Collaborative Remote Visualization

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Introduction
In the last few years, scientists and researchers have given a great deal of attention to the area of remote visualization of scientific datasets within collaborative environments. Most current remote visualization tools allow multiple parties to view images from different locations, but pose problems with efficiency and user interactivity.

Approach
In order to partially address these shortcomings, we focused this project on improving the communication portion of the client-server rendering pipeline in a piece of remote visualization software implemented as an extension to SCIRun. Specifically, we experimented with multicasting of image data as a means to improve network bandwidth utilization and scalability.

Results
We found reliable multicasting to be unsuitable for streaming real-time image data because of its high data transfer time. With IP Multicast we achieved send times that were comparable to FTP send times. Packet loss was acceptably low given that we expect some loss in an interactive remote imaging application.

Conclusion
We have found promising ways of using multicasting in order to achieve scalability, which allows better communication and flexibility with data exploration. We have also illustrated the collaborative potential of our remote visualization application through testing in a collaborative session between a standard Access Grid node and a Personal Interface Grid.