope

Status: (X) SOLD ( ) Prospect ( )Integrator
Industry: Science and Space exploration
Application Domain: Mapping
Status: In Production
Platform: Microsoft NT
Compiler: MSVC++ 5.0
Other Tools: Graphics imaging.

Buying Criteria

The customer was looking for a large scalable data storage solution to fulfill the role for the next Global Sky survey catalog or GSE II. Objectivity had influence in the High Energy Physics (HEP) market and this was instrumental in this decision. Robert Bruner who has since moved on to CalTech influenced the choice by prototyping a set of necessary routines in Objectivity. Gretchen Greene has enhanced Roberts Work into a set of standard API's that have been used internationally for storing and retrieving stellar data.

Why Objectivity

The STSCI (Space Telescope Institute) was created as an international body of scientists collaborating to understand and use the fantastic and never before obtainable images and spectral data from the Hubble Space Telescope (HST). Generations of astronomers could only dream of a telescope circling the earth free from light disturbances and peering some 10 million light years into space. The people and founders of the STSCI institute have realized a fantastic dream by merging satellite and new database technology to a virtual catalog of the starry sky.

The ultimate purpose of this application is to aid in the understanding of the process of finding another galaxy that can or has sustained life similar to ours. Never before has the whole sky been cataloged and digitized with such a powerful telescope. The end result will help scientists understand our planetary position in the universe as well as the movement of the stars and galaxies surrounding our planet.

With a simple data model and complex query demands, Objectivity has been an enabling technology to store, index and catalog large amounts of sky data. Astronomers and astrophysicists can retrieve and correlate the parts and pieces of the sky that have not been possible without painstaking work until now.

Using a relatively large NT Server and a networked RAID array for storing image data the Objectivity database is several Gigabytes. The current size of the federation is 500 Gigabytes and growing (loading). An expected full catalog size has been estimated at close to four terabytes contained in close to 32 K databases. Custom maps had to be built to navigate and handle such a large amount of databases. "Some tool response times with that many databases could use some improvement" sited one programmer.

The natural storage mechanisms matched with Objectivity's storage implementation. Each database stores a region of the sky. There can be many regions clustered to a plate. A plate is the actual film from the telescope cameras or high quality video images. Plates can hold millions of objects each. The object model is a simple name, location, brightness and a plate or picture number. One plate can consume many databases.

With the images of the sky stored outside of the database the purpose of the GSE II catalog is to fit the sky together using a triangular segmentation scheme. The triangular scheme maps to the images using complex computer algorithms to fit together the triangles into a never before seen continuous view of areas of the sky. In addition, these areas, plates and pictures of the same region in years past can be correlated to view areas of the sky that move faster or slower than others do. These and many more possibilities are exciting scientists like never before.

Basically a catalog of images with location and coordinate translators, the GSE II catalog stands as what is possible in astronomy today. Now as an icon of what can be done with the technology, what was once hailed as impossible is now in production.

The new GSE II catalog has quadrupled many times the original size and can no longer be distributed via CD ROM or other sources. The WEB has been instrumental in helping with the dissemination of this information by making it easier for scientists to take advantage of the images and new data.

The cross language support for both C++ and Java has enabled various tools and specialized query processes to be easily written and obtained from Objectivity.

With other bigger and more powerful telescopes proposed, the STSCI database is only a precursor of what is to come. As telescopes become more sophisticated the tools and databases will need to embrace this complexity for progress to continue. Objectivity has been a key enabling technology for this industry and has the capacity to embrace the complexity and scalability needed by future endeavors.

Contact Information

Objectivity Rep: Vince Ramotaur
Customer Contact: Gretchen Greene
Phone:
Email: